BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
Master of Computer Application Course Structure under CBCS
(For the candidates admitted from the academic year 2016-2017 onwards)

Sem ester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Programming in C++	5	4	3	25	75	100
	Core Course – II (CC)	Operating Systems	5	4	3	25	75	100
	Core Course – III (CC)	Computer Organization & Architecture	4	4	3	25	75	100
	Core Course – IV (CC)	Data Structures and Algorithms	4	4	3	25	75	100
	Core Course – V (CC)	OOAD & UML	4	4	3	25	75	100
	Core Course – VI (CC)	C++ Programming Lab	4	2	3	40	60	100
	Core Course – VII (CC)	Shell Programming Lab	4	2	3	40	60	100
		Total	**30**	**24**	**-**	**-**	**-**	**700**
II	Core Course – VIII (CC)	Programming in Java	5	4	3	25	75	100
	Core Course – IX (CC)	Database Systems	5	4	3	25	75	100
	Core Course – X (CC)	Software Engineering	4	4	3	25	75	100
	Core Course – XI (CC)	Computer Graphics	4	4	3	25	75	100
	Core Course – XII (CC)	Java Programming Lab	4	2	3	40	60	100
	Core Course – XIII (CC)	Database Systems Lab	4	2	3	40	60	100
	Elective – I(EC)		4	4	3	25	75	100
		Total	**30**	**24**	**-**	**-**	**-**	**700**
III	Core Course –XIV(CC)	Distributed Technologies	5	4	3	25	75	100
	Core Course –XV(CC)	Accounting and Financial Management	5	4	3	25	75	100
	Core Course – XVI(CC)	Discrete Mathematics	4	4	3	25	75	100
	Core Course – XVII(CC)	Enterprise Resource Planning	4	4	3	25	75	100
	Core Course – XVIII(CC)	Distributed Technologies Lab	4	2	3	40	60	100
	Core Course –XIX(CC)	Accounting and Financial Management Lab	4	2	3	40	60	100
	Elective Course II(EC)		4	4	3	25	75	100
	Professional Skills – I Practical / Hands-on		-	2		100	N/A	100
		Total	**30**	**26**	**-**	**-**	**-**	**800**

IV	Core Course – XX(CC)	Web Technologies.	4	4	3	25	75	100
	Core Course – XXI(CC)	Data Mining & Warehousing	4	4	3	25	75	100
	Core Course – XXII(CC)	Organizational Dynamics	4	4	3	25	75	100
	Core Course – XXIII(CC)	Probability & Statistics	4	4	3	25	75	100
	Core Course – XXIV(CC)	Web Technologies Lab	4	2	3	40	60	100
	Core Course – XXV(CC)	Data Mining Lab	4	2	3	40	60	100
	Elective Course III (EC)		4	4	3	25	75	100
	Managerial Skills	Managerial Skills	2	2	3	25	75	100
		Total	**30**	**26**	**-**	**-**	**-**	**800**
V	Core Course – XXVI(CC)	Computer Networks	5	4	3	25	75	100
	Core Course – XXVII(CC)	Smart Devices Programming	5	4	3	25	75	100
	Core Course –XXVIII(CC)	Optimization Techniques	4	4	3	25	75	100
	Core Course – XXIX(CC)	Smart Devices Programming Lab	4	2	3	40	60	100
	Core Course – XXX(CC)	Open Source Lab	4	2	3	40	60	100
	Elective IV (EC)		4	4	3	25	75	100
	Elective V (EC)		4	4	3	25	75	100
		Total	**30**	**24**	**-**	**-**	**-**	**700**
VI	Major Project	Dissertation=100 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	-	16	-	-	-	100
Total			**-**	**16**	**-**	**-**	**-**	**100**
Grand Total			**150**	**140**	**-**	**-**	**-**	**3800**

List of Elective Courses (For 2016 – 2017) :

Elective I		**Elective II**	
1	e-Commerce	1	Artificial Intelligence
2	Software Project Management	2	Computer Simulation and Modelling
3	Pervasive Computing	3	Mobile Communication
Elective III		**Elective IV**	
1	Parallel Processing	1	Big Data Analytics
2	Cloud Computing	2	Network Security
3	Soft Computing	3	Digital Image Processing
Elective V			
1	Compiler Design		
2	Human Computer Interaction		
3	Medical Informatics		

Recommended Credits Distribution: (Total should not be less than 140 Credits)

Course Type	Course	Credits	Total Credits
Core (Theory)	20	4	80
Core (Practical)	10	2	20
Core (Major Project)	1	16	16
Elective	5	4	20
Professional Skill	1	2	2
Skill Development	1	2	2
Total	**38**		**140**

The Internal and External Marks to be awarded for any **Practical Course** is **40 & 60** respectively and for **Theory course**, it is **25 & 75** respectively for MCA, M.Sc (CS), M.Sc (IT) & PGDCA.
Professional Skill Course:

This course is intended to make the students to learn Hardware Assembly, Trouble Shooting a Computer System and Peripherals, configuration Management, System Maintenance, Installation of Software Tools & Packages, Network Fundamentals, System Administration, etc.,

- No Theory Examination will be conducted.
- Students must learn the required things by themselves.
- The College may arrange for a workshop or invite Experts from the Industry to demonstrate the essential methods, tools and techniques to the students.
- An internal assessment of the knowledge acquired by the students should be evaluated at the End of the Semester and marks (Max: 100) awarded to each student to be communicated to the University.

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSEI

PROGRAMMING IN C++

Objective :

To impart Object Oriented Programming skills using C++

Unit I

What is Object Oriented Programming? – C++ Console I/O- C++ comments- Classes: Some difference between C and C++ - Introducing Function Overloading - Constructor and Destructor Functions- Constructors take parameters- Introducing Inheritance – Object Pointers – In line Functions – Automatic in lining.

Unit II

Assigning Objects – Passing Object to Functions – Returning Object from Functions- An Introduction to friend functions- Arrays of objects – Using Pointers to Objects – Using new & delete – More about new & delete – references – Passing references to objects - Returning references- Independent References and restrictions.

Unit III

Overloading Constructor Functions- Creating and Using a Copy constructor- Using default arguments- Overloading and ambiguity – Finding the address of an overload function- the basics of operator overloading- overloading binary operators-overloading the relational and logical operators- overloading a Unary operator – using friend operator functions- a closer at the assignment operator- overloading the subscript() operator.

Unit IV

Base class access control –using protected members- Constructors, destructors and inheritance - multiple inheritance- virtual bas classes- Some C++ I/O basics- formatted I/O using width(), precision () and fill() – using I/O manipulators- Creating your own inserters- creating extractors.

Unit V

Creating your own manipulators- File I/O basics- unformatted, binary I/O- more unformatted I/O functions- random access- checking the I/O status- customized I/O and files- Pointers and derived classes- Introduction to virtual functions- more about virtual functions- applying polymorphism- Exception handling.

Text Book(s)

Herbert Schildt, “Teach Yourself C++”, III edition, Tata McGraw Hill 5th Reprint 2000.

Reference(s)

1. Bjarne Stroustrup, The C++ Programming Language, Addison wesley,2013
2. E. Balagurusamy “Object Oriented Programming with C++ “, TMH New Delhi,2013
2. Robert Lafore, “Object Oriented Programming in Turbo C++”, Galgotia 2001

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CORE COURSE II

OPERATING SYSTEMS

Objective :

To present fundamental aspects of various managements in an operating

Unit I

Operating Systems Objectives and functions – Operating System and User /Computer Interface, Operating System as a Resource Manager: Evaluation of Operating Systems – Serial Processing, Sample Batch Systems, Time Sharing Systems.

Unit II

Process Description, Process Control – Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion – Hardware support, Mutual Messages – Deadlock – Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

Unit III

Memory Management – Memory Management Requirements – Fixed Partitioning, Placement Algorithm, Relocation in a Paging System – Sample Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set Management.

Unit IV

Scheduling – Types of Scheduling, scheduling Algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O function, Logical structure of the I/O function, I/O Buffering, Disk Cache.

Unit V

File Management – Files, File Management Systems, File System Architecture, Functions of File Management File Directories – File Sharing – Secondary Storage Management – File allocation.

Text Books

1. William Stallings, "Operating Systems", Second edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, "Operating Systems-A Design Oriented Approach", IRWIN Publications Chicago, 1997.

References

1. Ann McIver McHoes and Ida M. Flynn, Understanding Operating Systems, Sixth Edition, Course Technology, Cengage Learningm2011
2. Ann McHoes, Ida M. Flynn,**Understanding Operating Systems, Seventh Edition,** Cengage Learning, 2013.
3. Deital H.M. "An Introduction to Operating Systems", Addison Wesley Publishing
4. Silberchatz A., Peterson J.L., Galvan P. "Operating System Concepts", Third Edition, Addison Wesley Publishing Co., 1992.

CORE COURSE III

COMPUTER ORGANIZATION AND ARCHITECTURE

Objective:

To understand the principles of digital computer logic circuits and their design. To understand the working of a central processing unit architecture of a computer

Unit I

Number Systems – Decimal, Binary, Octal and Hexadecimal Systems – Conversion from one system to another – Binary Addition, Subtraction, Multiplication and Division – Binary Codes– 8421, 2421, Excess-3, Gray, BCD – Alphanumeric Codes – Error Detection Codes.

Unit II

Basic Logic Gates – Universal Logic – Boolean Laws and Theorems – Boolean Expressions – Sum of Products – Product of Sums – Simplification of Boolean Expressions –Karnaugh Map Method (up to 4 Variables) – Implementation of Boolean Expressions using GateNetworks.

Unit III

Combinational Circuits – Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Building Blocks – Half and Full Adders – Half and Full Subtractors – Parallel adder –2's Complement Adder – Subtractor – BCD Adder.

Unit IV

Sequential Circuits – Flip Flops – RS, Clocked RS, D, JK, T and Master-Slave Flip Flops –Shift Register – Counters – Asynchronous, MOD-n and Synchronous Counters – BCD Counter –Ring Counter.

Unit V

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer – CISC characteristics – RISC Characteristics.

Text Books:

1. Donald P. Leach, Albert Paul Malvino and GoutamSaha, *Digital Principles and Applications*, TataMcGraw Hill, Sixth Edition, Third Reprint, 2007.
   Unit:I : Chapter-5 Section (5.1-5.8)
   Unit:II : Chapter-2 Section (2.1-2.2), Chapter-3 Section (3.1, 3.2, 3.5, 3.7)
   Unit: III: Chapter-4 Section (4.1-4.3, 4.6), Chapter-6 Section (6.7, 6.8)
2. Thomas C. Bartee, *Digital Computer Fundamentals*, Tata McGraw-Hill, Sixth Edition, Twenty FifthReprint, 2006.
   Unit:III : Chapter-5 Section (5.1, 5.3, 5.10, 5.11)
   Unit:IV : Chapter-4 Section (4.1-4.9)
3. Morris Mano M, *Computer System Architecture*, Prentice Hall of India, Third Edition,2008.
   Unit: I: Chapter-3 Section (3.5-3.6)
   Unit: V: Chapter-8 Section (8.2-8.8)

Books for Reference:

1. Morris Mano. M, *Digital Logic and Computer Design*, Prentice Hall of India, 2008.
2. Linda Null, Julia Lobur, The Essentials of Computer Organization and Architecture, Fourth Edition2014

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CORE COURSE IV

DATA STRUCTURES AND ALGORITHMS

Objective:

To give a detailed knowledge on Data structures and to give an exposure in the development of algorithms related to data structures.

Unit I

Introduction to data structures, Records, Arrays, Stacks, Queues, Recursion, Linked list, Binary tree and traversing.

Unit II

Sorting and Searching Techniques: Introduction, Internal and External Sorting, Insertion, Selection, Merging, Radix, Quick sort, Heap sort and Bubble sort. Searching: Introduction, Sequential search, Binary search, Binary Tree search.

Unit III

Graphs and Their applications: Introduction, Graph Theory, Terminology, Representation of graphs, Tree & Binary tree, operations on graphs, shortest path Algorithms, Topological sorting.

Unit IV

Algorithms, Development of Algorithms, basic concepts, Structured Program Concepts, Top down development of algorithms, Principle of analyzing Algorithms, Algorithms design methods, Sub goals, Hill climbing.

Unit V

Algorithms Design Techniques: Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch & bound.

Text Books

1. Seymour Lipschitz "Data Structures, Tata McGraw-Hill
2. Ellis Horowitz & S. Sahni, Fundamentals of Data Structures, Galgotia Pub.

References

1. An Introduction to Data Structures and Algorithms, James A Store, Springer Science, 2012.
2. Data Structures and Algorithms made easy, Narasimha Karumanchi, CreateSpace Independent Publishing Platform, 2011.
3. Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI
4. Data structures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
5. Introduction to design and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem- TMH

CORE COURSE V

OOAD & UML

Objective:

To give a detailed knowledge on Structured approach to system construction, Various object oriented methodologies, Object oriented analysis, Object oriented design and UML examples

Unit I

Structured approach to system construction : SSADM/SADT - An overview of object oriented systems development & Life cycle

Unit II

Various object oriented methodologies – Introduction to UML

Unit III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

Unit IV

Object oriented design – Design axioms – Designing classes – Layering the software design :- data access layer, User interface layer, Control/business logic layer

Unit V

UML - Examples on :Behavioral models – Structural models – Architectural models from real world problems.

TEXT BOOK:

1. **D Jeya Mala, S Geetha,**Object Oriented Analysis and Design using UML, Mc Graw Hill Edition, 2013
2. **Bahrami Ali**, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
3.. **Booch Grady, Rumbaugh James, Jacobson Ivar**, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (Unit: -5 covered here).

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CORE COURSE VI

C++ Programming Lab
(Applied to Data Structures and Algorithms)

Objective :

To get hands on experience in developing Programs using C++ for Data Structures applications.

1. Implement Array Merging, sorting of array elements [Integer elements & character Elements]
2. Implement sorting of array of English words (in Dictionary order)
3. Implement Stack Data Structures and Operations on it (push, pop)
4. Implement Singly linked list Data structure and operations on it (insert, delete, print, navigate, search)
5. Implement sorting operation on a singly linked list data structure
6. Implement doubly linked list data structure and operations on it (insert, delete, print, navigate, search)
7. Implement Sorting operation on a doubly linked Data Structure
8. Implement Queue Data Structure and operations on it
9. Implement table Data structure and operations on it (insert, delete, print, navigate, search)
10. Implement binary tree data structure and operations on it (node insertion, deletion)
11. Implement pre-order, in-order, post-order traversal of binary tree and print node contents

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CORE COURSE VII

SHELL PROGRAMMING LAB

Objective:

To get hands on experience in developing shell Programs.

Write Shell Programs to

1. Find whether number given is even or odd
2. Reverse the digits of the integer
2. Search for a given number from the list of numbers provided using binary search method
3. Concatenate two strings and find the length of the resultant string
4. Find the position of substring in given string
5. Find the gcd for the 2 given numbers
6. Check whether a given string is palindrome or not.
7. Count number of words, characters, white spaces and special symbols in a given text
8. Sum of all the digits in a given 5 digit number
9. Average of numbers given at command line
10. Accept a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
11. Delete all lines containing a specified word in one or more files supplied as arguments to it.
12. Display a list of all files in the current directory to which the user has read, write and execute permissions.
13. Receive any number of file names as its arguments, checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
14. Receive any number of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

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CORE COURSE VIII
PROGRAMMING IN JAVA

Objective :

To Impart sound knowledge in Object Oriented Programming skills in JAVA

UNIT I

An overview of Java – Java Buzzwords- Data Types, Variables and Arrays - Operators – Control Statements- Introducing Classes: Class Fundamentals – Declaring Objects – IntroducingMethods – Constructors – The this keyword – Garbage Collection – Overloading Methods – Callby value, Call by reference – Recursion– Understanding static – final – Nested and Innerclasses.

UNIT II

Inheritance: Inheritance Basics – Using super – Method overriding –Dynamic Method Dispatch- Using Abstract Classes - Final with Inheritance- Object class. Packages and Interfaces:Declaring Packages – #Access Protection# – Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types – try, catch – throw – throws – finally –multiple catch and nested try statements- Creating User-defined Exception classes.

UNIT III

Multithreaded Programming: The Java Thread Model – Creating a Thread –Creating Multiple Threads-Thread Priorities- Synchronization – #Inter-thread communication. String Handling# –The Collection Interfaces and Collection Classes: List,Set,Map,Enumeration and Iterator interfaces-ArrayList, LinkedList, Vector, Stack,Properties,HashTable, StringTokenizer, and Date classes.

UNIT IV

Files and IO Streams: File – The Byte Streams: InputStream, Output Stream, FileInputStream,FileOutputStream, PipedInputStream and PrintStream – The Character Streams:Reader, Writer. FileReader and FileWriter – Serialization. Networking- Networking classes andinterfaces: InetAddress class -TCP/IP Client and Server sockets–Datagrams – URL and URLConnection classes.

UNIT V

Introduction to Applet class- Applet Architecture- The HTML APPLET tag – Passing parameters to Applets – Event handling: The Delegation Event Model, Event Classes, Event Listener Interfaces - Working with Graphics, Color and Font classes - Understanding Layout managers- Swing Component classes: JApplet, JFrame and JDialog - Text Fields, Buttons, Combo boxes, List ,Tabbled and Scroll Panes.Understanding Layout managers.

Text Book:

1. Herbert Schildt, *The Complete Reference Java 2*, Fifth Edition, TMH Education Pvt. Ltd.,2009.
   UNIT I : Chapter 1 to 7
   UNIT II : Chapter 8 to 10
   UNIT III : Chapter 11,13, and 15, 16
   UNIT IV : Chapter 17 and 18
   UNIT V : Chapter 19 to 22, and 26

Books for Reference:

1. Herbert Schildt with Joe O' Neil, *Java – Programmer's Reference*, TMH, 2000.

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CORE COURSE IX

DATABASE SYSTEMS

Objective:

To impart knowledge about relational database and distributed database.

Unit I

Introduction – purpose of database systems – Data Abstraction – Data models – Instances and schemes – Data independence – DDL – DML – Database users – ER model – Entity sets – Keys – ER diagram – relational model – Structure – Relations Algebra – Relational Calculus – Views.

Unit II

SQL – QBE – QUEL – Basic structure – various Operations – Relational database design problems in the relational data base design – Normalisation – normalization using functional, Multi value and join dependencies.

Unit III

File and system structure – overall system structure – file Organization – data dictionary – Indexing and hashing – basic concept B and B+ tree indices – Static and Dynamic hash functions.

Unit IV

Recovery and atomicity – failures classification and types – Transaction model and Log based recovery, schedules – serial and non-serial types – Serialization of schedules and views – testing for seriability – lock based protocols – time based protocols – validation techniques – multiple Granularity – multiversion schemes – insert and delete Operations.

Unit V

Distributed data bases – structure of distributed databases – Trade offs in Distributing the database – Transparency and autonomy – distributed query processing – recovery in distributed systems – commit protocols – security and integrity violations – authorization and views – security specification – encryption – Statistical databases.

Text Book(s):

Henry F.Korth, and Abraham Silberschatz,,Sudarshan "Database system Concepts", McGraw Hill, 4th Edition, 2002

References:

1. Hector Garcia Molina, Jeffrey D Ullman, JenniferWisdom,Database Systems: The Complete Book., Pearson Education 2013.
2. Pipin C. Desai, "An Introduction to data base systems", Galgotia Publications Private Limited, 1991.
3. C.J. Date, "An Introduction to Database Systems", 3rd Edition, Addison Wesley 1983.

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CORE COURSE X

SOFTWARE ENGINEERING

Objective:

To provide knowledge of the various phases of software engineering process.

Unit 1 SOFTWARE PROCESS

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

Unit 2 SOFTWARE REQUIREMENTS

Functional and non-functional – user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping –S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

Unit 3 DESIGN CONCEPTS AND PRINCIPLES

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems – Real time software design – system design – real time executives – data acquisition system – monitoring and control system. SCM – Need for SCM–Version control – Introduction to SCM process – Software configuration items.

Unit 4 TESTING

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues – unit testing – integration testing – validation testing – system testing and debugging.

Unit 5 SOFTWARE PROJECT MANAGEMENT

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking – Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

Text Books:

1. "Software engineering- A practitioner's Approach", Roger S. Pressman, McGraw-Hill International Edition, 5th edition, 2001.
2. "Software engineering", Ian Sommerville, Pearson education Asia, 6th edition, 2000.
3. "Software Engineering Concepts ", Richard E. Fairley, McGraw-Hill edition, 2002.

Reference Books:

1. "Software Engineering –,Jibithesh Mishra, Ashok Mohanty Pearson Education,2011

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CORE COURSE XI

COMPUTER GRAPHICS

Objective:

To present concepts on basic graphical techniques, raster graphics, two dimensional and three dimensional graphics.

Unit I

A survey of computer graphics – Overview of Graphic systems- output primitive (Mathematical functions for creating graphic output) – setting attribute of Output primitives

Unit II

Two dimensional geometric transformations – Two dimensional viewing

Unit III

Graphic structures – Hierarchical modeling – Graphical user interfaces and interactive input methods

Unit IV

3D Concepts – 3D- object Representation – 3D Geometric and Modeling Transformations.

Unit V

Visible surface detection methods – Illumination models – Computer Animation

TEXT BOOK:

1. **Hearn Donald, Baker Paulin M.,** Computer graphics – C version**,** Second edition, Pearson education, 2006. (ISBN 81-7758-765-X)

REFERENCE BOOK:

1.Rajiv Chopra, Computer Graphics: A Practical Approach, Concepts, Principles, Case Studies, S Chand 2011.
2. **Newman William M., &Sproull Robert F**., Principles of interactive computer graphics, Second edition, Tata –McGraw Hill, 1 (ISBN 0-07-463293-0)
3. Fundamentals of Computer Graphics, Peter Shirley, Michael Ashikhmin, Steve Marschner, 2009

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CORE COURSE XII

JAVA PROGRAMMING LAB

Objective : To get hands on experience in developing Programs using Java applications.

1. Assume that a bank maintains 2 kinds of account for its customers' one called savings account and the other current account' The savings account provides compound interest and withdraw facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account falls below this level a service charge is imposed. Create a class Account that stores customers name' account number and type of account. From this derive the classescurr-acct and sav-acct to make them more specific to their requirements. Introduce the necessary methods in order to achieve the following tasks:

   a. Accept deposit form a customer and update the balance.
   b. Display any deposit interest
   c. Compute and deposit interest.
   d. Permit withdrawal and update the balance.
   e. Check for the minimum balance' impose penalty' if necessary and update the balance.

2. Use constructors and methods to initialize the class members.
   Write a program that accepts a shopping list of five items from the command line and stores them in a vector and accomplish the following:

   a. To delete an item in the list.
   b. To add an item at a specified location in the list.
   c. To add an item at the end of the list.
   d. To print the contents of the vector.

3. Implementation of the concept of multiple inheritance using interfaces and design a package to contain the class students and another package to contain the interfaces sports.

4. Develop a simple real-life application program to illustrate the use of multithreads.

5. Create a try block that is likely to generate three types of exception and then incorporate necessary catch blocks to catch and handle them appropriately.

6. Write a Java applet' which will create the layout below:
   FORMAT
   Enter your Name:
   Enter your Age:
   Select City: *Delhi *Madras
   Select SIW: *Oracle *Visual Basic *Java
   OK CANCEL
   Handle the following simple validations.
   The name entered should be less than 25 characters wide.
   Age entered should be done as the user exits the fields as well as when OK button is pressed. Hint use the Boolean action (Event evt' object arg).

7. Write an Applet which will play two sound notes in a sequence continuously use the play ( ) methods available in the applet class and the methods in the Audio clip interface.

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CORE COURSE XIII

DATABASE SYSTEMS LAB

Objective: To get hands on experience in developing queries and designing forms using RDBMS software.

1.SQL – Data Definition Language
Table Creation with Constraints
Table Alteration (Add Column, Modify size and data type, Drop Column)
Drop Table

2. SQL – Data Manipulation Language
Data Insertion
Data Updation
Data Deletion
Ordering Tuples
Tuple Variable
Pattern Matching
Build-in Function
Set Operations
Join Operations
Nested Subqueries
Views

3. PL/SQL Procedure
3.1 Reverse the string.
3.2 Delete any record and count it.
3.3 Student Mark Sheet Preparation
3.4 Pay Roll preparation.
3.5 Excess record stored in separate files.
3.5 Split a table in to two tables.
3.6 Joining two tables in to one table.
3.7 Find factorial number using recursive function.
3.8 Find Fibonacci series using recursive function.

4. SQL Forms
Student Mark System
Pay Roll Preparation
Income Tax Calculation
Train Reservation System

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ELECTIVE COURSE I:1

e-Commerce

Objective:

To acquire the knowledge in Electronic Commerce, Electronic Payment systems, Security systems , Online Advertising and Marketing.

Unit I

Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the High way – Network Access Equipment – Global information Distribution Networks.

Unit II

The Internet as a Network Infrastructure: The Internet Terminology – NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization :Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Internet Connectivity options.

Unit III

Electronic Commerce and the World Wide Web: Architectural Framework for ElectronicCommerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web, Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – mercantile process model – mercantile models from the consumers perspective.

Unit IV

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues.

Unit V

Advertising and the Marketing on the Internet: The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer – Data Interface – Emerging Tools. On Demand Education and Digital Copyrights: Computer-based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets, Browsers and Software Agents.

Book for Study:

"Frontiers of Electronic Commerce", Ravikalakota& Andrew Whinston, Adison Wesley, 2000.

Book for Reference:

1. E-Commerce: An Introduction, Manzoor, Lambert Publications, 2010
2. "Electronic Commerce", Pete Loshin& Paul A.Murphy, Second edition, Jaico Publishing House, 2000.

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ELECTIVE COURSE I:2

SOFTWARE PROJECT MANAGEMENT

Objective:

To impart knowledge related to the various concepts, methods of Software Project Management using management process framework, management disciplines, and risk management techniques.

Unit I Basics of Software Project Management:

Introduction to Software-Introduction to Software Project Management

Unit II Software Project Initiation:

Software Project Evaluation- Contract Mangaement-Requirements Management

Unit III Software Project Planning:

Software Estimation Tools - Techniques and Models- Software Project Management Plan - Schedule Management-Cost Management

Unit IV Software Project Execution, Monitoring and Control:

Risk Management - Quality Management- Software Project Reviews

Unit V Project Closure and Manintenance:

Software Project Closure-Software Maintenance, Support and Implementation

Text Book:

1. "Software Project Management" - Subramanian Chandramouli, SaikatDutt - Pearson India Education Services Pvt. Ltd, 2015.
2. "Software Project Management" - Bob Hughes & Mike Cotterell – FourthEdition - 2008 - ISBN: 978 - 0 - 07 - 061985-2

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ELECTIVE COURSE I:3

PERVASIVE COMPUTING

Objective :

To understand about pervasive computing through pervasive devices and PDA.

Unit I

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

Unit II

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

Unit III

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

Unit IV

WAP and Beyond: Components of the WAP architecture – WAP infrastructure – WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

Unit V

PDA: Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

Text Book:

Pervasive Computing, Technology and Architecture of Mobile Internet Applications, JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006.

Reference Book

1. Pervasive Computing and Networking,Mohammad S. Obaidat, Mieso Denko, Isaac Woungang, Wiley 2011.
2. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

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CORE COURSE XIV

DISTRIBUTED TECHNOLOGIES

Objectives

To know the architectures of Distributed systems, to understand andcompare the technologies associated with J2EE and DOTNET.

Unit I

Client server architecture: 2-tier model - 3-tier model - n-tier model - J2EEarchitecture - DOTNET architecture - MVC architecture.

Unit II

Presentation services: Servlet - JSP - Javamail - Interaction services: RMI -CORBA - XML.

Unit III

Component model: EJB : Session Beans: Stateless and Stateful - Entity Beans- CMP and BMP - Message Driven Beans.

Unit IV

ASP.NET : Introduction - architecture - ASP.NET Runtime - ASP.NET Parser-- Assembly - Page class. Web Server Controls - HTML Controls –AdRotatorand Calendar controls - Validation Controls - Security Management.

Unit V

ADO.NET: System.Data, SqlClient and Xml namespaces - Provider objectsand Consumer objects - Disconnected data access - GridView&FormView.

Books for Study

Unit I,II

1. Justin Couch, Daniel H.Steinberg, “J2EE Bible”, Wiley India(P) Ltd, NewDelhi, 2002.

Unit III

2. Paul Tremblett, “Instant Enterprise Java y - Beans”, Tata McGraw HillPublishing company, New Delhi, 2001.

Unit IV,V

3. Platt S David, “Introducing Micorsoft .Net”, Prentice Hall of India, NewDelhi, 2003.

Books for Reference

1. Stephanie Bodoff, Dale Green, Eric Jendrock, “The J2EE tutorial”,Addison-Wesley, 2002.
2. Hitesh Seth, “Microsoft .NET: kick start”, Sams Publishing, 2004.

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CORE COURSE XV

ACCOUNTING AND FINANCIAL MANAGEMENT

Objective :

To present the whole range of book keeping & accountancy and to give comprehensive coverage to management accounts.

Unit I

Accounting Principles and Concepts – Double entry book keeping- Income and expenditure- Accounting record and system- assets and liabilities- Depreciation, Depletion and Amortization - Accounting for depreciation.

Unit II

Journal – Ledger- Trial Balance- Trading, Manufacturing and profit and Loss account – Balance sheet.

Unit III

Analysis and interpretation of financial statements with ratios

Unit IV

Cost Accounting- Methods and Techniques of Cost Accounting- classifications of cost - Material Cost- Labour Cost – Overhead- fixed and variable cost- Cost-volume – profit analysis - marginal costing and decision making.

Unit V

Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

Text Book(s):

1. T.S. Grewal, "Double Entry Book Keeping", All India Sultan Chand (Recent Edition)
2. S.N. Maheswari "Principles of Management Accounting ", Sultan Chand, New Delhi (Recent Edition)
3. Shukla, Grewal& Gupta, "Advanced Accounts "Sultan Chand Publications

Reference(s):

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recent edition)
2. Khan and Jain "Financial Management" Tata McGraw Hill (Recent Edition)

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CORE COURSE XVI

DISCRETE MATHEMATICS

Objective:

To impart knowledge on Sets, Relations & Functions, Mathematical logic, Groups & Subgroups, Lattices & Boolean Algebra and Combinatorics& Recurrence Relations

Unit I

Sets, Relations & Functions: Property of binary relations, equivalence, compatibility, partial ordering relations, Hasse diagram, functions, inverse functions, compositions of functions, recursive functions.

Unit II

Mathematical logic: Logic operators, Truth tables, Theory of inference and deduction, mathematical calculus, predicate calculus, predicates and qualifiers.

Unit III

Groups & Subgroups: Group axioms, permutation groups, subgroups, cosets, normal subgroups, semi groups, free semi-groups, monoids, sequential machines, error correcting codes, modular arithmetic grammars.

Unit IV

Lattices & Boolean Algebra: Axiomatic definition of Boolean algebra as algebra as algebraic structures with two operations , basic results truth values and truth tables, the algebra of propositional functions, Boolean algebra of truth tables.

Unit V

Combinatorics& Recurrence Relations: Disjunctive and sequential counting, combinations and permutations, enumeration without repetition, recurrence relation, Fibonacci relation, solving recurrence relation by substitution, solving non- recurrence relation by conversion to linear recurrence relation.

Text Book(s)

1. Trembly. J.P &Manohar. P., “Discrete Mathematical Structures with Applications to Computer Science” McGraw Hill.
2. Kolman, Busy & Ross “Discrete Mathematical Structures”, PHI
3. K.D Joshi, “Foundations of Discrete Mathematics”, Wiley Eastern Limited.

References

1. Seymour Lipschutz& March Lipson Tata McGraw Hill.
2. C.L. Liu “ Elements of screte mathematics “ Tata McGraw Hill.

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CORE COURSE VII

ENTERPRISE RESOURCE PLANNING

Objective:

In this course students shall learn various components of an application software that help computerize functioning of an enterprise such as sales, materials, production, financial , customer relationship AND supply chain modules.

Unit I

A Foundation for Understanding Enterprise Resource Planning systems – Re-engineering and Enterprise Resource Planning Systems – Planning ,Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems :Production and Materials Management ERP Systems: Human Resources

Unit II

Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team.

Unit III Solutions

Supply chains as Systems - Modeling the Supply Chain – Supply Chain Software - **Operations** – Meeting Demand – Maintaining Supply – Measuring Performance

Unit IV Planning

Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance

Unit V

Essentials of Customer relationship management – Designing CRM application – Various modules of CRM application - Advantages of CRM

TEXT BOOK:

1. **Sumner Mary**, Enterprise Resource Planning, First edition, Pearson education, 2006 (ISBN 81-317-0240-5) (**Unit 1**: Chapters 1 to 7; **Unit 2:** Chapters 8, 9 (continued on text book number TWO)
2. **Taylor David A**., Supply Chains (A managers guide), Pearson education, 2004 (ISBN 81-297-0334-3) (**Unit 2:** Chapters 1, 2, 3; **Unit 3:** Chapters 4, 5, 6, 7, 8, 9; **Unit 4:** Chapters 10, 11, 12, 13)
3. **Tiwana**, Essential guide to knowledge management : The e-business and CRM applications, Pearson education (ISBN 81-780-8326-4) **(Unit 5)**

REFERENCE BOOK:

1. Leon, ENTERPRISE RESOURCE PLANNING, Tata Mc Graw Hill, 2013
2. **ALTEKAR Rahul V**., Enterprise wide resource planning (Theory and practice), Prentice Hall of India, 2005 (ISBN 81-203-2633-4)
3. **GargVinod K &Venkitakrishnan N.K**, Enterprise resource planning, Second edition, Prentice Hall of India, 2006 (ISBN 81-203-2254-1).
4. **Handfield R. B & Nichols. Ernest L**., Introduction to supply chain management, Prentice Hall of India, 2006 (ISBN 81-203-2753-5)

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CORE COURSE XVIII

DISTRIBUTED TECHNOLOGIES LAB

Objective: To get hands on experience in developing applications for distributed environment.

1. RMI - Invocation of server side methods.
2. Servlets - Returning Information received from the client.
3. Servlets and JDBC - Constructing a response by accessing a database.
4. JSP - use of scriptlet.
5. JSP - use of java beans.
6. EJB - Session Bean.
7. EJB - Entity Bean.
8. ASP.NET - Server & Client side controls.
9. ASP.NET and ADO.NET - use of disconnected data object.
10. ASP.NET: Databind Controls.
11. DOM usage on the server side.
12. AJAX: Dynamic client - server interaction example.

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CORE COURSE XIX

ACCOUNTING AND FINANCIAL MANAGEMENT LAB

Objective: To get hands on experience in developing accounting and financial management applications using accounting software.

1. Creation of company, Groups – Single & Multiple
2. Posting of Journal to ledger – Single & Multiple.
3. Preparation of Accounting vouchers.
4. Preparation of Trail balance.
5. Financial Statement: Trading account, profit and loss account and Balance sheet.
6. Preparation of Bank Reconciliation Statement
7. Preparation of Inventory: Stock Item, Stock Group, Stock category,
8. Preparation of VAT (Value Added Tax)
9. Inventory Voucher.
10. Preparation of TDS (Tax Deducted at Source) & Service Tax.

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ELECTIVE COURSE II:1

ARTIFICIAL INTELLIGENCE

Objective :

To provide the knowledge of problem solving using AI techniques, knowledge representations, expert system development process and tools.

Unit I

What is Artificial Intelligence? The AI Problems – The Underlying Assumptions – What is an AI Techniques? Problems: Problems spaces and search – Defining the Problems as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics – Issues in the Design of Search Programmes.

Unit II

Generate – and-Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means – Ends – Analysis-Knowledge Representation issues: Representation and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem

Unit III

Using predicate logic – Representing Simple facts in Logic – Representing Instance and Is a relationships – Computable functions and Predicates – Resolutions – Natural Deductions – Representing Knowledge Using Rules: Procedural versus Declarative Knowledge – Forward versus Backward Reasoning – Matching – Control Knowledge

Unit IV

Symbolic Reasoning under uncertainty – Introduction to Non Monotonic Reasoning – Logics for Non Monotonic Reasoning – Implementation issues – Augmenting a Problem solver – Implementation :Deapth – First Search – Implementation : Breadth – First Search – Statistical reasoning – Bayesian Networks – Fuzzy Logic- Learning: What is learning? – Rote Learning – Learning by taking advice – Learning in Problem Solving

Unit V

Connectionist Models – Introduction – Hopfield Networks – Learning in Neural Networks – Applications of Neural Networks – Expert Systems – Representing and Using Domain Knowledge – Expert System Shells – Explanation – Knowledge acquisition

Text Book

Artificial Intelligence, Elaine Rich, Kevin Knight, 2/e, TataMcGraw Hill Publishing Ltd., - New Delhi, 1991
Chapters: 1.1 – 1.3, 2.3, 4.5, 6.7, 8.3 – 8.5, 17.1 – 17.4, 18.1 – 18.3 & 20

Reference Books

1. Artificial Intelligence, A Modern Approach, Stuart J. Russell and Peter Norvig, Prentice, 2010.
2. Introduction to Artificial Intelligence and Expert Systems, Dan W.Patterson, PrenticeHall of India, New Delhi, 1992
3. Introduction to Expert Systems, 3/e, Peter Jackson, Pearson Education, Reprint 2003
4. Artificial Intelligence, A New Synthesis, Nils J. Nilsson Harcourt Asia Pvt. Ltd., 1998

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ELECTIVE COURSE II:2

COMPUTER SIMULATION AND MODELING

Objective :

To impart knowledge in real time modeling process and the simulation of any system using the real time mode.

Unit I

Introduction to Simulation: When Simulation is the Appropriate Tool- When Simulation is not Appropriate- Advantages and Disadvantages of Simulation- Areas of Application- Systems and System Environment- Components of a System- Discrete and Continuous Systems- Model of aSystem- Types of Models- Discrete-Event System Simulation –Steps in a simulation study.Simulation Examples: Simulation of Queuing Systems, Simulation of Inventory Systems.

Unit II

Simulation Software: History of Simulation Software- Selection of Simulation Software- Simulation in JAVA, Simulation in GPSS, Simulation in SSF- Simulation software – Experimentation and Statistical and analysis tools .

Unit III

Statistical Models in Simulation: Review of Terminology and Concepts- Useful Statistical Models- Discrete Distributions- Continuous Distributions- Poisson process. Queuing models- Characteristics of queuing systems.

Unit IV

Random-Number Generation: Properties of Random Numbers-Generation of Pseudo-Random Numbers-Techniques for Generating Random Numbers-Linear congruential Method- Random number streams -Tests for random numbers-Frequency tests - Test for Autocorrelation.Random-Variate Generation: Inverse Transform Technique-Exponential Distribution-Uniform Distribution- Weibull Distribution.

Unit V

Input Modeling: Data Collection - Identifying the Distribution with Data- parameter estimation- goodness of fit tests. Verification and Validation of Simulation Models: Model Building, Verification, and Validation-Verification of Simulation Models-Calibration and Validation of Models.

Text Book:

1. Jerry Banks, John S. Carson, II Barry L. Nelson., *Discrete-Event System Simulation*, FourthEdition, PHI Edition, 2009.
   Unit:I :Chapter 1 Sections (1.1-1.11), Chapter 2 Sections (2.1, 2.2)
   Unit:II :Chapter 4 Sections (4.1, 4.2, 4.4-4.7)
   Unit:III :Chapter 5 Sections (5.1-5.5), Chapter 6 Sections (6.1)
   Unit:IV :Chapter 7 Sections (7.1, 7.2, 7.3.1, 7.3.3, 7.4), Chapter 8 Sections (8.1.1-8.1.3)
   Unit:V :Chapter 9 Sections (9.1-9.4), Chapter 10 Sections (10.1-10.3)

Book for Reference:

E.Winsberg, Science in the age of computer simulation, Chicago: University Press, 2010.

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ELECTIVE COURSE II:3

MOBILE COMMUNICATION

Objective : To understand the concepts of Mobile and wireless devices, Mobile IP and WAP.

Unit I

Introduction: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Medium Access Control: TDMA,CDMATelecommunications System: Telecommunication System – GSM – Architecture– Protocols – Hand over and Security–Satellite System

Unit III

Wireless LAN : IEEE S02.11– Bluetooth – MAC Layer – Security-and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling andReverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

Text Book(s)

1. Jochen Schiller, Mobile Communication, Pearson Education, Delhi, 2008.
2. Sandeep Singhal, et al.The Wireless Application Protocol: Writing Applications for theMobile Internet

Reference:

Rich Ling, Jonathan Donner, Mobile Communication, Wiley Publications,2013.

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CORE COURSE XX

WEB TECHNOLOGIES

Objective:

Unit I WEB PROGRAMMING

PHP introduction : variables – operators – control structures – Advanced concepts in PHP : Cookies – sessions – server variables

Unit II

PHP Files :accessing files – reading – writing - MySQL database: insert – update – delete – join – group by – aggregate functions – formats – case studies .

Unit III WEB SERVICES:

Introduction – What are web services? SOAP WSDL UDDI-Why Web Services are important ? – The evolution of web applications Not just another distributed computing platform – Web services and enterprises. XML: XML Fundamentals XML: The Lingua Franca of web services - XML Documents XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH

Unit IV

SOAP and WSDL5 The SOAP Model- SOAP- SOAP Messages SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults- SOAP encoding – SOAP RPC- Usingalternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC andSOAP Document-Literal, SOAP web services and the REST Architecture-Looking back to SOAP 1.1 Syntactic differences between SOAP 1.2 and SOAP1.1- Changes to SOAP-RPC- SOAP Encoding- WSDL structure, The stock quoteWSDL interface, definitions, The type element, bindings, services, managingWSDL descriptions, Extending WSDL – Using SOAP and WSDL

Unit V

UDDI: UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

Text Book(s)

1. K. Meena , R. Sivakumar , A.B. KarthickAnandBabu "Web programming using PHP and MySQL" - Himalaya Publishing House – 2011. (**for Unit 1 and Unit 2)**
2. SandeepChatterjee, James Webber, "Developing Enterprise Web Services - An Architect's Guide" - Pearson Education– Second Indian Reprint 2005. (**for Unit 3, Unit 4 and Unit 5)**

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CORE COURSE XXI

DATA MINING AND WAREHOUSING

Objective:

In this course students shall learn the mathematical & algorithmic details of various data association techniques to discover patterns in underlying data (namely mining data).He also learn how to consolidate huge volume of data in one place efficiently.

Unit I

Introduction to data mining – Association Rule Mining.

Unit II

Classification – Cluster analysis.

Unit III

Web Data Mining – Search engines.

Unit IV

Data warehousing – Algorithms & operations to create data warehouse – Designing data warehouse- Applications of data warehouse.

Unit V

Online analytical processing – Information Privacy.

TEXT BOOK:

1. **G.K. Gupta,** Introduction to Data mining with case studies ,Prentice Hall India, 2006 (ISBN 81-203-3053-6) **[Unit-1 : (**Chapters 1,2); **Unit-2** : (Chapters 3,4); **Unit-3 (**Chapters 5,6); **Unit-4 (**Chapters 7), **Unit-5 (**Chapters 8,9)**].**

REFERENCE BOOK:

1.S. K. Mourya, Shalu Gupta, data Mining and Data Warehousing, Alpha Science International Limited, 2013

2**. K.P.Soman&ShyamDiwakar and V. Ajay,** Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN -81-203- 2897-3)

3. **Jiawei Han and MichelineKamber**, Data Mining Concepts and Techniques, Elsevier, Second Edition, 2007 (ISBN: 81-312-0535-5)

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CORE COURSE XXII

ORGANIZATIONAL DYNAMICS

Objective:

To impart knowledge about fundamentals of organization behavior, Motivation, Individualand Interpersonal Behavior, Change, Stress and Counseling

Unit I

Fundamentals of Organization Behavior: – Understanding Organization Behavior – Fundamental Concepts – Contingency Approach – Limitation of Organization Behavior – AnOrganization Behavior System – Model of Organization Behavior. Managing Communications:communications Fundamentals – #Upward and Downward Communication# – Other Form ofCommunication – Informal Communication

Unit II

Social Systems and Organizational Culture: Understanding a Social System – Social Culture – Role – Status – Organizational Culture – Motivation: Model – Motivational Drives –Human Needs – Behavior Modification – #Goal Setting. Appraising: Organizational Behavior andperformance Appraisal# – Economic Incentive Systems

Unit III

Leadership – The Nature of Leadership – Behavior Approaches to Leadership Style – Contingency approaches to Leadership Style – Individual and Interpersonal Behavior: Nature ofEmployee Attitudes – Effects of Employee Attitudes – Studying Job Satisfaction. InterpersonalBehavior: Conflict in Organizations – #Power and Politics#.

Unit IV

Organizations and Individuals: Rights to Privacy – Discipline – QWL –Individual Responsibilities. Informal and Formal Groups: Group Dynamics –Nature of Informal Group –Formal Group. Team and Team Building: Organizational Context for Teams – Teamwork – TeamBuilding

Unit V

Change and its Effects: Change at Work- Resistance to Change – Implementing Change
Successfully – Understanding Organization Development. Stress and counseling: Employee Stress– #Employee Counseling – Type of counseling#.

Text Book:

1. John W Newstrom, "Organizational Behavior: Human Behavior at Work", 12th Edition,Tata McGraw Hill Education Private Limited, 2007.

Books for Reference:

1. Organizational Behavior, 12th Edition, Tata McGraw Hill Education Private Limited, 2011.
2. Stephen P. Robbins, *Organizational Behavior*, 13th Edition, PHI Pvt. Ltd, New Delhi, 2010.

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CORE COURSES XXIII

PROBABILITY AND STATISTICS

Objective

Unit I

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Baye's theorem of probability and Geometric probability. Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions

Unit II

Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions and their properties. (Definition, mean, variance, moment generating function, Additive properties, fitting of the distribution.)
Continuous distributions: Uniform, Normal, exponential distributions and their properties. Curve fitting using Principle of Least Squares.

Unit III

Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, Attributes, coefficient of Association, X2 – test for goodness of fit, test for independence.

Unit IV

Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation. Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of significance, power of the test.

Unit V

Queuing theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1: α Model, M/M/1 ; N Model.

Text book:

1. T.Veerarajan, "Probability, Statistics and Random Processes", Tata McGraw Hill

Reference Book:

1. **Yuri Suhov, Mark Kelber,** Probability and Statistics by Example, Cambridge University Press,2014.
2. **Kishor S. Trivedi**, "Probability & Statistics with Reliability, Queuing and Computer Applications", Prentice Hall of India, 1999

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CORE COURSE XXIV

WEB TECHNOLOGIES LAB

Objective : To get hands on experience in developing web based applications.

1. Create a simple Web Service that converts the temperature from Farenheit toCelsius and vice versa.

2. Use the above Web Service on a web page and execute to fetch the results

3. Create a Web Services provider and make it available on the Internet or intranet.

4. Create a web based Consumer of an existing web service.

5. Create a Windows application based consumer of an existing web service.

6. Write an application that simulates sending a SOAP message as a request and receiving another as a response.

7. Develop a Web Service that provides images as responses.

8. Develop a web service that access table contents of a database.

9. Develop a console based Web Service Client.

10. Develop a Web intranet/internet based Web Service Client.

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CORE COURSE XXV

DATA MINING LAB

Objective :

To get hands on experience in developing applications using data mining tool.

Practical	**Practical List**
Exercise 1	Preprocessing a. Datatype Conversion b. Data Transformation
Exercise 2	Filters- **Practical** a. Replace Missing Values b.Add Expression
Exercise 3	Feature Selection Select Attributes- **Practical** a. Filter b. Wrapper c. Dimensionality Reduction
Exercise 4	Supervised Technique Classifier - Function - **Practical** a. Multilayer Perceptron Tree - **Practical**J48
Exercise 5	Classifier- Bayes –**Practical** a.Naive Bayes Rule- **Practical** b.ZeroR
Exercise 6	Unsupervised Techniques Clustering- Theory Partitioned – Algorithm – Practical Hierarchical Algorithm – Practical Semi Supervised Algorithm – Practical
Exercise 7	Association Rule Mining A-Priori –Algorithm –Practical Predictive A-Priori –Practical
Exercise 8	Experimenter Dataset – Test – Practical Algorithm based –Test –Practical
Exercise 9	Knowledge Flow Feature Selection – Practical Clustering –Practical
Exercise 10	Knowledge Flow Classification – Practical

ELECTIVE COURSE III:1

PARALLEL PROCESSING

Objective:

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

Unit I

Parallel computer models: the state of computing – Multiprocessors and multicomputers – Multivector and SIMD computers.

Unit II

Program and Network properties: Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

Unit III

Processors and memory hierarchy : Advanced processor Technology – Superscalar and vector processors – Linear Pipeline Processors – Nonlinear Pipeline Processors.

Unit IV

Multiprocessors and Multicomputers: Multiprocessor System Interconnects-Message-Passing Mechanisms – SIMD Computer Organization. The Connection Machine CM5 – Fine – Grain Multicomputers.

Unit V

Software for Parallel Programming : Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Books for reference:

1. Introduction To Parallel Processing, By M. Sasikumar, Dinesh Shikhare, Ravi P.Prakash, Eastern Economy Edition, 2014
2.Computer Architecture and Parallel Processing, Kai Hwang and Baye
3. Parallel Computing, Theory and Practice, Michel J.Quinn, McGraw-Hill International Edn., Singapore 1994

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ELECTIVE COURSE III:2

CLOUD COMPUTING

Objective:

To impart knowledge on Introduction to Cloud Computing, The Evolution of SaaS, The Anatomy of Cloud Infrastructure, Workflow Management Systems and Clouds.

Unit I

Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud - Features of a cloud-Infrastructure Management-Infrastructure as a Service Providers-Platform as a Service Providers-Challenges and Risks. Broad Approaches to Migrating into the Cloud - Seven Step Model of Migration into a Cloud. .

Unit II

The Evolution of SaaS-The Challenges of SaaS Paradigm- Approaching the SaaS Integration Enigma- New Integration Scenarios- The Integration Methodologies- SaaS Integration Products, Platforms and Services-B2Bi Services -. Background of Enterprise cloud computing paradigm- Issues for Enterprise Applications on the Cloud- Transition Challenges- Enterprise Cloud Technology and Market Evolution - Business drivers toward a marketplace for Enterprise cloud computing- The Cloud Supply Chain. .

Unit III

The Anatomy of Cloud Infrastructure- Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- RVWS Design - Cluster as a Service: The Logical Design - Cloud Storage : from LANs TO WANs- Technologies for Data Security in Cloud Computing . .

Unit IV

Workflow Management Systems and Clouds - Architecture of Workflow Management Systems - Utilizing Clouds for Workflow Execution- A Classification of Scientific Applications and Services in the Cloud- SAGA based Scientific Applications that Utilize Clouds. MapReduce Programming Model- Major MapReduce Implementations for the Cloud- MapReduce Impacts and Research Directions. A Model for Federated Cloud Computing - Traditional Approaches to SLO Management- Types of SLA -Life Cycle of SLA - SLA Management in Cloud- Automated Policy based Management. **.**

Unit V

Grid and Cloud- HPC in the Cloud: Performance related Issues -Data Security in the Cloud- The Current State of Data Security in the Cloud- Homo Sapiens and Digital Information- Risk- Identity- The Cloud, Digital Identity and Data Security - Content Level Security :Pros and Cons- Legal Issues in Cloud Computing - Data Privacy and Security Issues- Cloud Contracting models- Case Studies : Aneka and CometCloud. **.**

Text Book(s):

1. Cloud Computing - Principles and Paradigms, by RajkumarBuyya, James Broberg, and AndrzejGoscinski. 2011 .

REFERENCES:

1. Cloud Application Architectures,GeorgeReese,ISBN: 184047142,Shroff/O'Reilly,2009.

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ELECTIVE COURSE III:3

SOFT COMPUTING

Objective:

To impart knowledge in Fuzzy Set Theory, Optimization, Neural Networks, Neuro Fuzzy Modelingand Application Of Computational Intelligence.

Unit I FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

Unit II OPTIMIZATION :

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

Unit III NEURAL NETWORKS:

Supervised Learning Neural Networks – Perceptrons – AdalineBackpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

Unit IV NEURO FUZZY MODELING:

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

Unit V APPLICATION OF COMPUTATIONAL INTELLIGENCE:

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J.S.R. Jang, C.T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, 2004.

REFERENCE BOOK

1. By L. Fortuna, G.. Rizzotto, M. Lavorgna, G. Nunnari, M.G. Xibilia, Riccardo Caponetto, Soft Computing: New Trends and Applications, Springer 2012
2. Timothy J. Ross, "Fuzzy Logic with Engineering Application, "McGraw Hill, 1977.
3. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and Machine Learning", Addision Wesley, 1989.
4. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003. Emereo Pty Limited, July 2008..

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MANAGERIAL SKILLS

Learning Objective

The learning objective of this course is to enable the students to learn the art of getting things done in the modern business world by learning topics like lateral thinking, decision making, balancing work and life, corporate social responsibility, and work ethics.

UNIT I THINKING STRATEGIES

Strategic thinking – meaning – questions- things included in Strategic thinking – Process consideration in Strategic thinking – Strategic thinking competencies – importance of Strategic thinking – characteristics of Strategic Thinkers – Points to be kept in mind in Strategic thinking.

Lateral Thinking – meaning – why Lateral Thinking – when to use Lateral Thinking – Benefits of Lateral Thinking – Techniques used in Lateral Thinking – Who needs Lateral Thinking – How to use Lateral Thinking? – Conventional Vs Lateral Leaders – Questions asked by Lateral Leaders – becoming a Lateral leader

UNIT II INTERPERSONAL STRATEGIES

Conflict Resolution – meaning – points to be understood before studying conflict resolution – sources of conflict – common reactions to conflict – role of perception in conflict – steps for Conflict Resolution – Conflict handling matrix – Functional and Dysfunctional outcome of conflict.

Negotiation skills – process – styles – outcome – principles involved – negotiation model – being a negotiator – qualities of a negotiator.

UNIT III IMPLEMENTATION STRATEGIES

Facing changes – meaning – characteristics –why changes –pace of changes – impact of resistance –Reasons for resistance – types of people in facing changes – introducing change. Facing challenges – meaning – importance – path to facing challenges – benefits of facing challenges.

UNIT IV ACTION BASED STRATEGIES

Risk taking - meaning – factors determining Risk Taking – Risk management – users of Risk Management – Steps in Risk Management.

Effective decision making – meaning – approaches – methods – steps – Decision making at the work place.

UNIT V BEHAVIOURAL STRATEGIES

Motivation and Staying motivated – meaning – finding reason for being motivated – staying motivated at work place – staying motivated in negative work environment – staying motivated during crisis.

Balancing work and life – meaning – work satisfaction – gender differences – responsibility of the employers and employees – ways of balancing work and life – handling professional and personal demands – organizing your desk.

TEXT BOOK:

Alex K. (2012) Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi- 110 055. Mobile No :94425 14814 (Dr. K. Alex)

REFERENCE BOOKS:

1. Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), P.R. Publishers & Distributors, No, B-20 & 21, V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli- 620 002.(Phone :0431-2702824: Mobile : 94433 70597, 98430 74472)
2. Emotional Quotient – Daniel Goleman
3. Power of the Plus factor – Norman Vincent Peale.
4. The Seven Habits of Highly Effective people – Stephen covey.

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CORE COURSE XXVI

COMPUTER NETWORKS

Objective:

To provide an overall knowledge in computer communication networks concepts and itsimplementation details in the Internet

Unit I

Introduction – Uses of Computer Networks – Network Hardware: LAN-MAN-WAN – Networks Software: Protocol Hierarchies – Reference models: OSI - TCP/IP.The Physical Layer: Guided Transmission Media - The Public Switched Telephone Network:Structure of the Telephone System – Switching

Unit II

The Data Link Layer: Design Issues –Error Detection and Correction – Elementary DataLink Protocol – Sliding Window Protocol – HDLC.The Medium Access Control Sub Layer: Multiple Access Protocol: CSMA Protocol – CollisionFree Protocol – Data Link Layer Switching: Repeaters, Hub, Bridges, Switches, Router, andGateways - Bluetooth.

Unit III

The Network Layer: Design Issues – Routing Algorithms: Optimality Principle – Shortestpath – Distance Vector – Link State – Hierarchal – Broadcasting –Congestion Controlalgorithm s– The network layer in internet: IP protocol – IP address.

Unit IV

The Transport Layer: The Transport Service: Service provided to the Upper Layer – Transport Service Primitives – Berkeley Sockets - Elements of Transport Protocols – The InternetTransport Protocol: UDP: Introduction – TCP: Service Model – TCP Segment Header.The Application Layer: DNS – E-Mail: Architecture and Services – Message Formats.

Unit V

Network Security: Cryptography: introduction – Substitution and Transposition Cipher –Symmetric-key Algorithm: DES – Public-key Algorithms: RSA – Digital Signature: Symmetricand Public key Signature – Communication Security: Firewalls – VPN. Authentication Protocol:Authentication based on shared key – Diffie-Hellman key Exchange.

Text Book:

1. Andrew S. Tanenbaum, *Computer Networks*, PHI, Fourth Edition, 2003.
   Unit: I: Chapter 1 (1.1, 1.2(1.2.1 to 1.2.3), 1.3(1.3.1), 1.4(1.4.1, 1.4.2)Chapter 2 (2.2, 2.5(2.5.1, 2.5.5)
   Unit: II: Chapter 3(3.1, 3.2, 3.3, 3.4, 3.6.1), Chapter 4(4.2.2, 4.2.3, 4.6, 4.7.5)
   Unit: III: Chapter 5 (5.1, 5.2(5.2.1, 5.2.2, 5.2.4, 5.2.5, 5.2.6, 5.2.7), 5.3, 5.6(5.6.1, 5.6.2)
   Unit: IV: Chapter 6 (6.1(6.1.1 to 6.1.3), 6.2, 6.4.1, 6.4.2, 6.5.2, 6.5.4.Chapter 7 (7.1, 7.2.1, 7.2.3)
   Unit: V: Chapter 8 (8.1.1, 8.1.2, 8.1.3, 8.2.1, 8.3.1, 8.4.1, 8.4.2, 8.6.2, 8.6.3, 8.7.1, 8.7.2)

Books for Reference:

1. William Stallings, *Data and Computer Communication*, PHI, Eighth Edition, 2009
2. Behrouz A. Forouzan, *Data Communications and Networking*, Third Edition, TataMcGraw Hill, 2003.

CORE COURSE XXVII

SMART DEVICES PROGRAMMING

Objective:

To provide concepts to enable the students for creating applications for smart devices using Android

Unit I

Introduction to Android: History of Android – Versions of Android – Android Architecture – App Architecture – Components – Intents – Mainfest – App Package - Activities - Services –Broadcast Receivers – Content Providers – Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Starting the AVD – Introducing UC – Creating UC – Installing and Running UC – Preparing UC for Publishing – Migrating to Eclipse –Developing UC with Eclipse.

Unit II

User Interface: Customizing the Window – Creating and Displaying Views – MonitoringClick Actions – Resolution Independent Assets – Locking Activity Orientation –DynamicOrientation Locking – Manually Handling Rotation - Creating Pop-up Menu Actions –Customizing Options Menu – Customizing Back Button – #Emulating the Home Button –Monitoring TextView Changes – Scrolling TextView Ticker – Animating a View – Creating –Drawables as Backgrounds – Creating Custom State Drawables – Applying – Masks to Image –Creating Dialogs that Persist – Implementing Situation – Specific Layouts – Customizing Keyboard Actions – Dismissing Soft Keyboard – Customizing AdapterView Empty View –Customizing ListView Rows – Making ListView Section Headers – Creating Compound Controls.

Unit III

Interacting with Device Hardware and Media – Interacting Device Location – MappingLocations – Annotating Maps – Capturing Images and Videos – Making a Custom Camera Overlay – Recording Audio – Adding Speech Recognition – Playing Back Audio/Video – Creating a Tit Monitor – Monitoring Compass Orientation.

Unit IV

Persisting Data : Marking a Preference Screen – Persisting Simple Data – Reading andWriting Files – Using Files as Resources - Managing a Database – Querying a Database –Backing Up Data – Sharing your Database – Sharing your other Data.

Unit V

Interacting with the Systems: Notifying from the Background – Creating Timed andPeriodic Tasks – Scheduling a Periodic Task – Creating Sticky Operations – Running Persistent Background Operations – Launching Other Applications – Launching System Application – other Applications – Interacting with Contacts – Picking Device Media – Saving to the MediaStore Working with Libraries : Creating Java Library JARs – Using Java Library JARs – Creating Android Library Projects - Using Android Library Projects – Charting – Practical Push Messaging.

Text Book:

1. Dave Smith and Jeff Friesen, “Android Recipes: A Problem – Solution Approach”, RakmoPress Pvt., Ltd, New Delhi, 2011.
   Web Reference:http://developer.android.com/Android Developer’s Guides

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CORE COURSE XXVIII

OPTIMIZATION TECHNIQUES

Objective:

To understand the basic concepts of operations research and to impart the knowledge on various operations research techniques and their applications.

Unit I

Linear Programming : Introduction – History of OR – Meaning of OR – Principles of Modeling – Linear equation – Gaussian Elimination – Formulation of LP models – Graphical Solution – Algebraic Solutions – Simplex Method – Feasibility – Optimality – Artificial Variables – M – Technique – Duality – Dual simplex Algorithm – Transportation Problem – Assignment Problem – Least Time Transportation Problems.

Unit II

Queuing Models : Introduction – Deterministic Model – Queue Parameters – M/M/I Queue – Limited queue Capacity – Multiple Servers – Finite Sources – Waiting Times – Queue discipline – Non – Markovian Queues – Probabilistic models.

Unit III

Inventory Models: Determine Models – EOQ – Finite and Infinite Delivery Rates without Back- Ordering – Finite and Infinite delivery rates with Backordering – Quantity Discounts – EOQ with constraints – Probabilistic model – Single Period Model – Reorder Point Model – Variable Lead Times

Unit IV

PERT / CPM: Arrow (Network) Diagram Representation – Time estimates – Critical Path – Floats – Construction of Time chart and Resource Leveling – Probability and Cost Consideration in Project Scheduling – Project Control.

Unit V

Replacement Theory : Introduction – Various replacement situations – Replacement Policy – Variables Maintenance costs and fixed money value – Variable Maintenance Costs and Variable Money Value – Individual Replacement Policy – Group Replacement Policy – Reliability.

Text Book:

KantiSwarup P.K. Gupta and Man Mohan, “Operation Research”, Sultan & Chand Publishers New Delhi, 1992.

Reference Book:

2. By Jagdish S. Rustag, Optimization Techniques in Statistics, Academic Press, 2014
2. Hamdy A Taha, Operations Research – An Introduction Macmillan Publishing Company, 1982.
3. Don.T. Philps, A.Ravindran, James. J. Solberg, “Operations Research – Principles and Practice John Wiley & Sons, 1976.

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CORE COURSE XXIX

SMART DEVICES PROGRAMMING LAB

Objective :

To get hands on experience in developing applications for smart devices.

XML

1. XML document creation
2. Style sheets: CSS
3. Style sheets: XSL
4. XSL templates
5. Validation using DTD
6. SAX and DOM

Android

1. Different Layout design including nested layout for a single biodata.
2. Arithmetic Operation for two numbers
3. Business Calculator
4. Animation: Bouncing of a ball
5. Intent
6. Database SQLite: Student Biodata
7. Fragments - Tablet Programming
8. Media Player

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CORE COURSE XXX

OPEN SOURCE LAB

Objective : To get hands on experience in developing Programs using LAMP.

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

2. Write a PHP program that adds products that are selected from a web page to a shopping cart.

3. Write a PHP program to access the data stored in a mysql table.

4. Write a PHP program interface to create a database and to insert a table into it.
   i)Write a PHP program using classes to create a table.
   ii) Write a PHP program to upload a file to the server.

5. Write a PHP program to create a directory, and to read contents from the directory.

6. Write a shell program to find the details of an user session.

7. Write a shell program to change the extension of a given file.

8. Create a mysql table and execute queries to read, add, remove and modify a recordfrom that table.

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ELECTIVE COURSE III:1

PARALLEL PROCESSING

Objective:

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

Unit I

Parallel computer models: the state of computing – Multiprocessors and multicomputers – Multivector and SIMD computers.

Unit II

Program and Network properties: Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

Unit III

Processors and memory hierarchy : Advanced processor Technology – Superscalar and vector processors – Linear Pipeline Processors – Nonlinear Pipeline Processors.

Unit IV

Multiprocessors and Multicomputers: Multiprocessor System Interconnects-Message-Passing Mechanisms – SIMD Computer Organization. The Connection Machine CM5 – Fine – Grain Multicomputers.

Unit V

Software for Parallel Programming : Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Books for reference:

1. Introduction To Parallel Processing, By M. Sasikumar, Dinesh Shikhare, Ravi P.Prakash, Eastern Economy Edition, 2014
2. Computer Architecture and Parallel Processing, Kai Hwang and Baye
3. Parallel Computing, Theory and Practice, Michel J.Quinn, McGraw-Hill International Edn., Singapore 1994

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ELECTIVE COURSE III:2

CLOUD COMPUTING

Objective:

To impart knowledge on Introduction to Cloud Computing, The Evolution of SaaS, The Anatomy of Cloud Infrastructure, Workflow Management Systems and Clouds.

Unit I

Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud - Features of a cloud-Infrastructure Management-Infrastructure as a Service Providers-Platform as a Service Providers-Challenges and Risks. Broad Approaches to Migrating into the Cloud - Seven Step Model of Migration into a Cloud. .

Unit II

The Evolution of SaaS-The Challenges of SaaS Paradigm- Approaching the SaaS Integration Enigma- New Integration Scenarios- The Integration Methodologies- SaaS Integration Products, Platforms and Services-B2Bi Services -. Background of Enterprise cloud computing paradigm- Issues for Enterprise Applications on the Cloud- Transition Challenges- Enterprise Cloud Technology and Market Evolution - Business drivers toward a marketplace for Enterprise cloud computing- The Cloud Supply Chain. .

Unit III

The Anatomy of Cloud Infrastructure- Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- RVWS Design - Cluster as a Service: The Logical Design - Cloud Storage : from LANs TO WANs- Technologies for Data Security in Cloud Computing . .

Unit IV

Workflow Management Systems and Clouds - Architecture of Workflow Management Systems - Utilizing Clouds for Workflow Execution- A Classification of Scientific Applications and Services in the Cloud- SAGA based Scientific Applications that Utilize Clouds. MapReduce Programming Model- Major MapReduce Implementations for the Cloud- MapReduce Impacts and Research Directions. A Model for Federated Cloud Computing - Traditional Approaches to SLO Management- Types of SLA -Life Cycle of SLA - SLA Management in Cloud- Automated Policy based Management. **.**

Unit V

Grid and Cloud- HPC in the Cloud: Performance related Issues -Data Security in the Cloud- The Current State of Data Security in the Cloud- Homo Sapiens and Digital Information- Risk- Identity- The Cloud, Digital Identity and Data Security - Content Level Security :Pros and Cons- Legal Issues in Cloud Computing - Data Privacy and Security Issues- Cloud Contracting models- Case Studies : Aneka and CometCloud. **.**

Text Book(s):

1. Cloud Computing - Principles and Paradigms, by RajkumarBuyya, James Broberg, and AndrzejGoscinski. 2011.

REFERENCES:

1. Cloud Application Architectures,GeorgeReese,ISBN: 184047142,Shroff/O'Reilly,2009.

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ELECTIVE COURSE III:3

SOFT COMPUTING

Objective:

To impart knowledge in Fuzzy Set Theory, Optimization, Neural Networks, Neuro Fuzzy Modelingand Application Of Computational Intelligence.

Unit I FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

Unit II OPTIMIZATION

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

Unit III NEURAL NETWORKS:

Supervised Learning Neural Networks – Perceptrons – AdalineBackpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

Unit IV NEURO FUZZY MODELING

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

Unit V APPLICATION OF COMPUTATIONAL INTELLIGENCE:

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J.S.R. Jang, C.T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, 2004.

REFERENCE BOOK

1. By L. Fortuna, G. Rizzotto, M. Lavorgna, G. Nunnari, M.G. Xibilia, Riccardo Caponetto, Soft Computing: New Trends and Applications, Springer 2012
2. Timothy J. Ross, "Fuzzy Logic with Engineering Application, "McGraw Hill, 1977.
3. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and Machine Learning", Addision Wesley, 1989.
4. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003. Emereo Pty Limited, July 2008..

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ELECTIVE COURSE IV:1

BIG DATA ANALYTICS

Objective:

To impart knowledge in Fundamentals, Big Data Analytics, Operationalizing Big Data, Big Data Warehouses and Map Reduce Fundamentals

Unit I

Fundamentals of Big Data : The Evolution of Data Management – Understanding the waves of Managing Data – Defining Big Data – Building a Successful Big Data Management Architecture – Examining Big Data Types : Defining Structured Data – Defining Unstructured Data – Looking at Real Time and Non Real Time Requirements - Digging into Big Data Technology Components : Exploring the Big Data Stack – Redundant Physical Infrastructure – Security Infrastructure – Operational Databases – organizing data Services and Tools – Analytical Data Warehouses – Big Data Analytics – Big Data Applications.

Unit II

Defining Big Data Analytics : Using Big Data to get Results – Modifying Business Intelligence Products to Handle Big Data – Studying Big Data Analytics Examples – Big Data Analytics Solutions – Understanding Text Analytics and Big Data : Exploring Unstructured Data – Analysis and Extraction Techniques – Putting Results Together with Structured Data – Putting Big Data to use – Text Analytics Tools for Big Data – Customized Approaches for Analysis of Big Data : Building New Models and Approaches to Support Big Data - Understanding Different Approaches to Big Data Analysis - Characteristics of a Big Data Analysis Framework.

Unit III

Operationalizing Big Data : Making Big Data a Part of Your Operational Process - Integrating Big Data - Incorporating big data into the diagnosis of diseases - Understanding Big Data Workflows - Workload in context to the business problem - Ensuring the Validity, Veracity, and Volatility of Big Data - Security and Governance for Big Data Environments : Security in Context with Big Data - Understanding Data Protection Options - The Data Governance Challenge - Putting the Right Organizational Structure in Place - Developing a Well-Governed and Secure Big Data Environment.

Unit IV

Appliances and Big Data Warehouses : Integrating Big Data with the Traditional Data Warehouse - Big Data Analysis and the Data Warehouse - Changing the Role of the Data Warehouse - Changing Deployment Models in the Big Data Era - Examining the Future of Data Warehouses - Examining the Cloud and Big Data : Defining the Cloud in the Context of Big Data - Understanding Cloud Deployment and Delivery Models - The Cloud as an Imperative for Big Data - Making Use of the Cloud for Big Data - Providers in the Big Data Cloud Market.

Unit V

MapReduce Fundamentals : Tracing the Origins of MapReduce - Understanding the map Function - Adding the reduce Function - Putting map and reduce Together - Optimizing MapReduce Tasks - Exploring the World of Hadoop : Explaining Hadoop - Understanding the Hadoop Distributed File System - HadoopMapReduce - The Hadoop Foundation and Ecosystem - Building a Big Data Foundation with the Hadoop Ecosystem - Managing Resources and Applications with Hadoop YARN - Storing Big Data with HBase - Mining Big Data with Hive - Interacting with the Hadoop Ecosystem.

Text Book

"Big Data" by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.

Reference Book

"Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics" by SoumendraMohanty, MadhuJagadeesh and HarshaSrivatsa, Apress Media, Springer Science + Business Media New York, 2013

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ELECTIVE COURSE IV:2

NETWORK SECURITY

Objective:

To impart knowledge related to the various concepts, methods of Network Security using cryptography basics, program security, database security, and security in networks.

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003 **ISBN:** 8178089025

References

1. By Joseph Migga Kizza, Guide to Computer Network Security, Springer 2015.
2. Johannes A. Buchaman, Introduction to cryptography, Springer-Verlag 2000.
3. AtulKahate, Cryptography and Network Security, Tata McGraw Hill. 2007

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ELECTIVE COURSE IV:3

DIGITAL IMAGE PROCESSING

Objective:

To study the various concepts, methods and algorithms of digital image processing with image transformation, image enhancement, image restoration, image compression techniques.

Unit I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS :

Light, Luminance,Brightness and Contrast, Eye, The Monochrome Vision Model, ImageProcessing Problems and Applications, Vision Camera, Digital ProcessingSystem, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd MaxQuantizer, Dither, Color Images, Linear Systems And Shift Invariance, FourierTransform, ZTransform, Matrix Theory Results, Block Matrices and KroneckerProducts.

Unit II IMAGE TRANSFORMS :

2-D orthogonal and Unitary transforms, 1-D and 2-DDFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, Singularvalue Decomposition transforms.

Unit III IMAGE ENHANCEMENT :

Point operations - contrast stretching, clipping andthresholding density slicing, Histogram equalization, modification andspecification, spatial operations - spatial averaging, low pass, high pass, bandpass filtering, direction smoothing, medium filtering, generalized cepstrum andhomomorphic filtering, edge enhancement using 2-D IIR and FIR filters, colorimage enhancement.

Unit IV IMAGE RESTORATION :

Image observation models, sources of degradation,inverse and Wiener filtering, geometric mean filter, non linear filters, smoothingsplines and interpolation, constrained least squares restoration.

Unit V IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS:

Image data rates, pixel coding, predictive techniques transformcoding and vector DPCM, Block truncation coding, wavelet transform coding ofimages, color image coding. Random transform, back projection operator,inverse random transform, back projection algorithm, fan beam and algebraicrestoration techniques.

Book for study :

1. Bernd Jähne, Digital Image Processing, Springer, 2013
2. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 1995.
3. Sid Ahmed M.A., “Image Processing”, McGraw Hill Inc, 1995.
4. Gonzalaz R. and Wintz P., “Digital Image Processing”, Addison Wesley, 2nd Ed, 1987.

ELECTIVE COURSE V:1

COMPILER DESIGN

Objective:

To understand the various phases of a compiler and to develop skills in designing acompiler.

Unit I Introduction

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

Unit II Basic Data Structures

Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser

Unit III Advanced Data Structures

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls

Unit IV Sorting & Searching Techniques

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimizaion

Unit V Files

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing

Text Book(s)

1. Alfred Aho, Ravi Sethi, Jeffy D. Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia, 2003

References

1. Torben Ægidius Mogensen, ntroduction to Compiler Design, Springer, 2011.
2. HenkAlblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
3.. Kenneth C. Louden, «Compiler Construction : Principles and Practices», Thompson Learning, 2003

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ELECTIVE COURSE V:2

HUMAN COMPUTER INTERACTION

Objective:

To impart knowledge related to the various concepts, methods of Human Computer Interaction techniques with design basics, design rules and evaluation techniques

Unit I The Interaction :

Introduction – Models of interaction – Frameworks and HCI Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interactions.

Paradigms : Introduction – Paradigms for interaction.

Unit II Interaction, Design basics :

Introduction – What is design? – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping.

HCL in the software process : Introduction – The software lifecycle – Usability engineering – interactive design and prototyping – Design rationate.

Unit III Design rules :

Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns.

Implementation Support : Introduction – Elements of windowing systems – Programming the application Using toolkits – User interface management systems.

Unit IV Evaluation techniques :

What is evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method.

Universal Design : Introduction – Universal design principles – Multi-modal interaction – Designing for diversity – summary. Introduction – Requirements of user support – Approaches to user support Adaptive help systems – Designing user support systems.

Unit V User support :

Introduction Requirements of user support – Approaches to; user support – Adaptive help systems designing designing user support systems.

Text Book

1. Human - Computer Interaction, Third Edition, “Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale”, Pearson Education, 2004.

Reference Book

1. Human – Computer Interaction in the New Millennium, “John C. Carroll”, Pearson Education” 2002.
2. Handbook of Human-Computer Interaction, M.G. Helander, Elsevier, 2014.

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ELECTIVE COURSE V:3

MEDICAL INFORMATICS

Objective: To understand the various aspects of medical informatics.

UNIT I Healthcare Data, Information And Knowledge:

Definitions And Concepts, Converting Data To Information To Knowledg,Clinical Data Warehouses, (Cdws). **Healthcare Data Analytics:** Terminology Of Analytics, Challenges To Data Analytics, Research And Application Of Analytics, Role Of Informaticians In Analytics.**Electronic Health Records:**Need For Electronic Health Records, Institute Of Medicine's Vision For Ehrs,Electronic Health Record Key Components, Computerized Physician Order Entry (Cpoe), Clinical Decision Support Systems (Cdss),Electronic Prescribing, Practice Management Integration,Electronic Health Record Adoption, Electronic Health Record And Meaningful Use Challenges,

Unit II Health Information Exchange:

History Of The Nationwide Health Information Network,Hitech Act Impact, Health Health Information Exchange Concerns, Health Information Organization Resources.**Data Standards and Medical Coding:**Content Standards, Terminology Standards, Transport Standards, Medical Coding And Reimbursement.**Architectures of Information Systems:**The Internet And World Wide Web, Web Servicesnetworks

Unit III Health Information Privacy And Security:

Hipaa Review, Basic Security Principles, Hipaa, Meaningful Use, And The Hitech Act Authentication And Identity Management, Data Security In The Cloud And Client/Server Solutions ,Standards, Compliance And Law, Security Breaches And Attacks, Medical Privacy And Security Stories In The News.**Health Informatics Ethics:**The Road From Nuremberg, Informatics Ethics,International Considerations: Ethics, Laws And Culture, Codes Of Individual Countries, Pertinent Ethical Principles, Difficulties Applying Medical Ethics In The Digital World, Transferring Ethical Responsibility, Electronic Communication With Patents And Caregivers, Practical Steps, Health Informatics Ethics And Medical Students.**Consumer Health Informatics:**The Origins Of Consumer Health Informatics, Classification Of Health Informatics Applications, Health Education & Information Applications, Home Telemedicine Devices, Patient Web Portals, Personal Health Records (Phrs), Electronic Patient To Physician Communication, Social Media,

Unit IV Mobile Technology:

History Of Mobile Technology Mobile Health (Mhealth), Mobile Technology And Patients,Mobile Technology And Clinicians, Mobile Technology To Track Health

Habits Mobile Telemedicine, Mobile Technology Resources, Mobile Technology Challenges, Future Trends.**Online Medical Resources:**Sponsored Medical Web Sites , Sponsored And Non-Sponsored Resources, Government Medical Web Sites, Free Medical Web Sites, Free Patient Education Sites, Subscription (Fee-Based) Resources, Evidence Based Subscription Products **Quality Improvement Strategies:** Quality Improvement Strategies, Quality Improvement Projects, Quality Improvement Dashboards, Recommended Reading, Quality Improvement Concerns And Limitations **Patient Safety And Health Information Technology:**Patient Safety Reports, Organizations And Programs Supporting Patient Safety, Health Information Technology And Patient Safety, Technologies With Potential To Decrease Medication Errors

Unit V Telemedicine:

Teleconsultations, Telemonitoring, Telemedicine Initiatives, International Telemedicine, Barriers To Telemedicine, Telemedicine Organizations And Resources.**Medical Imaging Informatics:**Typical Pacs Workflow, Web Based Image Distribution, Pacs And Mobile Technology, Pacs For A Hospital Desktop Computer, Pacs Advantages And Disadvantages,**Bioinformatics:**Introduction, Genomic Primer, Importance Of Bioinformatics, Bioinformatics Projects And Centers, Personal Genomics, Genomic Information Integrated With Ehrs.

Text Book:

HEALTH INFORMATICS, Practical Guide for Healthcare and Information Technology Professionals, Robert E Hoyt, Ann Yoshihashi. Informatics Education, Sixth Edition.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620024.

Master of Computer Application Course Structure under CBCS

(For the candidates admitted from the academic year 2020-21 onwards)

COMPUTER SCIENCE STREAM – I SEMESTER

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Programming in Java	5	4	3	25	75	100
	Core Course – II (CC)	Database Systems	5	4	3	25	75	100
	Core Course – III (CC)	Data Structures and Algorithms	5	4	3	25	75	100
	Core Course – IV (CC)	Mathematical Foundations	5	4	3	25	75	100
	Core Elective – I (CE)		4	4	3	25	75	100
	Core Practical – I (CP)	Programming in Java	3	2	3	40	60	100
	Core Practical – II (CP)	RDBMS	3	2	3	40	60	100
	Total		**30**	**24**	**-**	**-**	**-**	**700**

MANDATORY BRIDGE COURSE FOR STUDENTS OF NON-COMPUTER SCIENCE STREAM – 1st SEMESTER

Semester	Bridge Courses	Bridge Courses Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Bridge Course – I (BC)	Programming in C and C++		4	3	25	75	100
	Bridge Course – II (BC)	Information Technology		4	3	25	75	100
	Bridge Practical – I (BP)	Software Lab: Programming in C and C++		2	3	40	60	100
		Total		**10**	**-**	**-**	**-**	**300**

COMPUTER SCIENCE STREAM – II SEMESTER

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
II	Core Course – V (CC)	Accounting and Financial Management	5	4	3	25	75	100
	Core Course – VI (CC)	Operating Systems	5	4	3	25	75	100
	Core Course – VII (CC)	Distributed Technologies	5	4	3	25	75	100
	Core Course – VIII (CC)	Programming in Python	5	4	3	25	75	100
	Core Elective – II (CE)		4	4	3	25	75	100
	Core Practical – III (CP)	Distributed Technologies	3	2	3	40	60	100
	Core Practical – IV (CP)	Programming in Python	3	2	3	40	60	100
		Total	**30**	**24**	**-**	**-**	**-**	**700**

MANDATORY BRIDGE COURSE FOR STUDENTS OF NON-COMPUTER SCIENCE STREAM – 2nd SEMESTER

Semester	Bridge Courses	Bridge Courses Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
II	Bridge Course – III (BC)	Web Design		4	3	25	75	100
	Bridge Course – IV (BC)	Introduction to Internet		4	3	25	75	100
	Bridge Practical – II (BP)	Software Lab: Web Design		2	3	40	60	100
		Total		**10**	**-**	**-**	**-**	**300**

COMPUTER SCIENCE STREAM – III SEMESTER

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
III	Core Course – IX (CC)	Programming Smart Devices	5	4	3	25	75	100
	Core Course – X (CC)	Compiler Design	5	4	3	25	75	100
	Core Course – XI (CC)	Principles of Data Science	5	4	3	25	75	100
	Core Course – XII (CC)	Organisational Behaviour	5	4	3	25	75	100
	Core Elective – III (CE)		4	4	3	25	75	100
	Core Practical – V (CP)	Software Lab: Programming Smart Devices	3	2	3	40	60	100
	Core Practical – VI (CP)	Software Lab: R – Programming	3	2	3	40	60	100
	Total		**30**	**24**	**-**	**-**	**-**	**700**

MANDATORY BRIDGE COURSE FOR STUDENTS OF NON-COMPUTER SCIENCE STREAM – 3rdSEMESTER

Semester	Bridge Courses	Bridge Courses Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
III	Bridge Course – V (BC)	Open Source Technologies		4	3	25	75	100
	Bridge Course – VI (BC)	Internet Programming		4	3	25	75	100
	Bridge Practical–III (BP)	Software Lab: PHP and MySQL		2	3	40	60	100
		Total		**10**	**-**	**-**	**-**	**300**

COMPUTER SCIENCE STREAM – IV SEMESTER

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
IV	Core Course – XIII (CC)	Internet of Things	5	4	3	25	75	100
	Core Elective – IV (CE)		4	4	3	25	75	100
	Project Work	Dissertation=100 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	-	10	-	-	-	100
		Total	**9**	**18**	**-**	**-**	**-**	**300**

List of Elective Courses (For 2020–21)

Core Elective I		Core Elective II	
A.	Digital Computer Fundamentals	A.	Probability and Statistics
B.	Computer Organization and Architecture	B.	Resource Management Techniques
C.	Software Engineering	C.	Theory of Computation
Core Elective III		**Core Elective IV**	
A.	Big Data Analytics	A.	Software Project Management
B.	Computer Network and Security	B.	Artificial Intelligence and Machine Learning
C.	Cloud Computing	C.	Soft Computing

COMPUTER SCIENCE STREAM

Core Course – 13
Core Elective – 04
Core Practical – 06
Major Project – 01

NON-COMPUTER SCIENCE STREAM

Core Course – 13
Core Elective – 04
Core Practical – 06
Major Project – 01
Bridge Course – 06
Bridge Practical – 03

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CORE COURSE – I (CC)

PROGRAMMING IN JAVA

Objectives:

On completion of the course the student will be able to understand and explain the purpose of Object Oriented Programming concepts; understand the applicability of Packages, Interfaces and write simple Applets in Java; design User Interfaces using SWING Components and able to handle errors in programs; develop Threaded applications and perform Data Access using JDBC; develop distributed applications using RMI, Servlets and Cookies

Unit - I: Classes And Objects: General Form of A Class - Creation of Objects - Usage of Constructors - 'this' Keyword- Constructor Overloading-Copy Constructors-Static Data Members - Static Methods- Finalize Method. INHERITANCE AND POLYMORPHISM: Inheriting Variables in a Class - Inheriting Methods in a Class - Inheritance And Constructors – Abstract Classes - Final Classes.

Unit - II: Interfaces And Packages: Interfaces-Structure of an Interface - Implementation of an Interface - Interface Inheritance. Packages - Placing the Classes in a Package - Package Hierarchy - Access Control Modifiers. APPLETS: The Life Cycle of an Applet -The Applet Class – Development and Execution of a Simple Applet - Syntax Of Applet Tag- Methods in the Graphic Class.

Unit - III: Swing: JApplet class - Icons - JLabel Control - JOptionPane Class – JTextField Control - JButton Control - JCheckBox Control - JRadioButton Control Menus. EXCEPTION HANDLING: Default Exception Handling – Exception and Error Classes - Catch Block Searching Pattern - Custom Exceptions. I/O STREAMS: Text And Binary Formats of Data - Input Stream and Output Stream Classes - Reader and Writer Classes - Data Output Stream and Data Input Stream Classes.

Unit - IV: Threads: Life Cycle Of A Thread - Creating And Running Threads – Method In The Thread Class - Setting The Priority Of A Thread - Synchronization. NETWORKING:TCP Server Socket Class - TCP Socket Class.JAVA DATABASE CONNECTIVITY: Establishing a Connection - Creation Of Data Tables Entering Data Into The Tables - Table Updating.

Unit – V: Remote Method Invocation: Remote Interface-Java.Rmi. Server Package The Naming Class - Creating RMI Client And Server Classes. SERVLET: Servlet and Dynamic Webpages Life Cycle of a Servlet a Simple Servlet Javax. Servlet Package Retrieving the Values Of Parameters. COOKIES : Creating a Cookie and Sending it to the Client - Retrieving the Stored Cookies.

Text book(s):

1. C. Muthu, Programming with JAVA, Vijay Nicole Imprints Pvt Ltd, 2nd Ed, Chennai, 2011.

Books for Reference :

1. Herbert Schildt, "Java 2: Complete Reference", Tata McGraw Hill, 5thEd., 2009.
2. Cay Horstmann, "Big Java", John Wiley & Sons, Inc., 4th Ed., 2010.
3. Sagayaraj, Denis, Karthik and Gajalakshmi, "Java Programming - for Core and Advanced Users", Universities Press, Hyderabad, 2017.

Outcomes:

The students will be able to work efficiently in the following areas. Object Oriented Programming, Packages, Interfaces and write simple Applets in Java, design User Interfaces using SWING Components and able to handle errors in programs, develop Threaded applications and perform Data Access using JDBC and develop distributed applications using RMI, Servlets and Cookies.

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CORE COURSE – II (CC)

DATABASE SYSTEMS

Objectives:

On completion of the course the student will be able to understand the workings of a relational database system, develop E-R diagrams, and normalize data; write SQL queries to access data; normalize the data up to BCNF; write PL/SQL routines to process the data in the database; implement concurrency and parallelism in a database.

Unit – I: Introduction: Database System Applications – Database Systems vs File Systems – View of data – Data Models – Database Languages – Database Users and Administrators – Transaction Management – Database System Structure – Application Architectures. **Entity – Relationship model**: Basic Concepts – Constraints – Keys – Entity – Relationship Diagram – Weak entity Sets – Extended E–R Features. **Relational Model**: Structure of Relational Database – Relational Algebra–Extended Relational Algebra Operations.

Unit – II: Integrity and security: Domain Constraints Referential Integrity – Assertions – Security and Authorization – Authorization in SQL – Encryption and Authentication. **Relational Database Design:** First Normal Form – Pitfalls in Relational Database Design – Functional Dependencies – Decomposition – Desirable Properties of Decomposition – Boyce-Codd Normal Form – Third Normal Form – Fourth Normal Form – More normal Forms .

Unit – III: Storage and File Structure: RAID – File Organization – Organization of Records in Files – Dictionary Storage. **Indexing and Hashing**: Basic Concepts – Ordered Indices – B+ – Tree Index Files – Static Hashing – Dynamic Hashing.

Unit - IV: Transaction Management: Transactions Concept – Transaction state – Implementation of Atomicity and Durability – Concurrent Executions– Serializability –**Concurrency control:** Lock Based Protocols – Timestamp Based Protocols – Validation Based Protocols – **Recovery system:** Failure classification – Storage Structure – Recovery and Atomicity – Log Based Recovery–Shadow Paging.

Unit – V: Introduction to Oracle: Classification of SQL Commands – Data Types – Operators – Built in functions – Sorting – Joins – Special Operators: Set Operators. **Indexing:** Removing Index – Creating Index on Multiple Columns. **Views:** Creating and Accessing – Classification of Views. **PL/SQL:** Introduction – Advantages of PL/SQL – Structure of PL/SQL Block – Conditional Statement – Stored Functions: Structure of Function – Compiling a Function – Calling a Function. **Stored Procedures:** Advantages of Procedures – Why Called "Stored Procedures"? – Differences between Procedures and Functions – Compiling a Procedure – Executing a Procedure. **Cursors:** What is

Cursor? – Purpose of Cursors – Classification of Cursors. **Database Triggers:** Components of Trigger–Types of Triggers.

Books for Study:

1. Abraham Silberchatz, Henry F. Korth and S. Sudharshan,"Data Base System concepts" McGraw Hill, Fifth Edition, 2006.
2. Satish Asnani, "Oracle Database 11g –Hands–on SQL and PL/SQL", PHI Learning, 2010.

Books for Reference:

1. C.J. Date, A. Kannan, S. Swamynathan, "Introduction to Database Systems", Pearson Education, Eighth Edition 2006.
2. Ramez Elmasri, "Fundamentals of Database Systems", Pearson Education, 2008.

Outcomes:

Excellent understanding of basic concepts of database systems and fundamental relational algebraic operations. Explain, Apply SQL queries, Create ER model for any database applications. Explain the normalization techniques, compare the file organization techniques; compare Indexing & Hashing techniques and Discuss the concepts of Transaction and Concurrency control.

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CORE COURSE – III (CC)

DATA STRUCTURES AND ALGORITHMS

Objectives:

Understand the basics of Data Structures and its applications. Apply the real time applications in Linear Data Structures. Analyze the different types of Trees and its basic operations. Evaluate the various types of algorithms in finding the complexities of the algorithms. Analyze and design algorithms for various applications.

Unit – I: Linear Data Structures: Concepts Of Non-Primitive Data Structures - Storage Structure For Arrays - Stacks - Operations On Stacks - Queues - Priority Queues.

Unit – II: Linked Linear Lists: Operations On Linked Linear Lists - Circularly Linked Lists - Doubly Linked Linear Lists. **Non-Linear Data Structure:** Trees - Binary Trees –Tree Traversal - Operations On Binary Trees - AVL Trees - Storage Representation And Manipulations Of Binary Trees..

Unit - III: Algorithms: Algorithm Specification - Pseudo Code Conventions, Recursive Algorithms. **Divide And Conquer**: General Method - Sequential Search - Binary Search - Finding The Maximum And Minimum - Merge Sort- Quick Sort- Insertion Sort - Selection Sort.

Unit - IV: (a) **Greedy Method:** General Method - Knapsack problem - Job Sequencing With Deadlines - Optimal Merge Patterns – Spanning Tree - Minimum Cost Spanning Trees. (b) **Algorithm Design Methods**: Sub goals - Hill Climbing and Working Backward - Heuristics - Backtrack Programming - Branch and Bound.

Unit – V: Dynamic Programming: General Method - Multistage Graphs – Single-Source Shortest Paths: General Weights - All Pair Shortest Path - Optimal Binary Search Trees - 0/1 Knapsack - Travelling Salesperson Problem.

Text Books:

1. Jean-Paul Tremblay and Paul G. Sorenson, “An introduction to data structures with applications”, 2nd Ed, Tata McGraw Hill Publishing Company Limited, New Delhi, 1995. Units I and II.
2. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Computer Algorithms”, Galgotia Publications, New Delhi, 2007. Units III, IV(a) and V.
3. S.E. Goodman and S.T. Hedetniemi, “Introduction to the Design and Analysis of Algorithms”, Tata McGraw Hill, International Edition, 1987. Unit: IV(b).

Reference Books:

1. An Introduction to Data Structures and Algorithms, James A Store, Springer Science, 2012.
2. Data Structures and Algorithms made easy, Narasimha Karumanchi, Create Space Independent Publishing Platform, 2011.
3. Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI
4. Data structures and Algorithms, V. Aho, Hopcropft, Ullman , LPE
5. Introduction to Design and Analysis of Algorithms - S.E. Goodman, ST.Hedetniemi- TMH

Outcomes:

Understand the fundamentals of Data Structures and basic concepts of String Processing, Linear Arrays. Analyze the representation of Linked Lists in memory, Stack, Queues and implement real time applications in Stack and Queues. Explore the structure of Trees, basic operations of Trees, analyze and illustrate the algorithms. Analyze the various algorithm designs and implementations. Develop solutions using advanced algorithms for various kinds of problems.

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CORE COURSE – IV (CC)

MATHEMATICAL FOUNDATIONS

Objectives:

To provide the basic knowledge of mathematics so as to enable them to apply in designing appropriate algorithms and mathematical models to solve problems. Understand sets, relations, relations, functions, and discrete structure and know the properties of lattices and Boolean Algebra. Ability to apply mathematical logic to solve problems and apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.

Unit – I: Set: Definition- Inclusion and Equality of sets– Power set– Operations on Set– Ordered pairs and n-tuples – Cartesian products. **Relation**: Definition – Properties – Relation Matrix – Graph of a Relation – Partition and covering of a set – Equivalence relation – Compatibility relations – Partial ordering. **Functions**: Definition – Composition of function – Inverse functions – Binary and n-ary Operations – Characteristic Function of a Set – Hashing Function.

Unit – II: Propositions : Fully parenthesized propositions – Evaluation of constant propositions – Evaluation of propositions in a state – Precedence rules for operators – Tautologies – Propositions as sets of states – Transforming English sentence to propositional form – Laws of Equivalence – Rules of substitution and Transitivity.

Unit – III: A formal system of Axioms and inference rules : Introduction to deductive proofs – Inference rules – Proofs and subproofs– Developing Natural deduction proofs.

Unit – IV: Graph: Basic Terminology – Multigraphs and weighted graphs – Paths and Circuits – Shortest paths in weighted graph – Euler graph – Hamiltonian Paths and circuits. **Tree**: Definition – Rooted trees – Path Lengths – Prefix codes – Binary Search Trees – Minimum Spanning Trees.

Unit – V: Manipulation of Numeric functions : Numeric functions– Generating functions –Recurrence Relation – Liner Recurrence Relations with constant coefficients – Homogeneous solutions – Particular solutions – Total solutions – Solution by the method of generating functions – Sorting algorithms.

Text books:

1. J.P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill.**[Unit I]**

2. David Gries, 'The Science of Programming' Narosa Publishing House,1981**[Units II&III]**
3. C.L. Liu, Elements of Discrete Mathematics, Second Edition, Tata McGraw-Hill book Company**[Units IV and V]**

Reference books:

1. Gersting J.L., Mathematical Structure for Computer Science, 3rd Edition W.H. Freeman and Co.,
2. K.H. Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book Company, 1999.
3. Leon S. Levy, 'Discrete structures of Computer Science', Wiley Eastern Ltd., 1980.

Outcomes:

Learners would be able to apply the mathematical knowledge in designing appropriate algorithms and mathematical models to solve problems. Understand sets, relations, relations, functions, and discrete structure and know the properties of lattices and Boolean Algebra. Would have gained the ability to apply mathematical logic to solve problems and apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.

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CORE ELECTIVE – I (CE)

A: DIGITAL COMPUTER FUNDAMENTALS

Objectives:

Apply digital number conversion from decimal to binary, octal, hexadecimal and vice versa. Use logic gates and evaluate the Boolean expressions using Karnaugh maps. Evaluate the combinational circuits and to apply them in digital circuits. Construct the sequential circuits using Flip Flops and evaluate them using truth tables Distinguish the technical specifications and applications of RAM and ROM.

Unit – I: Digital Logic: The Basic Gates-NOT, OR, AND - Universal Logic Gates- NOR, NAND - AND-OR-Invert Gates. Combinational Logic Circuits: **Boolean Laws and Theorems** - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads, and Octets - **Karnaugh Simplifications** - Don't-care Conditions - Product-of-sums Method - Product-of-sums Simplification.

Unit – II: Data-Processing Circuits: Multiplexers - Demultiplexers - 1-of-16 Decoder - BCD-to-decimal Decoders - Seven-segment Decoders - Encoders - Exclusive-OR Gates. **Number Systems and Codes**: Binary Number System - Binary-to-decimal Conversion - Decimal-to-binary Conversion- Octal Numbers - Hexadecimal Numbers - The ASCII Code - The Excess-3 Code - The Gray Code.

Unit – III: Arithmetic Circuits: Binary Addition - Binary Subtraction - Unsigned Binary Numbers - Sign-magnitude Numbers - 2's Complement Representation - 2's Complement Arithmetic- Arithmetic Building Blocks - The Adder-subtracter - Arithmetic Logic Unit - Binary Multiplication and Division. **Flip-Flops**: RS FLIP-FLOPs - Gated FLIP-FLOPs - Edge-triggered RS FLIP-FLOPs – Edge triggered D FLIP-FLOPs - Edge-triggered JK FLIP-FLOPs - JK Master-slave FLIP-FLOPs.

Unit – IV: Registers: Types of Registers - Serial In-serial Out - Serial In-parallel Out - Parallel In-serial Out - Parallel In-parallel Out - Universal Shift Register - Applications of Shift Registers. **Counters**: Asynchronous Counters - Decoding Gates - Synchronous Counters.

Unit-V: Memory: Basic Terms and Ideas - Magnetic Memory - Optical Memory - Memory Addressing - ROMs, PROMs, and EPROMs - RAMs-Virtual Memory-Cache Memory.

Books for Study:

1. Donald P. Leach and Albert Paul Malvino, “Digital Principles and Application”, Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.

Books for Reference:

1. Thomas C. Bartee, “Digital Computer Fundamentals”, McGraw-Hill International Edition, New Delhi, 1985.
2. Morris Mano and Michael D Ciletti, “Digital Design”, 4th Edition, Pearson publications, 2008.

Outcomes:

Capability to apply digital number conversion from decimal to binary, octal, hexadecimal and vice versa; Use logic gates and evaluate the Boolean expressions using Karnaugh maps; Ability to evaluate the combinational circuits and to apply them in digital circuits; Construct the sequential circuits using Flip Flops and evaluate them using truth tables Distinguish the technical specifications and applications of RAM and ROM.

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CORE ELECTIVE – I (CE)

B: COMPUTER ORGANIZATION AND ARCHITECTURE

Objectives:

To provide knowledge about various types of data, types and working of flip-flops, CPU and its inner details of how CPU works by instructions; ideas about variety of memory modules and how they work, I/O processing and about interrupts and their use.

Unit – I: Data representation-Data types-Logic gates-Flip flops-Functional Units of a PC- Basic operational concepts

Unit – II: CPU registers- Counters-Register transfer-Instruction formats- System buses- Addressing modes- Instruction cycle.

Unit - III: Processing unit- Design of a Simple CPU- Fetching Instructions-branching-Design of a control unit-multiple buses in CPU-Micro program-Micro sequencer.

Unit – IV: Memory-Memory hierachy-Speed-Size-RAM-ROM-Cache memory-HIT Ratio-Multilevel organization of Cache memory.

Unit – V: Input -Output operations-Accessing Input-Output devices-Asynchronous data transfers-Handshaking-Programmed Input -Output -Polling-Interrupts- Types of Interrupts-Processing Interrupts-Priority-Interrupt hardware.

Text book(s):

1. M. Morris Mano. 'Computer System Architecture', Third edition, Pearson education.
2. John. P. Hayes, 'Computer Architecture and organization', Fourth edition, McGraw Hill publishers.
3. Carpinelli, John.D, 'Computer system organization and Architecture', Pearson education.

Book(s) for Reference:

1. Carl Hamacher, Vranesic, Zaky," Computer organization", Fourth edition, McGraw Hill publishers.

Outcomes:

Students would have gained knowledge about various types of data, types and working of flip-flops, CPU and its inner details of how CPU works by instructions; ideas about variety of memory modules and how they work, I/O processing and about interrupts and their use.

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CORE ELECTIVE – I (CE)

C: SOFTWARE ENGINEERING

Objectives:

To acquire knowledge in various software development models, Extract and analyze software requirements specifications for different projects; Develop skills in basic architecture/design and apply standard coding practices; Ability to define the basic concepts and importance of software project management concepts like cost estimation, scheduling and reviewing progress; Identify and implement of the software metrics; Apply different testing and debugging techniques and analyzing their effectiveness; Critically analyse and provide; recommendations to improve the operations of the development of the project; Demonstrate the need for appropriate decision making, control and performance evaluation of a project.

Unit – I: Software Product and Process – Role of Software – Software – software myths - Software process – Software process model s – Linear sequential model – Prototyping model – RAD Model - Evolutionary software process models – Incremental model – Spiral Model – Win WIN spiral model – concurrent model - format method models – fourth generation techniques – process technology

Unit – II: Software Project Planning – Project Planning Objectives – Software Scope – Resources – Software project estimation – Decomposition techniques – Empirical Estimation Techniques – Software Risk Analysis – Software Risk – Risk Identification – Risk Projection – Risk Refinement – Risk Mitigation - Software Quality Assurance – Quality concepts – SQA activities – Software reviews – Formal technical reviews – Approaches to SQA – Software Reliability – SCM Process – version control – change control – SCM standards.

Unit – III: Design concepts and principles – Design Process – Design Principles – Design Concepts – Effective Modular Design – Design Model – Design Documentation – Architectural Design – Software Architecture – Data Design – Architectural styles – Architectural Design – Mapping requirements – Transform Mapping – Transaction Mapping – User Interface Design – Interface Design activities.

Unit – IV: Software Testing Techniques – Testing Objectives – Principles – Testability – Test case Design – White-Box Testing – Basis path Testing – Control structure Testing – Black-Box Testing – Software Testing Strategies – Strategic approach – Strategic issues – Integration Testing – Validation Testing – System Testing – Art of Debugging.

Unit – V: Component –Based Software Engineering – CBSE process - Domain Engineering – Component-Based development – Economics of CBSE – Client / Server Software Engineering - Structure of Client/Server system – Design for

C/S system – Web Engineering – Attributes of Web-Based applications – Frame work of WebE – Design of WebE.

Text Books:

1. Roger S. Pressman, "Software engineering- A practitioner's Approach", McGraw-Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, "Software engineering", Pearson education Asia, 6th edition, 2000.
3. Richard E. Fairley, "Software Engineering Concepts ", McGraw-Hill edition, 2002.

Reference Book:

1. Jibithesh Mishra, Ashok Mohanty, "Software Engineering", Pearson Education, 2011.

Outcomes:

Students would have acquired knowledge in various software development models, Capable of extracting and analyzing software requirements specifications for different projects; Develop skills in basic architecture/design and apply standard coding practices; Ability to define the basic concepts and importance of software project management concepts like cost estimation, scheduling and reviewing progress; Identify and implement of the software metrics; Apply different testing and debugging techniques and analyzing their effectiveness; Critically analyse and provide; recommendations to improve the operations of the development of the project; Demonstrate the need for appropriate decision making, control and performance evaluation of a project.

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CORE PRACTICAL – I (CP)

PROGRAMMING IN JAVA

Objectives:

To provide hands on training to solve real world problems using OOP techniques; design GUI based applications using SWING; to develop Applets and Servlets for distributed web applications, to perform Database Operations using JDBC, to design and Develop a Java Application for real time environment.

1. Classes & Objects
2. Inheritance & Polymorphism
3. Packages & Interfaces
4. Applet & Swing
5. Exception Handling
6. I/O Streams
7. Multithreading
8. Networking &JDBC
9. RMI
10. Servlets
11. Cookies
12. JDBC

Outcomes:

The learners would have had training in solving real world problems using OOP techniques; design GUI based applications using SWING; to develop Applets and Servlets for distributed web applications, to perform Database Operations using JDBC, to design and Develop a Java Application for real time environment.

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CORE PRACTICAL – II (CP)

RDBMS

Objectives:

To impart knowledge of creating tables with all possible integrity constraints; Write complex SQL queries; Generate reports by using SQL plus commands; Use cursors, functions, procedures, packages and triggers in the back end; Design and Develop forms to interact with the database

1. SQL – Data Definition Language
1.1 Table Creation with Constraints
1.2 Table Alteration (Add Column, Modify the size and data type, Drop Column)
1.3 Drop Table

2. SQL – Data Manipulation Language
2.1 Data Insertion
2.2 Data Updating
2.3 Data Deletion
2.4 Ordering Tuples
2.5 Tuple Variable
2.6 Pattern Matching
2.7 Build-in Function
2.8 Set Operations
2.9 Join Operations
2.10 Nested Subqueries Views

3. PL/SQL
3.1 Reverse the string.
3.2 Delete any record and count it.
3.3 Student Mark Sheet Preparation
3.4 Pay Roll preparation.
3.5 Excess record stored in separate files.
3.6 Split a table in to two tables.
3.7 Joining two tables in to one table.
3.8 Find factorial number using recursive function.
3.9 Find Fibonacci series using recursive function.

4. SQL Forms
4.1 Student Mark System
4.2 Pay Roll Preparation
4.3 Income Tax Calculation
4.4 Train Reservation System

Outcomes:

On completion of the course the student will be able to create tables with all possible integrity constraints; write complex SQL queries; generate reports by using SQL plus commands; use cursors, functions, procedures, packages and triggers in the back end; design and Develop forms to interact with the database

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BRIDGE COURSE – I (BC)

PROGRAMMING IN C AND C++

Objectives:

To provide knowledge of basics elements of C and C++ languages, their specifications, functions, passing of parameters, control constructs; Special features of C language such as Structures and Unions, Pointers and types of files and processing them; Classes and objects in C++ language and the features of C++ and to use them effectives to solve problems.

Unit – I: History, Execution of C Program, Constants, Variables and Keywords, Data types, Expressions, constants, variables, Operators, Operator Precedence and associatively, data input and output, Formatted Console I/O Functions, Conversion Specifications, assignment statements, conditional statements, Looping Statements, Storage Classes

Unit – II: Array and Modular Programming: Introduction to Function, Functions with Simple Output Parameters, Passing Values between Functions, Multiple Calls to a Function, Parameter Passing by Value v/s Parameter Passing by Reference, Recursion. Arrays: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Multidimensional Arrays, Passing arrays as arguments

Unit – III: Structures, Unions, Strings, Pointers and files: Structures & Unions- definition, Processing structures – Passing structures to a function. Pointers: Operations on Pointers – Pointers to Functions, Functions Returning Pointers, Arrays of pointers. String handling - Text and data file processing.

Unit – IV: Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language. Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, input and output, Conditional expression, loop statements, breaking control statements.

Unit – V: Classes and objects, constructors and destructors, function and operator overloading, inheritance, Virtual Function, friend function, this pointer, dynamic type information and polymorphism. C++ streams, console stream classes, formatted and unformatted console I/O operations, manipulators, File streams, classes file modes file pointers and manipulations file I/O, Exception handling, dynamic memory allocation.

Text books:

1. E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, New Delhi, 8th Edition, 2019.

2. E. Balagurusamy, “Object-oriented Programming with C++”, Tata McGraw Hill, New Delhi, 7th Edition, 2017.

Books for reference:

1. Herbert Schildt, “C++: The Complete Reference”, McGraw Hill Education India, 4th Edition, 2017.
2. Herbert Schildt, “C: The Complete Reference”, McGraw Hill Education India, 4th Edition, 2017.

Outcomes:

The students would have gained knowledge of basics elements of C and C++ languages, their specifications, functions, passing of parameters, control constructs; Special features of C language such as Structures and Unions, Pointers and types of files and processing them; Classes and objects in C++ language and the features of C++ and to use them effectives to solve problems.

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BRIDGE COURSE – II (BC)

INFORMATION TECHNOLOGY

Objectives:

To provide the foundations of data, numbers, ideas of acquisition of variety of data including image, video and audio; structure of CPU, elements of WAN and LAN, Operating systems and Data organisation.

Unit – I: Data and Information: Types of Data - Simple Model of a Computer - Data Processing Using a Computer - Desktop Computer Acquisition of Numbers and Textual Data: Input Units - Internal Representation of Numeric Data - Representation of Characters in Computers - Error-Detecting Codes - Acquiring Image Data: Acquisition of Textual Data - Acquisition of Pictures - Storage Formats for Pictures - Image Compression – Fundamentals - Image Acquisition with A Digital Camera

Unit – II: Acquiring Audio Data**:** Basics of Audio Signals - Acquiring and Storing Audio Signals - Compression of Audio Signals - Acquisition of Video: Capturing a Moving Scene with a Video Camera - Compression of Video Data - MPEG Compression Standard - Data Storage: Storage Cell - Physical Devices Used as Storage Cells - Random Access Memory - Read Only Memory - Secondary Storage - Compact Disk Read Only Memory - Archival Store

Unit – III: Structure of a Central Processing Unit - Specifications of a CPU - Interconnection of CPU with Memory and I/O Units - Embedded Processors. Computer Networks: Local Area Network - Applications of LAN - Wide Area Network (WAN) – Internet - Naming Computers Connected to Internet- Future of Internet Technology. Output Devices: Video Display Devices - Touch Screen Display - E-Ink Display – Printers - Audio Output

Unit - IV: Operating System - Programming Languages - Classification of Programming Languages - Classification of Programming Languages Based on Applications Data Organization: Organizing a Database - Structure of a Database - Database Management System - Example of Database Design - Non-Text Databases - Archiving Databases. Processing Numerical Data: Use of Spreadsheets - Numerical Computation Examples. Processing Multimedia Data: Graphics Processing - Audio Signal Processing

Unit – V: Some Internet Applications – Email - World Wide Web - Information Retrieval from the World Wide Web - Other Facilities Provided by Browsers - Audio on the Internet - Accessing Pictures and Video via Internet. Business Information Systems: Types of Information Needed by Organizations - Why Should We Use Computers in Businesses? -

Management Structure and their Information Needs - Design of an Operational Information System - System Life Cycle - Computer System for Transaction Processing Electronic Commerce: Introduction - Business to Customer E-Commerce - Business to Business E-Commerce - Customer to Customer E-Commerce - Advantages and Disadvantages of e-Commerce - E-Commerce System Architecture - Digital Signature - Payment Schemes in e-Commerce - Electronic Clearing Service in e-Commerce - Cash Transactions in e-Commerce - Payment In C2C e-Commerce - Electronic Data Interchange - Intellectual Property Rights and Electronic Commerce - Information Technology Act. Societal Impacts of Information Technology: Introduction - Social Uses of World Wide Web - Privacy, Security and Integrity of Information - Disaster Recovery - Intellectual Property Rights - Careers in Information Technology

Text Book:

1. V. Rajaraman, "Introduction to Information Technology", PHI Learning Pvt. Ltd., New Delhi, Second Edition, 2018.

Book for Reference:

1. Pelin Aksoy, "Introduction to Information Technology", Cengage Learning, 2009.

Outcomes:

Learners would have understood the foundations of data, numbers, ideas of acquisition of variety of data including image, video and audio; structure of CPU, elements of WAN and LAN, Operating systems and Data organisation.

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BRIDGE PRACTICAL – I (BP)

PROGRAMMING IN C AND C++

Objectives:

To provide hands on training to handle various data types in C language; use control structures, strings and arrays; functions, pointers and their combinations. To define and create classes and objects, to understand the ideas of call by value, references; create and use all types of constructors and to use the ideas of inheritance, virtual functions and polymorphism. To learn to operate with files in C and C++ languages.

C-language:

1. Data types & Expressions, Constants & Variables, Operators, Operator Precedence and associatively, Storage Classes
2. Conditional statements, Looping Statements, Array and Modular Programming,
2. Basic Array programs using for loop, User defined functions, Recursion.
3. Programs on Two dimensional Arrays, Passing arrays as arguments, String handling based on String Functions and Character Operation
4. Programs based on an array of Pointers to Strings, Structure and Pointers, Programs based on Structures & Unions
5. Programs based on pointers (arithmetic operations on Pointer, arrays with pointers), Programs of Pointers to structures and Array of structures.

C++ - language:

6. Program using functions, functions with default arguments, implementation of call by value, address, reference.
7. Simple classes for understanding objects, member functions & constructors, classes with primitive data members, classes with arrays as data members, classes with pointers as data members, classes with constant data members, classes with static member functions.
8. Compile time polymorphism: operator overloading, function overloading,
9. Run time polymorphism, inheritance, virtual functions, virtual base classes, templates.
10. File handling, sequential access, random access.

Outcomes:

The learners would have learnt to handle various data types in C language; use of control structures, strings and arrays; functions, pointers and their combinations; to define and create classes and objects, to understand the ideas of call by value, references; create and use all types of constructors and to use the ideas of inheritance, virtual functions and polymorphism; learnt to operate with files in C and C++ languages.

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CORE COURSE – V (CC)

ACCOUNTING AND FINANCIAL MANAGEMENT

Objectives:

To provide knowledge to analyze and record transactions, construct financial statements, and close the books for the accounting period and will have the ability to adjust and correct errors in the process of accounting; understand the fall in value of assets and use of accounting packages; identify and analyze the costing systems adopted in the business organizations and can demonstrate mastery of costing systems, cost management systems; appreciate budgeting systems and performance and critically analyze and provide recommendations to improve the operations of organizations; demonstrate the need for appropriate decision making, control and performance evaluation of an organization.

Unit – I: Accounting Principles and Concepts – Double entry book keeping- Income and expenditure- Accounting record and system- assets and liabilities- Depreciation, Depletion and Amortization - Accounting for depreciation.

Unit – II: Journal – Ledger- Trial Balance- Trading, Manufacturing and profit and Loss account – Balance sheet.

Unit – III: Analysis and interpretation of financial statements with ratios.

Unit – IV: Cost Accounting- Methods and Techniques of Cost Accounting- classifications of cost - Material Cost- Labour Cost – Overhead- fixed and variable cost- Cost volume – profit analysis - marginal costing and decision making.

Unit – V: Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

Text Book(s):

1. T.S. Grewal, "Double Entry Book Keeping", All India Sultan Chand (Recent Edition)
2. S.N. Maheswari "Principles of Management Accounting ", Sultan Chand, New Delhi (Recent Edition)
3. Shukla, Grewal& Gupta, "Advanced Accounts "Sultan Chand Publications

Reference(s):

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recent edition)
2. Khan and Jain "Financial Management" Tata McGraw Hill (Recent Edition).

Outcomes:

On completion of the course the student will be able to analyze and record transactions, construct financial statements, and close the books for the accounting period and will have the ability to adjust and correct errors in the process of accounting; Understand the fall in value of assets and use of accounting packages. Identify and analyze the costing systems adopted in the business organizations and can demonstrate mastery of costing systems, cost management systems; Appreciate budgeting systems and performance and critically analyze and provide recommendations to improve the operations of organizations; Demonstrate the need for appropriate decision making, control and performance evaluation of an organization.

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CORE COURSE – VI (CC)

OPERATING SYSTEMS

Objectives:

To provide knowledge to understand the fundamental concepts of an Operating systems; design and solve synchronization, deadlock problems; understand and analyse theory concepts of Memory Management; ability to analyse the structure and basic architectural components involved in file System; acquire knowledge about protection and security mechanisms in Operating system

Unit – I: Operating Systems Objectives and functions – Operating System and User Computer Interface, Operating System as a Resource Manager: Evaluation of Operating Systems– Serial Processing, Sample Batch Systems, Time Sharing Systems.

Unit – II: Process Description, Process Control – Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion – Hardware support, Mutual Messages – Deadlock – Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

Unit – III: Memory Management – Memory Management Requirements – Fixed Partitioning, Placement Algorithm, Relocation in a Paging System – Sample Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set Management.

Unit – IV: Scheduling – Types of Scheduling, scheduling Algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O function, Logical structure of the I/O function, I/O Buffering, Disk Cache.

Unit – V: File Management – Files, File Management Systems, File System Architecture, Functions of File Management File Directories – File Sharing – Secondary Storage Management – File allocation.

Text Books:

1. William Stallings, "Operating Systems", Second edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, "Operating Systems-A Design Oriented Approach", IRWIN Publications Chicago, 1997.

Books for Reference:

1. Ann McIver McHoes and Ida M. Flynn, Understanding Operating Systems, Sixth Edition, Course Technology, CengageLearningm2011
2. Ann McHoes, Ida M. Flynn**, Understanding Operating Systems, Seventh Edition,** Cengage Learning, 2013.
3. Deital H.M. "An Introduction to Operating Systems", Addison Wesley Publishing
4. Silberchatz A., Peterson J.L., Galvan P. "Operating System Concepts", ThirdEdition, Addison Wesley Publishing Co.,1992.

Outcomes:

The student will be able to Understand the fundamental concepts of an Operating systems; Design and solve synchronization, deadlock problems; understand and analyse theory concepts of Memory Management; ability to analyse the structure and basic architectural components involved in file System; acquire knowledge about protection and security mechanisms in Operating system

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CORE COURSE – VII (CC)

DISTRIBUTED TECHNOLOGIES

Objectives:

To provide ideas to be able to compare the architectures of distributed systems; to be able to differentiate the technologies associated with presentation and interaction services; to have sound knowledge in developing applications with components; to know the art of developing ASP.NET pages with web server and HTML controls; familiar with the disconnected data access technology in ADO.NET.

Unit – I: Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies - Client server architecture: 2-tier model - 3-tier model - n-tier model.

Unit – II: J2EEarchitecture - DOTNET architecture - MVC Architecture - Java Beans –Enterprise Java Beans – Distributed Object models – RMI – XML-JSP.

Unit – III: Advanced ASP, NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Web Parts - Security in ASP, NET – State Management in ASP, NET – Mobile Application development in ASP. NET- Uses of these controls and features in Website development.

Unit – IV: Advanced ADO. NET – Disconnected Data Access – Grid view, Details View, Form View controls – Crystal Reports – Role of ADO.NET in Distributed Applications.

Unit – V: Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through n ASP.NET application.

TEXT BOOKS:

1. Walther, ASP. NET 3.5, SAMS Publication, 2008.
2. Justin Couch, Daniel H.Steinberg, “J2EE Bible”, Wiley India(P) Ltd, NewDelhi, 2002

REFERENCES:

1. Platt S David, “Introducing Micorsoft .Net”, Prentice Hall of India, New Delhi, 2005.
2. Paul Tremblett, “Instant Enterprise Java y – Beans”, Tata McGraw Hill Publishing Company, New Delhi, 2001

3. Stephanie Bodoff, Dale Green, Eric Jendrock, “The J2EE tutorial”, Addison-Wesley, 2002
4. Hitesh Seth, “Microsoft .NET: kick start”, Sams Publishing, 2004

Outcomes:

On completion of the course the student will be able to compare the architectures of distributed systems; able to differentiate the technologies associated with presentation and interaction services; have sound knowledge in developing applications with components; know the art of developing ASP.NET pages with web server and HTML controls; familiar with the disconnected data access technology in ADO.NET.

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CORE COURSE – VIII (CC)

PROGRAMMING IN PYTHON

Objectives:

To enable the students to understand the concepts of programming in Python. To provide knowledge in core python, concepts like modules and packages, file handing, regular expressions, exception handling, to be able to work with numbers and data and to use them with visualisation tools.

Unit – I: Introduction to Python: Features of Python - How to Run Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) - Input, Output and Import Functions. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary. **Flow Control:** Decision Making-Loops-Nested Loops-Types of Loops.

Unit – II: Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value. **Modules and Packages:** Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - dir() function - reload() function - Packages in Python - Date and Time Modules. **File Handling:** Opening a File - Closing a File - Writing to a File - Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

Unit – III: Object Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python-Encapsulation - Data Hiding-Inheritance - Method Overriding-Polymorphism. **Exception Handling:** Built-in Exceptions - Handling Exceptions - Exception with Arguments - Raising Exception - User-defined Exceptions. **Regular Expressions:** match() function - search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - findall() method - compile() method.

Unit – IV: Introduction to NumPy: Basics of NumPy Array – Computation on NumPy Array – Aggregations – Broadcasting – Comparisons, Masks and Boolean Logic – Sorting Arrays – NumPy Structured Array. **Data Manipulation with Pandas**: Introducing Panda Objects – Data Indexing and Selection - Operating Data on Pandas – Handling Missing Data – Hierrachical Indexing – Combining DataSets – Vectorized String Operations – Working with Time Series.

Unit – V: Visualization with Matplotlib: Simple Line Plots – Simple Scatter Plots – Visualizing Errors – Density and Contour Plots – Histograms, Binnings and Density – Customizing Plot Legends – Customising Colorbars – Multiple Subplots – Text and Annotation – Three Dimension Plotting in Matplotlib – Geographic Data with Basemap – Visualization with Seaborn

Text Book(s) :

1. Jeeva Jose and P. SojanLal, "Introduction to Computing and Problem Solving with Python", Khanna Book Publishing Co. (P) Ltd., 2019, **ISBN**: 9789382609810. (**Units: I, II & III).**
2. Jake Vander Plas, **"**Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media, 2016. **ISBN:** 9352134915. **(Units: IV & V).**

Book for References :

1. Wesley J. Chun, "Core Python Programming", Second Edition, Prentice Hall, 2006.
2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, ISBN:9780071321228.

Outcomes:

Students would have understood the concepts of programming in Python. Gained knowledge in core python, concepts like modules and packages, file handing, regular expressions, exception handling, would be able to work with numbers and data and to use them with visualisation tools.

*****

CORE ELECTIVE – II (CE)

A: PROBABILITY AND STATISTICS

Objectives:

To provide knowledge to understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena and translate real-world problems into probability models and finding a reasonable solution ; to understand and use the properties of discrete and continuous distribution functions and its applications; apply Mathematical expectations, Correlation and Regression for Practical Problems and Identify when and how to use various tests of hypothesis such as t, F, Chi-square; to understand the ideas of variety of Queues and their characteristics and to apply them in applications.

Unit – I: Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Baye's theorem of probability and Geometric probability. Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions

Unit – II: Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions and their properties. (Definition, mean, variance, moment generating function, Additive properties, fitting of the distribution.) **Continuous distributions:** Uniform, Normal, exponential distributions and their properties. Curve fitting using Principle of Least Squares.

Unit – III: Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, multiple Regression, Attributes, coefficient of Association, Chi-square test for goodness of fit, test for independence.

Unit – IV: Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of significance, power of the test.

Unit – V: Queuing theory: Queue description, characteristics of a queuing model, steady state solutions of M/M/1: α Model, M/M/1; N Model.

Text book(s):

1. T. Veerarajan, "Probability, Statistics and Random Processes", Tata McGraw Hill, New Delhi, 2017.

Reference Books:

1. Yuri Suhov, Mark Kelber, Probability and Statistics by Example, CambridgeUniversity Press,2014.
2. Kishor S. Trivedi, "Probability and Statistics with Reliability, Queuing, and Computer Science Applications", Wiley, 2nd Edition, 2008.

Outcomes:

Upon successful completion of this subject, the student will be able to: Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena and translate real-world problems into probability models and finding a reasonable solution; Understand and use the properties of discrete and continuous distribution functions and its applications; apply Mathematical expectations, Correlation and Regression for Practical Problems and Identify when and how to use various tests of hypothesis such as t, F, Chi-square; understood the ideas of variety of Queues and their characteristics and to apply them in applications.

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CORE ELECTIVE – II (CE)

B: RESOURCE MANAGEMENT TECHNIQUES

Objectives:

To identify real life problems as Linear Programming model and find an optimized solution; To apply the primal dual relationship as producer and consumer relationship in business; to understand the concept of solving transportation problems and assignment problem with business solutions; to use CPM and PERT techniques, to plan, schedule, and control project activities; analyse and choose the best course of action out of several alternative courses for the purpose of achieving objectives by solving game problems.

Unit – I: Linear Programming: Formulations and Graphical solution to L.P. Problem Simplex method-Degeneracy, Unbounded and infeasible solution– Two Phase Method.

Unit – II: Linear Programming (contd): Duality-Primal and Dual Computations – Dual Simplex Method - Transportation problem and its solution-Assignment problem and its solution by Hungarian method.

Unit – III: Project scheduling by PERT / CPM: Phases of project scheduling –Arrow Diagram - Critical Path Method - Probability Considerations in Project Scheduling.

Unit – IV: Queueing Theory: Queueing System - Characteristics of Queueing system - classification of queues - Poisson Queues - M/M/1 and M/M/C Queueing Models.

Unit – V: Inventory Management: Inventory Control - ABC analysis - Economic Lot size Problems - EOQ with uniform Demand and shortages - Limitations of inventories - Buffer stock - Determination of Buffer stocks. Note: Stress to be on solving Numerical Problems only.

Text book:

1. Kanti Swarup, P K Guptha and Man Mohan, “Operations Research”, Sultan Chand & Sons, New Delhi, 2013.

Book(s) for Reference:

1. Hamdy A. Taha, “Operations Research-An Introduction”, Macmillan Publishing Co, 5th Edition, 1987.
2. P.K.Gupta, Man Mohan, “Operations Research and Quantitative Analysis”, Sultan Chand & Sons, New Delhi First Edition, 1987.

Outcomes:

The students would have learnt to identify real life problems as Linear Programming model and find an optimized solution; apply the primal dual relationship as producer and consumer relationship in business; understood the concept of solving transportation problems and assignment problem with business solutions; to use CPM and PERT techniques, to plan, schedule, and control project activities; analyse and choose the best course of action out of several alternative courses for the purpose of achieving objectives by solving game problems.

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CORE ELECTIVE – II (CE)

C: THEORY OF COMPUTATION

Objectives:

To understand the concept of machines such as finite automata, pushdown automata, linear bounded automata, and Turing machines; to understand the formal languages and grammars: regular grammar and regular languages, context-free languages and context-free grammar; and introduction to context-sensitive language and context-free grammar, and unrestricted grammar and languages; to understand the relation between these formal languages, grammars, and machines; to understand the complexity or difficulty level of problems. to compare the complexity of problems.

Unit – I: Automata Theory: Set, Relation and Function– Introduction to Formal Proof– Additional Forms of proof – Inductive proofs – Alphabets, Strings and Language – Finite representation of language– Chomsky hierarchy.

Unit – II: Finite Automata And Regular Expressions: Deterministic Finite Automata – Nondeterministic Finite Automata – Finite Automata with Epsilon Transitions – Regular Expression – Finite Automata and Regular Expressions– Equivalence of Regular languages.

Unit – III: Context-Free Grammars And Pushdown Automata: Context-Free Grammars – Parse Trees – Applications of Context-free Grammars – Ambiguity in Grammars and Languages – Definition of Pushdown Automata – The languages of Pushdown Automata – Equivalence of PDA and CFG – Deterministic Pushdown Automata.

Unit – IV: Context-Free Languages And Turing Machine: Definition– Languages that are and are not Context-free – Normal Forms – Pumping Lemma for Context-Free Languages – Closure and Decision Properties of Context Free Languages – Definition of Turing Machines – Computing with Turing Machine – Extensions of Turing Machine – Random Access Turing Machine – Nondeterministic Turing Machine.

Unit – V: Undecidability And Computational Complexity: The Church-Turing Thesis – Universal Turing Machine – The Halting Problem – Unsolvable Problems about Turing Machines – Class P, Class NP – NP-completeness.

Text books:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, “Introduction to Automata Theory, Languages and Computations”, Second Edition, Pearson Education, 2009
2. H.R. Lewis and C.H. Papadimitriou, “Elements of The theory of Computation”, Second Edition, Pearson Education/PHI, 2007

Reference books:

1. J. Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2008
2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman, "Compilers: Principles, Techniques, & Tools", Second Edition, Boston, Addison-Wesley, 2007.

Outcomes:

The students will be able to design Finite Automata machines for given problems; able to analyze a given Finite Automata machine and find out its Language; able to design Pushdown Automata machine for given CF language(s); able to generate the strings/sentences of a given context-free languages using its grammar; able to design Turing machines for given any computational problem.

*****

CORE PRACTICAL – III (CP)

DISTRIBUTED TECHNOLOGIES

Objectives:

To develop RMI/CORBA applications; have skills to develop web applications using Servlet and JDBC; have experience to create presentation services using JSP; to develop secured, robust and scalable distributed applications; to have the knowledge to develop appropriate ASP.NET web applications and understand the disconnected data access technology in ADO.NET.

1. RMI application with a server and more than one client.
2. RMI application with Database Connectivity
3. Webpages using JSP Scriptlet.
4. Webpage using JSP of java beans.
5. Performing XML transformation using XML and XSL coding.
6. Create XML Schema.
7. Creation of a table and insertion of a few records using Disconnected Access.
8. Viewing records using GridView, Details View, Form View Controls.
9. Generation of a crystal report from an existing database.
10. Web page that uses of Ad Rotator Control.

Outcomes:

The learners will have the ability to develop RMI/CORBA applications; have skills to develop web applications using Servlet and JDBC; have experience to create presentation services using JSP; develop secured, robust and scalable distributed applications; have the knowledge to develop appropriate ASP.NET web applications and understand the disconnected data access technology in ADO.NET.

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CORE PRACTICAL – IV (CP)

PROGRAMMING IN PYTHON

Objectives:

To introduce the ideas of programming in Python; to provide knowledge in core python, advanced concepts like regular expressions; to handle numerical data and strings and to operate on data sets; to visualize the data.

1. Flow controls, Functions and String Manipulation.
2. Operations on Tuples and Lists.
3. Operations on Sets and Dictionary.
4. Simple OOP – Constructors, Method Overloading, Inheritance.
5. Reading and Writing Files & Regular Expressions.
6. NumPy Arrays, Sorting and Searching on Arrays.
7. String and Date &Time Functions using NumPy.
8. Data Series, Data Frame using Pandas.
9. Combining and Merging Data Sets.
10. Graphs and Charts using MatplotLib.

Outcomes:

The students would have gained the ideas of programming in Python; knowledge in core python, advanced concepts like regular expressions; able to handle numerical data and strings and operate on data sets; capable of visualizing the data.

*****

BRIDGE COURSE – III (BC)

WEB DESIGN

Objectives:

To understand the basic concepts of Internet; identify the features of HTML tags; to design the HTML tables, frames and forms; to design applications with JavaScript Programming; to comprehend the objects in HTML and Java Script.

Unit – I: Networking Concepts: INTERNET - History - Applications-Users – Protocols - Host Machines and Host Names - Internet Architecture and Packet Switching- Client Server Model - Band width and Asynchronous Communication. Connection: Dial-up Access-Direct and Dedicated Connections - shell or TCP/ IP accounts - Domains and Addresses – IP addresses.

Unit – II: HTML: Introduction to HTML Tags - Document Layout - Comments - Headings-Paragraphs -Breaks - Texts - Lists - Special Characters.

Unit – III: HTML: Tables - Linking documents - Frames - Form and its elements.

Unit – IV: JavaScript: Introduction to JavaScript - JavaScript in web pages-writing JavaScript with HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions - dialog boxes.

Unit – V: **JavaScript:** JavaScript DOM: JSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - Handling events - The form object - built-in objects-user defined objects - cookies - setting a cookie.

Text book(s):

1. Wendy G. Lehnert, "Internet 101 - A Beginners Guide To The Internet And The World Wide Web", Addison-Wesley, 1999.(Unit-I).
2. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010.(Units-II, III, IV, V)

Books for Reference :

1. Chuck Musciano& Bill Kennedy, "HTML - The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
2. Raj Kamal, " Internet And Web Technologies", TMH, New Delhi, SBN: 9780070472969
3. John Pollock, "JavaScript A Beginner's Guide", The McGraw-Hill, 2010.

Outcomes:

After completing this course the students will be able to understand the basic concepts of Internet; identify the features of HTML tags; design the HTML tables, frames and forms; design applications with JavaScript Programming; work with the objects in HTML and Java Script.

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BRIDGE COURSE – IV (BC)

INTRODUCTION TO INTERNET

Objectives:

To introduce the ideas of working with Internet, knowledge of basic hardware, WWW, basics of Electronic Commerce, communication using Internet, and to have own space in the Internet.

Unit – I: Welcome to the Internet – Internet Safety – Viruses, Spyware, Spam – Advantages of Internet – Web bugs, Cookies – Internet and Kids – Useful websites - Internet – Connecting with WiFi, Laptops and Smart phones - The Types of Internet Connections - What's in an Account? - Speedy Connections: DSL and Cable – Broadband - A hub, switch, or router - Setting up a router - Wiring your computers into a LAN - Set a password - Making the Wi-Fi connection

Unit – II: What Is the Web?- Linking up Web pages – Web Surfing with Your Browser - The best place to start browsing - Browsing from Your Smartphone - Telling the browser what to display at the start – Storing Passwords - Getting and Installing a Browser - Saving Stuff from the Web - Saving text from a page - Saving an image - Printing pages - Viewing Lots of Web Pages at the Same Time - Downloading pictures, Files and Programs – Bookmarking - Music and Video on the Web – Borrow, Rent, Buy, Subscribe to media – Subscribing to Podcasts – Watching TVs and Movies

Unit – III: Shopping Online - Pros and Cons - The Credit Card - Paying at the Store – Auctions and used stuff – Books, Music , Clothes, Food and Computers - Going to the Bank without Ever Leaving Home - Transferring money between bank accounts - Paying bills online - Taking advantage of other online bank services

Unit – IV: E-Mail - Sending and Receiving E-mail – Keeping your mail safe from viruses, spam and wi-fi snoops - Typing and Talking on the Net – AIMing to Chat via Text - Windows Live Messenger - Yahoo! Messenger - Google Chat - Facebook chat – Chat and phone calls with Skype - Abbreviations and smileys - Adding Voices and Faces

Unit – V: Putting Your Own Stuff on the Net - Setting up your social site - Blogs and Twitter – What is in a Blog? – Writing your own Blog - Twittering about Your Life - Private tweeting - Specifying a topic by using hash marks - Making Twitter lists - Making Your Own Web Site - Setting up your site - Editing a page - Publishing your first Web page - Linking to Other Pages

Text Book:

1. Internet for Dummies, John R. Levine and Margaret Levine Young, WILEY Publishing Inc., 12th Edition, 2010, ISBN: 978-0-470-56095-2,

Reference Books:

1. Absolute Beginner's Guide to Computers and the Internet, Michael Miller, Que Pub, 2001, 480 pages, ISBN-10 : 0789780127, ISBN-13 : 978-0789780126,
2. 2.Computer & Internet Basics Step-by-Step, Etc End the Clutter, Infinity Publishing (PA), 2004, 256 pages, ISBN-10 : 074142178X, ISBN-13 : 978-0741421784,

Outcomes:

The students would have gained knowledge to work with Internet, about basic hardware, WWW, basics of Electronic Commerce, communication using Internet, and would be able to create and use own writing materials in the Internet.

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BRIDGE PRACTICAL – II (BP)

WEB DESIGN

Objectives:

To have hands-on experience of displaying formatted text and pages, learn to accept input from user and display using tables and frames; to know how to create forms in web pages to collect data.

1. Text formatting
2. Getting input and performing string manipulation operations
3. Using tables for neatly displaying information about an organization
4. Using frames to categorise and display information in a easy-to-understand format.
5. Using forms to create web pages for applying for a position in an organization
6. Event handling
7. Creating and managing cookies

Outcomes:

After completion the students would be able to display formatted text and pages, accept input from user and display using tables and frames; and know how to create forms in web pages to collect data.

*****

CORE COURSE – IX (CC)

PROGRAMMING SMART DEVICES

Objectives:

To provide ability to develop applications for smart devices using android; Ability to handle operation of the application, configuration files, intents, and activities; Ability to work with UI-component layouts, event handling, and screen orientations; Ability to appreciate android framework and features; Ability to design interfaces like Buttons, Menus, and Dialogs; Ability to design different types of screen layouts in android.

Unit – I: Introduction to Android: History of Android – Versions of Android – Android Architecture – App Architecture – Components – Intents – Manifest – App Package - Activities - Services – Broadcast Receivers – Content Providers – Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Starting the AVD – Introducing UC – Creating UC – Installing and Running UC – Preparing UC for Publishing – Migrating to Eclipse – Developing UC with Eclipse.

Unit – II: User Interface: Customizing the Window – Creating and Displaying Views – Monitoring Click Actions – Resolution Independent Assets – Locking Activity Orientation – Dynamic Orientation Locking – Manually Handling Rotation - Creating Pop-up Menu Actions – Customizing Options Menu – Customizing Back Button – Emulating the Home Button – Monitoring Text View Changes – Scrolling Text View Ticker – Animating a View – Creating Drawables as Backgrounds – Creating Custom State Drawables – Applying Masks to Images – Creating Dialogs that Persist – Implementing Situation Specific Layouts – Customizing Keyboard Actions – Dismissing Soft Keyboard – Customizing Adapter View Empty Views – Customizing List View Rows – Making List View Section Headers – Creating Compound Controls.

Unit – III: Interacting with Device Hardware and Media: Interacting Device Location – Mapping Locations – Annotating Maps – Capturing Images and Videos – Making a Custom Camera Overlay – Recording Audio – Adding Speech Recognition – Playing Back Audio/Video – Creating a Tilt Monitor – Monitoring Compass Orientation.

Unit – IV: Persisting Data : Making a Preference Screen – Persisting Simple Data – Reading and Writing Files – Using Files as Resources - Managing a Database – Querying a Database – Backing Up Data – Sharing your Database – Sharing your other Data.

Unit – V: Interacting with the Systems: Notifying from the Background – Creating Timed and Periodic Tasks – Scheduling a Periodic Task – Creating Sticky Operations – Running Persistent Background Operations – Launching Other Applications – Launching System Application – other Applications –

Interacting with Contacts – Picking Device Media – Saving to the Media Store - Working with Libraries : Creating Java Library JARs – Using Java Library JARs – Creating Android Library Projects – Using Android Library Projects – Charting – Practical Push Messaging.

Text book:

1. Dave Smith and Jeff Friesen, — "Android Recipes: A Problem – Solution Approach", Rakmo Press Pvt., Ltd, New Delhi, 2011.

Book(s) for Reference:

1. Wallace Jackson, "Android Apps for Absolute Beginners", Apress, 4th edition, 2017.
2. Marko Gargenta, "Learning Android", O'Reilly Media, Inc., 2011.
3. http://developer.android.com/Android Developer's Guides.

Outcomes:

The students would have the knowledge and ability to develop applications for smart devices using android; Ability to handle operation of the application, configuration files, intents, and activities; Ability to work with UI-component layouts, event handling, and screen orientations; Ability to appreciate android framework and features; Ability to design interfaces like Buttons, Menus, and Dialogs; Ability to design different types of screen layouts in android.

*****

CORE COURSE – X (CC)

COMPILER DESIGN

Objectives:

To introduce the various phases of a compiler; To know the various parsing techniques; To impart the code optimization techniques; To know the structure and various phases of compiler; To implement lexical analyser; To know the basic parsing techniques; To develop skills in generating intermediate code.

Unit – I: Compilers: Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

Unit – II: Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – Bottom –up parsing – Shift Reduce Parsing – Operator Precedence Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

Unit – III: **Intermediate Languages** – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls.

Unit – IV: Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimizaion.

Unit – V:**Introduction** – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

Text Book:

1. Alfred Aho, Ravi Sethi, Jeffrey D. Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia, 2003

Reference Books:

1. TorbenÆgidius Mogensen, “Introduction to Compiler Design”, Springer, 2011.
2. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
3. Kenneth C. Louden, “Compiler Construction: Principles and Practices”, Thompson Learning, 2003

Outcomes:

The students would be familiar with the various phases of a compiler; know the various parsing techniques; knw the code optimization techniques; know the structure and various phases of compiler; able to implement lexical analyser; know the basic parsing techniques; develop skills in generating intermediate code.

*****

CORE COURSE – XI (CC)

PRINCIPLES OF DATA SCIENCE

Objectives:

To offer basic concepts and variety of data; Mathematical and Statistical ideas to manipulate data; to communicate the results using various forms of visualisation and predict using basic Data Mining techniques.

Unit – I: Basic Terminology: The data science Venn diagram - :Python practices – Domain knowledge – Case studies – Types of Data: Flavors of data – Structured versus Unstructured data – Quantitative versus qualitative data. The four levels of data: The Nominal, ordinal, interval and ratio levels. The five steps of Data Science – Exploring the data

Unit - II: Basic Mathematics: basic symbols and terminology – Graphs, Logarithms, Exponents, Set theory – Linear Algebra – Probability: Definitions – Bayesian versus Frequentist – Compound events – Conditional probability – Rules of probability – Collectively exhaustive events – Bayes theorem – Applications of Bayes theorem – Random variables

Unit – III: **Basic Statistics:** Obtaining data – Sampling data – Measures of centre - measures of variation – measures of relative standing – Point estimates – Sampling distributions – Confidence intervals – Hypothesis tests

Unit – IV: Communicating Data: Effective and ineffective visualizations – Scatter plots – Line graphs – Bar Charts – Histograms – Box plots. Correlation versus causation – Simpson's paradox – verbal communication. Machine Learning: Supervised and Unsupervised learning – Linear regression – Probability, odds and logodds – Dummy variables.

Unit - V: **Prediction**: Naïve-Bayes classification – Decision trees – Unsupervised learning – K-means clustering – choosing an optimal number for K and cluster validation – feature extraction and Principal Component Analysis – Bias variance tradeoff – K folds cross-validation – Grid searching – Ensembling techniques – Neural networks.

Text Book:

1. Sinan Ozdemir, ":Principles of Data Science", Packt Publishing, First Edition, Birmingham- Mumbai, ISBN: 978-1-78588-791-8, 2016.

Books for reference:

1. Joel Grus, "Data Science from Scratch", O'Reilly Publishers, First Edition, 2015.
2. Vijay Kotu & Bala Deshpande, "Data Science Concepts and Practice", Morgan Kaufmann publishers, Second Edition, 2019.

Outcomes:

The students would have grasped the basic concepts and variety of data; Mathematical and Statistical ideas to manipulate data; learnt to communicate the results using various forms of visualisation and be able to predict using basic Data Mining techniques.

*****

CORE COURSE – XII (CC)

ORGANISATIONAL BEHAVIOUR

Objectives:

To familiarize the students to understand the basic concepts of organizational structure and its behaviour; to understand the Human Behaviour and Perception; Develop the Attitudes, Formation factors and attitude changes; Equip the students in building the Perceptual Interpretation and Motivation; Have the group decision making and analysis; Acquire knowledge and capability to develop communication skills; Equip their Leadership skills through various activities; Have the knowledge about organizational structure and projects.

Unit – I: Nature of Organization: Features – types – goals. Nature Of Organizational Behavior: Nature of OB – Role of OB – Foundations of OB.

Unit – II: Nature Of Human Behavior: Nature and causes of individual differences – models of man. **Perception:** concept – process – perceptual selectivity and distortion – Developing perceptual skills. **Attitudes:** Concept – Theories – Formation factors – measurements – Attitude change.

Unit – III: Personality: Concept – theories – determinants of personality-Personality and behaviour. **Motivation**: Definition – Motivation & Behavior – Theories – approaches – incentives. **Interpersonal Behavior:** Transactional analysis – Ego states – life scripts – life positions – transactions – stroking – Psychological games – Benefits of TA.

Unit – IV: Group Dynamics: Concepts & features of group – types of groups – group behaviour – group decision making – committee – task group – inter group behaviour. **Leadership:** Definitions – types – importance theories – styles. **Communication:** Basics of communication – Communication network – Factors affecting communication – Business writing – Office management – Presentation strategies.

Unit – V: Organization Theory: Classical organizational theory – neoclassical organization theory. **Designing Of Organizational Structure**: need – planning and process – **Departmentation:** Span of management – delegation of authorities – centralization & decentralization. **Forms Of Organizational Structures:** line and staff – functional – divisional – project – matrix – free form.

Book for study :

1. Prasad L.M., “Organisational Behavior”, Sultan Chand and Sons, New Delhi, 2014.

Books for Reference :

1. S. S. Khanka, “Organisational Behavior”, S. Chand Ltd., New Delhi
2. K. Aswathappa, “Organisational Behavior”, Himalaya Publishing House, New Delhi

Outcomes:

The students would have understand the basic concepts of organizational structure and its behaviour; understood the Human Behaviour and Perception; Developed the Attitudes, Formation factors and attitude changes;Equiped the students in building the Perceptual Interpretation and Motivation; Have the ability of contributing in group decision making and analysis; Acquired knowledge and capability to develop communication skills; Equiped their Leadership skills through various activities; Have the knowledge about organizational structure and projects.

*****

CORE ELECTIVE – III (CE)

A: BIG DATA ANALYTICS

Objectives:

To provide students to acquire the knowledge on the basics of Big Data and its role in various Industries; understand the various techniques of Big Data Analytics; learn the cutting edge tools and technologies to analyze Big Data; ability to appreciate the Big Data Storage concepts and Data Visualization techniques; to get insights into social media and mobile analytics

Unit – I: Introduction: Concepts and Terminology – Big Data Characteristics-Different Types of Data-case study Background- Business goals and Obstacles-Business Motivations and Drivers for Big Data Adoption-Marketplace Dynamic-Business Architecture- Business process Management- Information and Communication Technology-Data Analytics and Data Science-Digitization.

Unit – II: Big data Adoption and Planning Considerations: Organization Prerequisites- Data Procurement - Privacy- Security- Provenance-Limited Real time Support- Distinct Performance Challenges – Distinct Governance Requirements- Distinct Methodology- Clouds- Big Data Analytics-Data Identification- Data Acquisition and Filtering-Data Extraction- Data validation and cleansing-Data Aggregation and Representation- Data Analysis-Data Visualization-Utilization of Analysis Results.

Unit – III: Enterprise Technologies and Big Data Business Intelligence: Online Transaction and Processing (OLTP)-Online Analytical Processing (OLAP)-Extract Transform Load (ETL)-Data Warehouses-Data Marts-Traditional BI-Big Data BI-Big Data Storage Concepts- Clusters- File System and Distributed Systems- No SQL-Shading-Replication-ACID.

Unit – IV: Big Data Processing Concepts: Introduction -Parallel Data Processing-Distributed Data Processing- Hadoop-Processing Workloads-Cluster- Processing in Batch Mode-Map-Combine-Partition- Shuffle and Sort—Processing in Real Time Mode- Speed Consistency Volume (SCV)-Event Stream Processing- Complex Event Processing- Realtime Big data Processing and SCV-Realtime Big Data Processing and Map Reduce.

Unit – V : Big Data Storage Technology: On-Disk Storage Devices-NoSQL Database- In-Memory Storage Device- Big Data Analytics Techniques-Quantitative Analysis- Qualitative Analysis- Data Mining- Statistical Analysis-A/B Testing-Correlation-Regression- Machin Learning- Semantic Analysis-Visual Analysis-Heat Maps-Time Series Plots-Network Graphs-Spatial Data Mapping.

Book for Study :

1. Paul Buhler, Wajid Khattak and Thomas Erl, "Big Data Fundamentals: Concepts, Drivers & Techniques", Prentice Hall Publications, January 2016.
   Unit 1: Chapter 1 and Chapter 2
   Unit 2: Chapter 3
   Unit 3: Chapter 4 and Chapter 5
   Unit 4: Chapter 6
   Unit 5: Chapter 7 and Chapter 8

Books for Reference :

1. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", Published by Apress Media, 2013.
2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'reilly Media, 2012.

Outcomes:

On successful completion of the course, the students will be able to acquire the knowledge on the basics of Big Data and its role in various Industries; understand the various techniques of Big Data Analytics; learn the cutting edge tools and technologies to analyze Big Data; ability to appreciate the Big Data Storage concepts and Data Visualization techniques; get insights into social media and mobile analytics.

*****

CORE ELECTIVE – III (CE)

B: COMPUTER NETWORK AND SECURITY

Objectives:

To provide students with the fundamental knowledge in computer network communication; make them understand the OSI reference model; learn the technical factors of each layer in OSI reference model; understand the fundamentals of network security; learn the encryption and digital signature techniques.

Unit – I: Introduction – Uses of Computer Network – Network Hardware – Network Software – Reference Models – Example Network.

Unit - II: Introduction –OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms.

Unit – III: Symmetric Ciphers – Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Advanced Encryption standard

Unit – IV: Public key Encryption and Hash Functions – Public key cryptography and RSA key Management – Message Authentication and Hash Function

Unit – V: Network Security Applications – Authentication Applications – Electronic Mail Security – IP Security – Web Security. System Security – Intruders – Malicious Software – Firewalls

Text book :

1. Andrew S. Tanenbaum, **"Computer Networks"**, PHI, New Delhi, (EEE), Fourth Edition, 2011.
2. William Stallings, **"Cryptography and Network Security",** Pearson Publications, Sixth Edition, 2014

Books for Reference:

1. Larry L. Peterson and Bruce S. Davie, **"Computer Networks – A Systems Approach"**, Morgan Kaufmann Publishers, Third Edition
2. Charlie Kaufman, Radia Perlman, Mike Speciner, **"Network Security – Private Communication in a Public World"**, Eastern Economy Edition, PHI, Second Edition
3. William Stallings, **"Network Security Essentials – Applications and Standards"**, Pearson Education – 2007.

Outcomes:

Students completing this course will be able to obtain the fundamental knowledge in computer network communication; understand the OSI reference model; learn the technical factors of each layer in OSI reference model; understand the fundamentals of network security; learn the encryption and digital signature techniques.

*****

CORE ELECTIVE – III (CE)

C: CLOUD COMPUTING

Objectives:

To provide concepts of cloud Architecture and its services; classify different services providers and their services and tools; demonstrate various web based applications for collaborating everyone in the cloud computing; assess various industrial platforms for the developments in terms of security and related facilities.

Unit – I: Fundamentals of Cloud Computing: Grid Computing – Utility Computing – Need for Cloud Computing – Defining Cloud Computing – Stakeholders in Cloud Computing – Cloud versus Grid – Applications of Cloud Computing – Limitations of Cloud Computing – Ultimately need for Cloud Computing - Essential Needs of Enterprises and how they turn out as unique Features of Cloud Computing – Scalability - Scalability and On-Demand Provisioning - Self-Service based Access - Resource Pooling and Multi-Tenancy - Rapid Elasticity - Measured Service and Pay-as-Per-use Pricing Model – Architecture of Cloud – Deployment Models – Service Class Models – Infrastructure as a Service – Platform as a Service – Software as a Service

Unit – II: Technological Foundations of Cloud Computing: Basic Foundations of Cloud Computing - Technological Drivers of Cloud Computing - Multicore Technology and Parallel Programming Models – Virtualization - Server Virtualization - Types of Hypervisors - Types of Server Virtualization - Storage Virtualization - Network Virtualization - Memory Virtualization - Desktop Virtualization - Data Virtualization - Application Virtualization - Service Oriented Architecture (SOA) and Cloud Computing - Grid and Utility Computing technologies - Web 2.0 for cloud computing – MicroServices Architecture (MSA), DevOps and Agile- Software Defined Networking and Software Defined Security

Unit – III: Cloud Networking: Overview Of Enterprise Networks and Internetworking - Network Design Requirements and Design Goals - Standard Network Models - Flat Networking Model - Hierarchical Networking Model - Modern Network Requirement & Need For Suitable Network Model - Leaf-Spine Architecture - Need For Programmable/Automatic Network Configuration - Different Methods Of Configuring Network Devices - Manual and Conventional Method for Configuring Network Devices - Early Methods for Automatic Configuration of Network Devices - Software Defined Network (SDN) - Features of SDN - How does SDN Controller help SDN Applications to Manage a Network easily? - SDN Controller and SDN Switches - Functional Modules of SDN Controller - Software Defined Wide Area Network (SDWAN) - Network Functions Virtualization (NFV)

Unit – IV: Cloud Storage: Taxonomy of Storage - Direct Attached Storage (DAS) - Network Attached Storage (NAS) Architecture of NAS - File Sharing Concept in NAS - Storage Area Network (SAN) - Why Do We Need SAN? - Concept of SAN - FC SAN - Architecture of FC SAN - Fibre Channel topologies - How FC SAN Works – An Overview - Data Access Methods in SAN. IP SAN - Architecture of IP SAN - Storage Protocols for IP SAN - Internet Small Computer System Interface (iSCSI) - Fibre Channel over TCP/IP(FCIP) Protocol - Internet Fibre Channel Protocol (IFCP) - Converged Enhanced Ethernet (CEE) - Fibre Channel over Ethernet SAN (FCoE SAN) - Cloud Storage - Cloud and Cloud Storage? - Storages inside the Cloud - Architecture of Cloud Storage - Architecture of Cloud Storage- Storage Optimization Techniques - Software Defined Storage (SDS)

Unit – V: Cloud Security: Basic Security Requirements - Traditional Enterprise Security Model - Aspects/Factors which influence Security in Cloud - Security Threats In Cloud Computing - General Types Of Threats - Data Related Security Threats - Application Related Security Issues - Server And Network Related Threats - Vulnerabilities In Cloud APIs - Insider Threats - Threats Due To Virtualization - Virtualization threats and Related Security aspects in IaaS Cloud - Virtualization threats and Related Security aspects in PaaS Cloud

Text Book:

1. Chellammal Surianarayanan, Pethuru Raj Chelliah, Essentials of Cloud Computing: A Holistic Perspective, Springer, First Edition, 2019.

Books for Reference:

1. K.Chandrasekharan, Essentials of Cloud Computing, CRC press, 2014.

Outcomes:

The students would have gained the understanding of the concepts of cloud Architecture and its services; able to classify different services providers and their services and tools; able to demonstrate various web based applications for collaborating everyone in the cloud computing; assess various industrial platforms for the developments.

*****

CORE PRACTICAL – V (CP)

PROGRAMMING SMART DEVICES

Objectives:

To offer hands-on training in designing and developing Android applications to use and demonstrate the facilities available in the Android development environment.

Android

1. Different Layout design including nested layout for a single biodata.
2. Arithmetic Operation for two numbers
3. Business Calculator
4. Animation: Bouncing of a ball
5. Intent
6. Database SQLite: Student Biodata
7. Fragments – Tablet Programming
8. Media Player

Outcomes:

The students would have familiarised themselves in the usage and application development of small applications as listed above.

*****

CORE PRACTICAL – VI (CP)

R –PROGRAMMING

Objectives:

To offer hands-on training the R-environment to use the facilities to handle variety of data and to display the results in the form of charts and graphs.

1. Built in functions
2. Data Frames and Matrices
3. Accessing Data and Indexing
4. Diagrammatic representation of data
   a) Plotting data
   b) Bar chart and its varieties
   c) Bar plot
   d) Pie chart
   e) Stem-and –Leaf plot
5. Frequency distribution
6. Graphical representation of data
   a) Rod-spike graph
   b) Histogram
   c) Frequency polygon
7. Measures of central tendency functions
8. Simple R programs

Outcomes:

The students would have become familiar with the development of programs in R environment to accept input in many forms, process them and display the results in charts or graphs and also in applying statistical techniques.

*****

BRIDGE COURSE – V (BC)

OPEN SOURCE TECHNOLOGIES

Objectives:

To make the students appreciate the Open Source Technologies and to use them effectively as an alternate to proprietary software that are available for all types of application from scripting languages, databases and webservers and to become aware of the open source tools and processors, and policies of governments.

Unit – I: Introduction: The need of open Sources, advantages of Open sources application, Open Source Development Model Licences and Patents, FOSS, BSD, Free Software Movement, commercial software vs. Open Source software Commercial aspects of Open Source movement - Certification courses issues - global and Indian. Copyrights and copy lefts, Application of Open Sources. Problems with traditional commercial software

Unit – II: Open source scripting Language. Introduction: What is PHP? - Basic Syntax of PHP – programming in web environment - Common PHP Script Elements - Using Variables - Constants – Data types - Operators ; Statements – Working With Arrays -Using Functions – OOP - String Manipulation and Regular Expression , **File and Directory Handling** , **Working With Forms,** Introduction to advanced PHP concepts

Unit – III: Open source database management System: MySQL: Introduction – Setting up an account - Starting, Terminating and writing your own MySQL Programs - Record Selection Technology - Working with Strings - Date and Time – Sorting Query Results module - Generating Summary - Working with Metadata – Using Sequences – MySQL and Web **PHP and SQL database:** PHP and LDAP ; PHP Connectivity ; Sending and receiving emails , **PHP Database Connectivity:** Retrieving data from MySQL - Manipulating data in MySQL using PHP

Unit – IV: WEB SERVER : Apache Web server – Working with web server – Configuring and using apache web server, WAMP server, Lighttpd, Fnord, Nginx, Savant, tornado.

Unit – V: Open Source Software tools and Processors: Introduction – Eclipse IDE Platform – Compilers – Model driven architecture tools – Selenium ID – Features and uses Government Policy toward Open Source (E- Governance) – Wikipedia as an open Source Project Case Studies: Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

Text Books:

1. Rem Card, Eric Dumas and Frank Mevel , The Linux Kernel Book Wiley Publications sons, 2003.
2. Steve Suchring, MySQL Bible John Wiley sons, 2002.
3. Rasmus Lerdorf and Levin Tatroe, Programming PHP O'Reilly Publications, 2002.

Books for Reference:

1. Information Resources Management Association (An Imprint of IGI Global), USA, "Open Source Technology: Concepts, Methodologies, Tools and Applications,", 2015.

Outcomes:

The students would be familiar with the Open Source Technologies and to use them effectively as an alternate to proprietary software that are available for all types of application from scripting languages, databases and webservers and to become aware of the open source tools and processors, and policies of governments.

*****

BRIDGE COURSE – VI (BC)

INTERNET PROGRAMMING

Objectives:

To introduce .Net framework, HTML, development of Applets; to learn applet – servlet communication and JSP.

Unit – I: Introduction to ASP.NET: Architecture of .NET Framework – Life cycle of ASP.NET – Standard controls – Validation controls – Rich web controls – Data controls – Navigation controls.

Unit – II: HTML tags: History of HTML – Structure of HTML – Basic Tags of HTML - List – Linking Document – Frames – Graphics to HTML Documents.

UNIT – III: The Servlet Life Cycle: The Servlet Alternative – Servlet Reloading. Retrieving Information: Initialization Parameters – The Server – The Client – The Request.

UNIT – IV: Applet-Servlet Communication: Communication Options - Daytime Server - Chat Server. Inter servlet Communication: Servlet Manipulation - Servlet Reuse - Servlet Collaboration.

UNIT – V: Introducing Java Server Pages: What Is Java Server Pages? – Why Use JSP? – The Web Programming Environment: Evolution of the Web Application – The Shift from Client-Side to Server-Side Solutions.

TEXT BOOKS:

1. Kogent (2010), ASP.NET 4.0 Black Book – Platinum Edition, DreamtechPress,New Delhi. (Unit – I)
2. Ivan Bayross, Web Enable Commercial Application Development using HTML, DHTML, Javascript, PERL CGI, BPB Publications, 2000. (Unit – II)
3. Java ™ Servlet Programming by Jason Hunter with William Crawford, O'Reilly Publishers, (Units – III, IV).
4. Phil Hanna, "JSP: The Complete Reference", McGraw-Hill, 2001. (Unit – V)

REFERENCE BOOKS:

1. Mathew Mac Donald (2010), ASP.NET Complete Reference , Tata McGraw Hill publishing Company Ltd., New Delhi.
2. Thomas A. Powell, HTML and XHTML: The Complete Reference, Tata McGraw Hill, 4th Edition 2003.
3. Herbert Schildt, "JAVA 2 Complete References", TMH publications, 4th Edition, 2001.

Outcomes:

The students would have become familiar with the .Net framework, HTML, development of Applets; to learn applet – servlet communication and JSP.

*****

BRIDGE PRACTICAL – III (BP)

PHP AND MYSQL

Objectives:

To offer hands-on training to students in the use of PHP and MySQL to develop small application programs with the facilities available with both the software, such as, use of controls and functions, passing mechanisms, handling arrays, tokenising, file system functions, use of sessions and cookies and database usage.

1. Develop a PHP program using controls and functions
2. Develop a PHP program and check message passing mechanism between pages.
3. Develop a PHP program using String function and Arrays.
4. Develop a PHP program using parsing functions (use Tokenizing)
5. Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.
6. Develop a PHP program and check File System functions, Network functions, Date and time functions.
7. Develop a PHP program using session
8. Develop a PHP program using cookie
9. Develop a PHP program to display student information using MySQL table.
10. Develop a college application form using MySQL table.

Outcomes:

The students would be familiar in the use of PHP and MySQL to develop small application programs with the facilities available with both the software, such as, use of controls and functions, passing mechanisms, handling arrays, tokenising, file system functions, use of sessions and cookies and database usage.

*****

CORE COURSE – XIII (CC)

INTERNET OF THINGS

Objectives:

To introduce IoT and its flavors; to realise the IoT ecosystem and topologies; to learn how to integrate IoT with the environment; communicate from and to machines and some aspects of security of IoT.

Unit – I: Introduction To Internet Of Things: Introduction - Physical design of IoT – Logical design of IoT – IoT Enabling Technologies – IoT levels & Deployment technologies. DEMYSTIFYING THE IoT PARADIGM: The Emerging IoTflavors-The Industrial Internet of Things – Consumer Internet of Things - Social Internet of things - Semantics for The Interoperable IoT- Cognitive IoT.

Unit – II: Realization Of Iot Ecosystem Using Wireless Technologies: Introduction-Architecture for IoT Using Mobile Devices- Mobile Technologies for Supporting IoT Ecosystem- Mobile Use Cases for IoT – Low Power Wide Area Networking Topologies – Sigfox- Weightless – NwaveIngenu- Lora.

Unit – III: Infrastructure And Service Discovery Protocols For The Iot Ecosystem: Introduction- Layered Architecture for IoT – Protocol Architecture of IoT – Infrastructure Protocols-Device or Service Discovery for IoT – Protocols for IoT service Discovery. INTEGRATION TECHNOLOGIES AND TOOLS FOR IOT ENVIRONMENTS: Sensor and actuator networks.

Unit - IV: Iot And M2m: Introduction – M2M – Difference Between IoT and M2M – SDN and NFV for IoT. DEVELOPING IOT: IoT Design Methodology.

Unit - V: Security Management Of An Iot Ecosystem: Introduction Security Requirements of an IOT Infrastructure-Authentication, Authorization And Audit Trail (AAA) Framework-Defense In Depth-Security Concerns of Cloud Platforms-Security Threats of Big Data –Security Threats In Smart phones-Security Solutions For Mobile Devices-Security Concerns In IoT Components-Security Measures for IoT Platforms/Devices.

Text books:

1. ArshdeepBahga, Vijay Madisetti, "Internet of Things, A Hands-On Approach", Universities Press (INDIA) Private Limited, 1st Edition, 2015.
2. Pethuru Raj and Anupama C. Raman, "The Internet of Things Enabling Technologies, Platforms, and Use Cases", Taylor & Francis, CRC Press, 1st Edition, 2017.

Book for Reference:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014

Outcomes:

The students would have become familiar with IoT and its flavors; realised the IoT ecosystem and topologies; learnt how to integrate IoT with the environment; communicate from and to machines and some aspects of security of IoT.

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CORE ELECTIVE – IV (CE)

A: SOFTWARE PROJECT MANAGEMENT

Objectives:

To introduce the basic concepts of SPM, project evaluation, planning, monitoring and controlling a software project; to teach team management and to introduce ISO standards.

Unit – I: **Introduction to Software Project Management**: What is a Project? – Software Projects versus Other Types of Project – Activities Covered by Software Project Management -Stakeholders - Project Success and Failure - What is Management? - Management Control. An overview of Project Planning: Introduction to stepwise Project Planning - Select the Project – Identify Project Scope and Objectives – Identity of Project Infrastructure -Analyze Project Characteristics - Identify Project Projects and Activities – Estimate Effort for each Activity - Identify Activity Risks - Allocate Resource – Review/Publicize plan - Execute Plan/Lower levels of Planning.

Unit – II: Project Evaluation: Evaluation of Individual Projects -Risk Evaluation - Strategic Programme Management – Selection of an Appropriate Project Approach: Introduction – Choosing Methodologies and Technologies – Software Processes and Process Models –Choice of Process models – The Waterfall model - Software Prototyping - Other ways of Categories Prototypes – Incremental Delivery – Selecting the Most Appropriate Process Model. Software Effort Estimation : Basis for software Estimating - Software Effort Estimation Techniques – Bottom-up Estimating – The Top-down Approach and Parametric Models - Albrecht Function Point Analysis – COCOMO II : A Parametric Productivity Model.

Unit – III: Activity Planning: Objectives - Project Schedules - Sequencing and Scheduling Activities -Network Planning Models - Formulating a Network Model – The Forward Pass – The Backward Pass – Identifying the Critical Path - Identifying Critical Activities –Activity0n-Arrow Networks. Risk Management : Risk – Categories of Risk - Risk Identification – Risk Assessment – Risk Planning – Risk Management - Applying the PERT Technique Resource Allocation : The Nature of the Resources - Identifying Resource Requirements –Scheduling Resources – Creating Critical Paths - The Scheduling Sequence.

Unit – IV: **Monitoring and Control**: Creating the Framework – Collecting the Data –Visualizing Progress - Cost monitoring Earned Value Analysis – Prioritizing Monitoring - Change control. Managing Contracts: Types of Contract - Stages in Contract Placement – Typical Terms of Contract – Contract Management -Acceptance Managing People in Software Environments: Understanding the Behaviour - Organizational Behaviour: A

Background - Selecting the Right Person for the Job – Instruction in the Best methods – Motivation - The Oldham - Hackman Job Characteristic Model.

Unit – V: **Working in Teams:** Becoming a Team – Decision Making – Organization and Team Structures - Leadership – Coordination dependencies - Software Quality The importance of Software Quality - Defining Software Quality - ISO 9126 - Product versus Process Quality Management - Quality Management systems - Software Reliability -Quality Plans - Prince2 – An overview - Project Management Tools.

Text Book:

Bob Hughes, Mike Cotterell, Rajib Mall –Software Project Management, Fifth Edition, McGraw Hill Education Pvt. Ltd, 2014.
Unit-I : chapters –1, 3, Unit-II: chapters –2, 4, 5, Unit-III: chapters –6, 7, 8, Unit-IV: chapters –9, 10, 11, Unit-V:Chapters –12, 13

Books for Reference:

1. Walker Royce, Software Project Management, Pearson Education, 2012.
2. Joel Henry, Software Project Management, Pearson Education, 2009.

Outcomes:

The students would have become familiar with the basic concepts of SPM, project evaluation, planning, monitoring and controlling a software project, team management and ISO standards.

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CORE ELECTIVE – IV (CE)

B: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Objectives:

To introduce to the students the following aspects of AI and ML; simple linear regression, multiple regression, logistic regression, Bayesian networks and Genetic algorithms.

Unit – I: Simple Linear Regression: Introduction to Simple Linear Regression- The Least-Squares Estimates- Dangers of Extrapolation- The Coefficient of Determination, r-Standard Error of the Estimate s- Correlation Coefficient r- ANOVA Table for Simple Linear Regression- Outliers, High Leverage Points, and Influential Observations-Population Regression Equation- Verifying the Regression Assumptions- Inference in Regression-t-Test for the Relationship Between x and y -Confidence Interval for the Slope of the Regression Line - Confidence Interval for the Correlation Coefficient ρ - Confidence Interval for the Mean Value of y Given x - Prediction Interval for a Randomly Chosen Value of y Given x - Transformations to Achieve Linearity- Box–Cox Transformations.

Unit – II: Multiple Regression And Model Building: Introduction to Multiple Regression - The Population Multiple Regression Equation - Inference in Multiple Regression- Regression with Categorical Predictors, Using Indicator Variables - Adjusting R2: Penalizing Models for Including Predictors that are not Useful - Sequential Sums of Squares- Multicollinearity - Variable Selection Methods - An Application of Variable Selection Methods - Using the Principal Components as Predictors in Multiple Regression.

Unit - III: Logistic Regression: Simple Example of Logistic Regression- Maximum Likelihood Estimation- Interpreting Logistic Regression Output-Odds Ratio and Relative Risk-Interpreting Logistic Regression for a Dichotomous Predictor-Interpreting Logistic Regression for a Polychotomous Predictor- Interpreting Logistic Regression for a Continuous Predictor- Assumption of Linearity-Zero-Cell Problem- Multiple Logistic Regression- Introducing Higher Order Terms to Handle Nonlinearity - Validating the Logistic Regression Model-

Unit – IV: Naive Bayes And Bayesian Networks: Bayesian Approach- Maximum a Posteriori (Map) Classification- Posterior Odds Ratio- Balancing the Data- Naïve Bayes Classification- Interpreting the Log Posterior Odds Ratio- Zero-Cell Problem - Numeric Predictors for Naïve Bayes Classification.

Unit - V: Genetic Algorithms: Introduction to Genetic Algorithms-Basic Framework of a Genetic Algorithm- Simple Example of a Genetic Algorithm at Work - Modifications and Enhancements: Selection-Modifications and Enhancements: Crossover- Genetic Algorithms for Real-Valued Variables- Using Genetic Algorithms to Train a Neural Network -

Text Book:

1. Daniel T. Larose , Chantal D. Larose, Data mining and Predictive analytics, Second Ed., Wiley Publication, 2015.**Chapters:** 8, 9, 13,14,27.

Books for Reference:

1. Bertt Lantz, Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition, April 15, 2019,
2. Jason Bell, Machine Learning: Hands-On for Developers and Technical Professionals, Wiley Publication, 2015.

Outcomes:

The learners would have become familiar with the following concepts; AI and ML; simple linear regression, multiple regression, logistic regression, Bayesian networks and Genetic algorithms.

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CORE ELECTIVE – IV (CE)

C: SOFT COMPUTING

Objectives:

To introduce the students the following areas of knowledge that is important for research in Computer Science. Fuzzy set theory, Optimisation, Artificial neural networks, neuro-fuzzy modelling and computational intelligence.

Unit – I: Fuzzy Set Theory: Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models –Input Space Partitioning and Fuzzy Modeling.

Unit – II: Optimization: Derivative based Optimization – Descent Methods – The Method of Steepest Descent– Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search –Downhill Simplex Search.

Unit – III: Neural Networks: Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self –Organizing Networks – Learning Vector Quantization – Hebbian Learning.

Unit – IV: Neuro Fuzzy Modeling: Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

Unit – V: Application Of Computational Intelligence: Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

Text book:

1. J.S.R. Jang, C.T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI,Pearson Education, 2004.

Books for Reference:

1. Timothy J. Ross, "Fuzzy Logic with Engineering Application, "McGraw Hill, 1977.
2. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and MachineLearning", Addision Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and GeneticAlgorithms", PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, "Grid Computing - A Practical Guide to technology and **Applications", Charles River media, 2003.**

Outcomes:

The students would have gathered knowledge in the following areas; Fuzzy set theory, Optimisation, Artificial neural networks, neuro-fuzzy modelling and computational intelligence.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. Biochemistry Course Structure under CBCS
(For the candidates admitted from the academic year 2016-2017 onwards)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Chemistry of Biomolecules	6	4	3	25	75	100
	Core Course – II (CC)	Analytical Techniques	6	4	3	25	75	100
	Core Course – III (CC)	Enzymes and Enzyme Technology	5	4	3	25	75	100
	Core Course – IV (CC)	Cell Biology and Physiology	5	4	3	25	75	100
	Core Practical- I (CP)	Practical – I (Biochemical Techniques and Enzymology)	8	4	3	40	60	100
	Total		**30**	**20**				**500**
II	Core Course – V (CC)	Metabolism and Regulation	6	5	3	25	75	100
	Core Course – VI (CC)	Molecular Biology	6	5	3	25	75	100
	Core Practical - II (CP)	Practical – II (Molecular and Microbial Techniques)	8	4	3	40	60	100
	Elective – I (EC)	Biostatistics	5	5	3	25	75	100
	Elective – II (EC)	Microbiology	5	5	3	25	75	100
	Total		**30**	**24**				**500**
III	Core Course – VII (CC)	Immunology	6	5	3	25	75	100
	Core Course – VIII (CC)	Clinical Biochemistry	6	5	3	25	75	100
	Core Practical - III (CP)	Practical – III (Clinical Biochemistry)	8	4	3	40	60	100
	Elective – III	Genetic Engineering	5	5	3	25	75	100
	Elective – IV	Developmental Biology	5	5	3	25	75	100
	Total		**30**	**24**				**500**
IV	Core Course –IX (CC)	Endocrinology	5	5	3	25	75	100
	Core Course – X (CC)	Bioinformatics	5	5	3	25	75	100
	Core Practical- IV (CP)	Practical – IV (Phytochemistry, Soil Analysis and Immunological Techniques)	8	4	3	40	60	100
	Elective – V	Ecology and Environmental Sciences	5	4	3	25	75	100
	Project Work	Dissertation=80 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	7	4	-	-	-	100
	Total		**30**	**22**				**500**
Grand Total			**120**	**90**				**2000**

Core Paper	-	10
Core Practical	-	4
Elective	-	5

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

CHEMISTRY OF BIOMOLECULES

Objectives:

To understand the basis of macromolecules and their structure.

Unit I

Carbohydrates: Structure and biological functions of Mono, di and Polysaccharides. Types of polysaccharides: Homo polysaccharides -chitin, fructans, mannans, xylans, and galactans. Structure and biological importance of Hetero polysaccharides- sugar derivatives- glycosaminoglycans, proteoglycans. Glycoprotein – Blood group and bacterial cell wall polysaccharides, O- linked and N- linked oligosaccharides, marine polysaccharides and Lectins.

Unit II

Aminoacids and its general properties. Classification of amino acids. The peptide bond– Chemical synthesis of peptides –Merrifield method. Proteins– classification and general properties. Orders of protein structure, Primary- Ramachandran plot, Secondary structure– the α-helix, β- pleated sheet. Collagen triple helix. Protein sequencing methods.

Unit III

Super secondary structure– helix– loop helix, the hairpin β -motif and the β-α-β-motif. Tertiary and quaternary structure- Forces stabilizing tertiary and quaternary structure- Structure of myoglobin, Structure of hemoglobin– oxygen binding and changes in conformation. Methods of isolation, characterization and purification of proteins.

Unit IV

Lipids: Definition and classification of lipids. Biological significance of lipids. Types of Fatty acids-Essential, Non essential. Structure and biological functions of phospholipids, sphingolipids, glycolipids. Steroids – structure and functions of cholesterol, bile acids, sex hormones, ergosterol. Structure and biological role of prostaglandins, thromboxanes and leukotrienes.

Unit V

Nucleic acid: Structure of purines, pyrimidines, nucleosides and nucleotides. DNA double helical structure. A, B and Z forms of DNA. Triple and quadruple structures.DNA super coiling and linking number. Properties of DNA: buoyant density, viscosity, hypochromicity, denaturation and renaturation – the cot curve. DNA sequencing– chemical and enzymatic methods. Chemical synthesis of DNA. RNA– types and biological role- Secondary, tertiary structures of RNA.

Reference Books:

1. Biochemistry Zubay 4th edition William C.Brown Publication, 1998.
2. Harper's Biochemistry 29th edition McGraw Hill, 2012.
3. Biochemistry Stryer 5th edition .W.H Freeman, 2002.
4. Principles of Biochemistry.7th edition Lehninger Nelson Cox Macmillan worth Publishers, 2013.
5. Biochemistry. Davidson and Sittmann, NMS 4th ed. Lippincott William's and Wilkins, 1999
6. Biochemistry – Voet and Voet. J O H N WI VP & *Publisher* Kaye Pace Associate Publisher, 2011.
7. Biochemistry Student Companion, by Berg, 7th Edition Berg, Jeremy M. / Tymoczko, John L. / Stryer, Lubert Published by W. H. Freeman, 2011.
8. 8.Chemistry of natural Products , Sujata V. Bhat, Bhimsen A. Nagasampagi, Meenakshi Sivakumar First Edition – 2005.

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CORE COURSE II

ANALYTICAL TECHNIQUES

Objectives:

1. To understand the working principles, construction and applications of the instruments used in the studies related to various disciplines of biological sciences.
2. To apprise the importance of research and to learn the art of publication.

Unit I

Electrochemical techniques – Principles, Electrochemical cells and reaction – pH and buffers. Measurement of pH – glass electrode and titration curves. Ion selective and gas sensing electrodes, oxygen electrode, and their applications. Methods for studying cells and organelles. Methods for lysis of plant, animal and microbial cell Sub-cellular fractionation. General scheme for purification of bio-components.

Unit II

Chromatographic techniques – General principle; adsorption and partition chromatography. Techniques and application of paper, column, thin layer, normal phase and reverse phase - ion-exchange chromatography, exclusion chromatography, affinity chromatography, GLC and HPLC, HPTLC.

Unit III

Centrifugation: Principles, differential and analytical centrifugation, density gradient centrifugation; Analysis of sub cellular fractions, ultracentrifuge and its application.
Tracer technique: Nature of Radioactivity: Patterns of decay, half life and its application, Geiger Muller Counter- principle and applications. Scintillation counter – Principle, types and applications. Use of isotopes in biological studies.

Unit- IV

Electrophoresis: Principles, electrophoretic mobility, factors influencing electrophoretic mobility – paper, disc, slab gel electrophoresis. Isoelectric focusing, 2D PAGE, blotting techniques, capillary electrophoresis. Pulse field Electrophoresis, Isotachophoresis.

Unit - V

Spectroscopy: Laws of absorption and absorption spectrum.CD, ORD, Principle, instrumentation and applications of UV-visible spectrophotometry, ESR, NMR, IR and spectrofluorimetry. Basic principles of turbidimetry and nephelometry. Principle, instrumentation and applications of luminometry.

Atomic spectroscopy – principle and applications of atomic flame and flameless spectrophotometry. Use of lasers for spectroscopy. MALOF TOF.

Reference Books:

1. Principles and Techniques of Practical Biochemistry, Keith Wilson & John Walker, Cambridge University Press, India. 2005.
2. Biophysical Chemistry (Principles and Techniques) 4th Edition, Avinash Upadhyay, Kakoli Upadhyay and Nirmalendu Nath, Himalaya Publishing House, India, 2014.
3. Bioanalytical Techniques, Abhilasha Shourie and Shilpa S Chapadgaonkar, the Energy and Resources Institute, TERI, India, 2015.
4. Methods and Techniques, 2nd ed, C.R. Kothari, Research Methodology, New Age International Publishers. India, 2004.
5. Introduction to Instrumental Analysis, Braun, R.P.,Tata McGraw Hill, India, 1987.
6. Textbook of Biochemistry, West, E.S. and Todd, W.R, MacMillan, Germany, 1985.
7. Research Methodology, Methods and Techniques 2nd Edition, C.R. Kothari, New Age International Publishers. New Delhi, 2004.
8. Fundamentals of Bio Analytical Techniques and Instrumentation, Ghosal Sabari and Srivastava A. K., PHI Learning Pvt. Ltd. India, 2009.
9. Introduction to Spectroscopy. 3rd Edition. Pavia, Brooks/Cole Pub Co., New Delhi, India, 2000.
10. Basic Instrumentation, K. K. Machve, Neha Publishers & Distributors, India 2010.

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CORE COURSE III

ENZYMES AND ENZYME TECHNOLOGY

Objectives:

1. To understand the concepts and classes of enzymes
2. To study about enzyme kinetics and applications of enzymes.

Unit I

Historical aspects of enzymology. Nomenclature and classification of enzymes, according to IUB-EC-1964. Intracellular localization of enzymes, homogenization techniques, isolation and fractionation of enzymes - classical methods of purification and crystallization - separation based on molecular size, electric charge, solubility difference and selective adsorption, criteria of purity, units of enzyme activity. Turn over number, specific activity. Active site definition, organization and determination of active site residues.

Unit II

Thermodynamic terms and basic concepts - types of thermodynamic systems. Enthalpy and biochemical reactions, biological thermodynamic standard state, activation energy and free energy. Biological oxidation, redox reactions. High-energy phosphate compounds, role of ATP in biological system; energy transfer; acyl-phosphate group transfer. Types of energy transformation in living systems; energy in photosynthesis. Phosphorylation types. Organization of electron carriers and enzymes in mitochondria, chloroplast and microsomes and their inhibitors, cyanide resistant respiration.

Unit III

Kinetics of catalyzed reaction: Single substrate reactions, bisubstrate reactions, Concept and derivation of Michaelis – Menten equation, Line-weaver burk plot, Briggs Haldane relationship. Determination and significance of kinetic constants, Limitations of Michaelis-Menten Kinetics. Inhibition kinetics - competitive, non-competitive and uncompetitive. Allosteric inhibition, cooperative, cumulative, feedback inhibition.

Unit IV

Criteria of chemical reactions - Collision & transition state theories, specificity of enzymes. Mechanism of catalysis: Proximity and orientation effects, general acid-base catalysis, covalent and electrostatic catalysis - nucleophilic and electrophilic attacks, catalysis by distortion, metal ion catalysis.Theories on mechanism of catalysis. Coenzymes - structure and function, Mechanism of enzymes action: mechanism of action of lysozyme and chymotrypsin. Multienzymes system - Mechanism of action and

regulation of pyruvate dehydrogenase, and fatty acid synthase complex. Isoenzymes.

Unit V

Applications of enzymes in Industry. Immobilization and Immobilized enzymes. Various methods of immobilization - ionic bonding, adsorption, covalent bonding (based on R groups of amino acids), microencapsulation and gel entrapment. Applications of immobilized enzymes. Biosensors – glucose oxidase, cholesterol oxidase, urease and antibodies as biosensors. Abzymes and Ribozymes. Enzymes of clinical importance - diagnostic significance and therapeutic effects. Enzyme Engineering.

Reference Books

1. Modern concepts in Biochemistry (Alllyn and Bascon Inc. Boston) Bohinski, R.C: 1987.
2. Inorganic, Organic and Biological Chemistry – Caret,(W.M.C. Brown Publ. USA 1993.
3. Enzymes (Longman, London) - Dixon, M. and Webb, J.F.: 1979.
4. Principles of Biochemistry (Worth Publ. Inc. USA) - Lehninger, A.H,+ 1993.
5. Biochemistry: A case Orientede Approach (The C.V. Mosby Co., St. Louis) - Montgomery, R, 1990.
6. Biochemistry- Rawn, J.D, (Neil Patterson Publ. North Carolina) - 1989.
7. Biochemistry- Stryer, I, (II Ed) W.H. Freeman & Co., New York) 1988.
8. Biochemistry - Voet, D. and Voet, J.G, (John Wiley & Sons Inc., New York) 1990.
9. Principles of Biochemistry- White, A., (McGraw Hill Book Co., New York) 1959.
10. Fundamentals of Enzymology- Price and Stevens: (Oxford University Press) 1999.
11. Handbook of Proteolytic Enzymes - Alan J. Barrett, J. Fred Woessner, Neil D. Rawlings , 2012.
12. Fundamentals of Enzymology (Oxford Science Publications) 2nd Edition, Nicholas C. 1989.
13. Enzymes: Biochemistry, Biotechnology, Clinical Chemistry Kindle Edition-T Palmer , 2007.

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CORE COURSE IV

CELL BIOLOGY AND PHYSIOLOGY

Objectives:

To understand on integrative physiology at several levels of organization from molecules to living organisms, microscopic structures to macroscopic organization, and cellular properties to organ functions.

Unit I

Tissues: Types of tissue. Epithelium – organization and types. The basement membrane. Bone and cartilage. Major classes of cell junctions – anchoring, tight and gap junctions. Major families of cell adhesion molecules (CAMs) – the cadherins (classical and desmosomal). The integrins. The extracellular matrix of epithelial and nonepithelial tissues. ECM components – collagen, elastin, fibrillin, fibronectin, laminin and proteoglycans and tubulins.

Unit II

Biomembranes, cell cycle, cell death: Membrane assembly – importins and exportins. Membrane transport. Diffusion (passive and facilitated) active transport (symport, antiport, Na+ K+ ATPase), ion gradients, ion selective channels, group translocations, porins, endocytosis and exocytosis. The cell cycle : phases, regulation by cyclins and cyclin – dependent kinases. Checkpoints in cell cycle regulation. Programmed cell death – Brief outline of apoptosis. Differences between apoptosis and necrosis.

Unit III

Blood: Composition and functions of blood. Separation of plasma and serum. Plasma proteins in health and disease. Red blood cells – formation and destruction. Important aspects of RBC metabolism. The RBC membrane – principle proteins (spectrin, ankyrin, glycophorins). Anaemias. Composition and functions of WBCs. Blood coagulation – mechanism and regulation. Fibrinolysis. Anticoagulants.

Unit IV

Body Fluids: Lymph – composition and functions. CSF – composition and clinical significance. Formation of urine – structure of nephron, glomerular filtration, tubular reabsorption of glucose, water and electrolytes. Countercurrent multiplication, tubular secretion. Composition, functions and regulation of saliva, gastric, pancreatic, intestinal and bile secretions. Digestion and absorption of carbohydrates, lipids, proteins and nucleic acids.

Unit V

Neuromuscular System: Structure of neuron. Propagation of action potential: structure of voltage – gated ion channels. Neurotransmitters - examples, release and cycling of neurotransmitters. The neuromuscular junction – activation of gated ion channels. The acetylcholine receptor. Structure of skeletal muscle. Muscle proteins – myosin, actin, troponin and tropomyosin and other proteins. Sequence of events in contraction and relaxation of skeletal muscle. Pathophysiology of Duchenne muscular dystrophy. Cardiac muscle – $Ca2^{+}$ -Na^{+} exchanger, Ca2+ -ATPase. Brief outline of channelopathies. Cardiac myophathy. Smooth muscle – regulation by Ca2+ and nitric oxide. Source of energy for muscle contraction.

Reference Books

1. Molecular Cell Biology 5th ed., Lodish, WH Freeman (for unit 1, 2, 5) 2003.
2. Harper's Biochemistry 26th ed- Murray, McGraw Hill (unit 2 Biomembranes, unit 3, unit 4, unit 5 muscle) 2003.
3. Principles of Biochemistry- Smith et al. Mammalian Biochemistry. McGraw Hill 7th ed. (for unit 3, unit 4) 1983.

References:

1. Cell and Molecular Biology. De Robertis and De Robertis. Lea and Febiger 8th ed (1987).
2. Molecular Biology of the Cell - Alberts , 4th ed. Garland Sci. 2002.

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CORE PRACTICAL I

BIOCHEMICAL TECHNIQUES AND ENZYMOLOGY

Objectives:

1. To assay the activity of enzymes from different sources.
2. To stimulate their interest in learning the structure, function and kinetics of enzyme and their role as catalyst and regulator of cell metabolism and to serve as foundation for more advanced enzymology courses

1. Estimation of proteins by Lowry / Brad ford method
2. Estimation of phospholipids by phosphorous assay
3. Estimation of sodium and potassium by Flame photometry
4. Effect of pH, temperature and substrate concentration for amylase and urease and determination of Vmax & Km
5. Effect of inhibitor on activity of any one enzyme
6. Effect of activator on activity of any one enzyme
7. Desalting of proteins by dialysis
8. Separation of polar and non polar lipids by TLC
9. Rf value calculation of various amino acids using TLC and PC
10. Separation of serum proteins by paper electrophoresis

Reference Books:

1. Laboratory manual for Analytical Biochemistry & separation Techniques, P.Palanivelu, MKU University, Madurai.2001.
2. Introductory practical Biochemistry – S.K. Sawhney, Randhir Singh, 2nd ed, 2005.
3. Biochemical methods – S.Sadasivam, New Age International Pub, 2000.
4. Instrumental Methods of Chemical Analysis Bk.Sharma, Goel publications, Meerut, 2000.
5. Enzyme Kinetics – A modern Approach. AG Marangani, John Wiley & Sons, 2003.
6. Laboratory Manual in Bio Chemistry, Jayaraman, New Age International Pub, 2000.

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CORE COURSE V

METABOLISM AND REGULATION

Objectives:

To understand the metabolic pathways and regulatory mechanisms.

Unit I

Bioenergetics: Free energy and entropy. Phosphoryl group transfers and ATP. Enzymes involved in redox reactions. The electron transport chain– organization and role in electron capture. Electron transfer reactions in mitochondria. Oxidative phosphorylation- F1/F0 ATPase- structure and mechanism of action. The chemiosmotic theory. Inhibitors of respiratory chain and Oxidative phosphorylation – uncouplers, ionophores. Regulation of oxidative phosphorylation. Mitochondrial transport systems- ATP/ADP exchange, malate /glycerophosphate shuttle.

Unit II

Carbohydrate metabolism: Glycolysis and gluconeogenesis– pathway, key enzymes and co-ordinate regulation. Pyruvate dehydrogenase complex and the regulation of this enzyme through reversible covalent modification. The citricacid cycle and regulation. The pentose phosphate pathway. Metabolism of glycogen and regulation.

Unit III

Lipid metabolism: Lipogenesis-Control of acetyl CoA carboxylase-Role of hormones-Effect of diet on fatty acid biosynthesis. Regulation of biosynthesis of triacylglycerol, phospholipids and cholesterol. Metabolism of triacylglycerol during stress. α, β,γ, Oxidation of fatty acids– Role of carnitine cycle in the regulation of β -oxidation. Ketogenesis and its control. Lipoprotein metabolism exogenous and endogenous pathways.

Unit IV

Metabolism of amino acids, purines and pyrimidines: Overview of biosynthesis of nonessential amino acids. Catabolism of amino acid– transamination, deamination, ammonia formation, the urea cycle and regulation of ureogenesis. Importance of glutamate dehydrogenase. Overview of Catabolism of carbon skeletons of amino acids. Metabolism of purines- de novo and salvage pathways for purine biosynthesis-Purine catabolic pathway. Metabolism of pyrimidines -biosynthesis and catabolism. Regulation of biosynthesis of nucleotides.

Unit V

Metabolic integration and hormonal regulation: Key junctions in metabolism– glucose-6-phosphate, pyruvate and acetyl CoA. Metabolic

profiles of brain, muscle, liver, kidney and adipose tissue. Metabolic interrelationships in various nutritional and hormonal states– obesity, aerobic, anaerobic endurance, exercise, pregnancy, lactation, IDDM, NIDDM and starvation.

Reference Books

1. Biochemistry- Stryer, Freeman. 5th ed, 2002.
2. Harper's Biochemistry- Murray, 29th ed. Mc. GrawHill, 2011.
3. Principles of Biochemistry. 7th ed, Nelson Cox. Lehninger's McMillan Worth, 2013.
4. Biochemistry- Donald Voet, J.G. Voet, John Wiley, J O H N WI VP & Publisher Kaye Pace
5. Biochemistry- 2nd ed- Kuchel and Ralston. Schaum's Outlines McGraw Hill, 1998.
6. Biochemistry NMS.4th ed- Davidson and Sittman. Lippincott.Willams and Wilkins, 1999.
7. Biochemistry 4th ed- Campbell and Farrell, Brooks/Cole Pub Co. 2002.
8. Metabolic Regulation-Keith N. Frayn, 2009.

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CORE COURSE VI

MOLECULAR BIOLOGY

Objectives:

1. To understand the basic structure and functioning of the genetic materials - DNA.
2. To emphasize the molecular mechanism of DNA replication, repair, transcription, protein synthesis and gene regulation in various organisms.

Unit I

Eukaryotic and Prokaryotic chromosomes: Structure of prokaryotic Chromosomes Structure of eukaryotic chromosomal DNA, banding pattern, c-value, complexity heterochromatin, centromere, nuclear organizer, telomeres, Kinetic complexity of DNA, cot curve, and classes of DNA sequences. Histones, Non-histone proteins, and their properties, structure of nucleosome, role of histones in chromatin folding, concept of gene.

Unit II

Replication: Review of replication in bacteria, plasmid and viruses, Models of DNA replication.DNA replication in prokaryotes and eukaryotes. Eukaryotic DNA polymerases and their roles, origin of replication, Autonomously Replicating Segments (ARS) in yeast, elongation, lagging strand synthesis, and termination.

Recombination: DNA recombination: Homologous, site specific and transposition, Homologous recombination: Holliday Model, Messelsson - Radding Model, Rec BCD pathway. Site specific recombination: Lambda phage integration, and excision rearrangement, of immunoglobulin genes. Transposition: Prokaryotic transposition, conservative and replicative transposition. Eukaryotic transposable elements, yeast and Drosophila transposons.

Unit- III

Transcription: Review of prokaryotic transcription, transcription in eukaryotes: Eukaryotic RNA polymerases and their subunit structure, Class I, II and III promoters, upstream elements, enhancers and silencers, General transcription factors, Class I, II, III genes and their functions, elongation factors, TBP structure and its role in transcription, mediators. Structure of transcription activators, zinc fingers, homeodomains, helix loop helix, bZIP, beta barrels, Post transcriptional modification.

Unit - IV

Translation: genetic code and its features. Wobble hypothesis. Translation machinery, initiation, elongation and termination of translation in prokaryotes and eukaryotes. Translational proof reading, translational

inhibitors, post-translational modifications, chaperones and protein targeting- translocation, heat shock proteins, glycosylation; SNAPs and SNAREs. Bacterial signal sequences. Mitochondrial, chloroplast and nuclear protein transport. Endocytosis - viral entry. Ubiquitin TAG protein destruction.

Unit - V

Chromosomal changes and consequences: Changes in the chromosome number and chromosome structure and its related genetic disorders. Mutation: definition, chemical basis and types. Types of mutagens. Mutant types - lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis. DNA repair mechanism: thymine dimer, light activation, excision, recombinational, SOS and mismatch repair. Cancer Biology: genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes, cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, apoptosis, therapeutic interventions of uncontrolled cell growth.

Reference Books:

1. The Cell- A Molecular Approach Geoffrey Cooper, Robert E Harsman, 3rd ed ASM Press 2004.
2. Molecular Cell Biology, Lodish et.al. 5th ed., WH Freeman & Company 2003.
3. Cell and Molecular Biology De Robertis and De Robertis.. 8th ed Wolters Kluwer India Pvt Ltd 2001
4. Molecular Biology of the Cell Alberts et al 4th ed. Garland Science Inc. 2002.
5. David Freifelder, 2008. Molecular Biology. (Ed: 2). Narosa Publications, New Delhi.
6. Cell and Molecular Biology, Gerald Karp, 4th ed John Wiley & Sons, Inc, New York 2004.
7. Text book of Principles of Molecular Biology- Cram, 2015.

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CORE PRACTICAL II

MOLECULAR AND MICROBIAL TECHNIQUES

Objectives:

To introduce students to various practical aspects of Molecular biology.

Practical:

1. Isolation of plasmid & Genomic DNA
2. Estimation of DNA by diphenylamine method
3. Estimation of RNA by orcinol method
4. Separation of DNA by Agarose Gel Electrophoresis
5. Separation of protein by SDS-PAGE
6. Purification of enzyme by ammonium sulphate precipitation Microbial Techniques
7. Staining technique - Grams staining
8. Determination of bacterial growth curve
9. Media preparation and Culture techniques - pour plate, spread plate and streak plate method
10. Antibiotic Resistance
11. Biochemical Characterization of Bacteria

1. Indole test
2. Methyl Red test
3. Triple Sugar Iron Agar test
4. Voges Proskauer test
5. Citrate Utilization test
6. Catalase test
7. Urease test
8. Oxidase test
9. Nitrate test

Reference Books]

1. Manuals in Biochemistry – Dr. J. Jayaraman, New Age International Pub, 2000.
2. Instrumental Methods of Chemical Analysis Bk.Sharma, Goel publications, Meerut, 2000
3. Laboratory Manual in Bio Chemistry, Jayaraman, New Age International Pub, 2000.
4. Laboratory manual in Biochemistry T.N.Pattabiraman. All India publishers, 1998.
5. Lab Manual in General Microbiology - N Kannan, Palaniappa Brothers, 2000.
6. Lab Manual in Microbiology - Dr P Gunasekaran, New Age International Pub, 2000.

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ELECTIVE I

BIOSTATISTICS

Objectives:

1. The course emphasizes on various statistical methods and its significance.
2. The students are expected to understand the concepts and solve relevant problems pertaining to each topic.
3. To provide sufficient background to be able to interpret statistical results in research.

Unit I

Statistical survey – Organizing, planning and executing the survey. Source of data - Primary and secondary data, collection, observation, interview, enquiry forms, questionnaire schedule and check list. Classification and tabulation of data. Diagrammatic and graphic presentation of data.

Unit II

Measures of central tendency - arithmetic mean, median, mode, quartiles, deciles and percentiles. Measures of variation - range, quartile deviation, mean deviation, standard deviation, Coefficient of variation. Correlation analysis - Scatter diagram, Karl's Pearson's coefficient of correlation and Spearman's rank method. Regression analysis.

Unit III

Probability - Definition, concepts, theorems (proof of the theorems not necessary) and calculations of probability - Simple problems. Theoretical distributions – Binomial, Poisson and normal distribution - Simple problems (proof of the theorems not necessary).

Unit IV

Sampling distribution and test of significance – Concepts of sampling, Testing of hypothesis, errors in hypothesis testing, standard error and sampling distribution, sampling of variables (large samples and small samples.). Student's "t" distribution and its applications. Chi-square test and goodness of fit. Analysis of variance - one way and two way classification. Duncan's Multiple Range test. Design of experiment- Completely randomized block design, Randomized block design.

Unit V

Scientific Methodology: Selection of research problems – hypothesis – definition and characteristics. Experimental approaches – biological, physical and chemical methods. Sources of information: Journals, e-journals, books, biological abstracts, Preparation of index cards, Review writing, Article writing – structure of article. Selection of journals for publication- Impact factor – Citation index and H index. Proposal writing for funding.IPR and Patenting – Concept and types.

Reference Books:

1. Statistical Methods, 4th Edition- Gupta, S.P, Sultan Chand & Son Publishers. 2012.
2. Biostatistical Analysis, 5th Edition- Zar, J.H, Pearson Education, 2010.
3. Biostatistics - Daniel, W.W. A Foundation for Analysis in Health Sciences, 10th Edition, John Wiley and Sons, Inc.,1999.

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ELECTIVE II

MICROBIOLOGY

Aim: To provide wide knowledge on general microbiology

Objectives:

To understand the metabolic reaction occurs in the microbial cells, it helps the student to gain basic information about microbiology.

Unit I

Morphology and Ultra structure: Ultra structure of bacteria, fungi, algae and protozoa. Classification of microbes, molecular taxonomy. Cell walls of eubacteria (peptidoglycan) and related molecules. Outer membrane of Gram– negative bacteria. Cell wall and cell membrane synthesis, flagella and motility, cell inclusions like endospores, gas vesicles. Purple and green bacteria, cyanobacteria, homoacetogenic bacteria, Acetic acid bacteria, Budding and appendaged bacteria, spirilla, spirochaetes, Gliding and sheathed bacteria, Pseudomonads, Lactic and propionic acid bacteria. Endospore forming rods and cocci, Mycobacteria, Rickettsia and Mycoplasma. Archaebacteria.

Unit II

Microbial growth and metabolism: Microbial growth– definition. Mathematical expression of growth, growth curve, measurement of growth and growth yields, synchronous growth, continuous culture, factors affecting growth. Microbial metabolism– overview. Photosynthesis in microbes.Role of chlorophylls, carotenoids and phycobilins, Calvin cycle. Chemolithotrophy; Hydrogen– iron– nitrite oxidising bacteria; nitrate and sulfate reduction; methanogenesis and acetogenesis, fermentations– diversity, syntrophy-role of anoxic decompositions. Nitrogen metabolism, nitrogen fixation, hydrocarbon transformation.

Unit III

Microbiological Techniques: Methods in microbiology. Current methods in microbial identification. Pure culture techniques. Theory and practice of sterilization. Principles of microbial nutrition, construction of culture media, Enrichment culture techniques for isolation of chemoautotrophs, chemoheterotrophs and photosynthetic microbes.

Unit IV

Viruses: Bacterial, plant, animal and tumor viruses. Classification and structure of viruses. Lytic cycle and lysogeny. DNA viruses; positive and negative strand, Double stranded RNA viruses. Replication; example of Herpes, pox, adenoviruses, Retroviruses. Viroids and prions.

Unit V

Medical Microbiology: Disease reservoirs; Epidemiological terminologies. Infectious disease transmissions. Respiratory infections caused by bacteria and viruses; Tuberculosis, sexually transmitted diseases including AIDS; Vector borne diseases, water borne diseases. Public health and water quality. Pathogenic fungi. Antimicrobial agents, Antibiotics. Penicillins and cephalosporins, Broad spectrum antibiotics. Antibiotics from Prokaryotes, Antifungal antibiotics– Mode of action, Resistance to antibiotics. Lantibiotics.

Reference Books

1. Brock Biology of microorganisms- Madigan, 10th ed. Prentice Hall, 2002.
2. Microbiology 4th ed- Davis, Lippincott Williams and Wilkins, 1989.
3. Microbiology - Joklik, Zinsser's Mc Graw-Hill Professional, 1995.
4. Microbiology 5th ed- Pelczar, Mc Graw Hill, 2000.
5. General Microbiology 5th ed- Stainer Ry, Prentice Hall 1986.
6. Medical Microbiology- Brooks, Jawetz, Melnick and Adelberg's Lange Med, 1998.
7. Textbook of Microbiology & Immunology: Edition- Subhash Chandra Parija et al. 2014.
8. Medical Microbiology: 7th -Patrick R. Murray 2012.

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CORE COURSE VII

IMMUNOLOGY

Objectives:

To understand about immune response and immunological techniques

Unit I

Elements of Immunology. Types of immunity- innate and acquired. Humoral and cell mediated immunity. Central and peripheral lymphoid organs- Thymus, bone marrow, spleen, lymph nodes and other peripheral lymphoid tissues- GALT. Cells of the immune system- lymphocytes, mononuclear phagocytes- dendritic cells, granulocytes, NK cells and mast cells, cytokines.

Antigens vs immunogens – types – determinants – Haptens - Factors influencing immunogenicity. Immunoglobulins structure, classification and functions. Isotypes, allotypes and idiotypes.

Unit II

Complement activation and its biological consequences. Theories of Antibody formation. – Factors influencing antibody production – Genetic basis of antibody diversity.

T-cell, B-cell receptors, Antigen recognition- processing and presentation to T-cells. Interaction of T and B cells. Immunological memory. Effector mechanisms- macrophage activation. Cell mediated cytotoxicity, immunotolerance, immunosuppression.

Unit III

MHC genes and products. Polymorphism of MHC genes, role of MHC antigens in immune response, MHC antigens in transplantation. Transplantation types. Immune responses to infectious diseases- Viral, bacterial and protozoal. Tumor antigens-immune response to tumor antigens-immunotherapy. AIDS and other immunodeficiency disorders. Autoimmunity - Autoimmune diseases – pathogenesis - treatment. Hypersensitivity - types & Mechanism.

Unit IV

Immunization practices- active and passive immunization. Vaccines- killed, attenuated- toxoids. Recombinant vector vaccines- DNA vaccines, synthetic peptide vaccines- anti idiotype vaccines. Hybridomas - production of polyclonal and monoclonal antibodies. Principles, techniques and application. Genetically engineered antibodies.

Fractionation of leucocytes by density gradient centrifugation. Identification of lymphocytes and their subsets in blood. Leukocyte migration inhibition technique. Delayed type hypersensitivity technique.

Unit V

Agglutination and precipitation: Techniques - Immuno-electrophoresis, RIA, immunoblotting assay, Avidin- biotin mediated immuno assay. Immunohistochemistry- immunofluorescence, immunoferritin technique. Cytokines assay: ELISA and ELISPOT, Abzymes.

Experimental animal models: inbred strains, SCID mice, nude mice, knockout mice cell culture system: Primary lymphoid culture cloned lymphoid cell lines.

Reference Books

1. Essential Immunology, 10th ed - Roitt's, Blackwell Sci, 2001.
2. Immunology, 4th ed- Kuby, Richard A, Goldsby et al. WH Freeman & Co. 2003.
3. Cellular and Molecular Immunology- Abbas, W.B. Saunders Company, 2000.
4. Immunobiology- 5th ed Janeway, C. (Ed), Paul Travers. Garland Publ. 2001.
5. Immunology- Eli Benjamini AU, A short course. 4th ed. Wiley-Liss, 2000.
6. NMS Series in Immunology- 3rd ed, Lippincott Williams & Wilkins.
7. Fundamentals of immunology- Bier, Springer Verlag, 1986.
8. Cellular and Molecular Immunology: 7th Edition, Abul K, 2011.

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CORE COURSE VIII

CLINICAL BIOCHEMISTRY

Objectives:

1. To impart thorough knowledge about the biochemical basis of various diseases and disorders.
2. To study various diagnostic and therapeutic methodologies available for diseases and disorders.

Unit I

Disorder of carbohydrate and lipid metabolism Disorders of carbohydrate metabolism– glycogen storage diseases, galactosemia, fructose intolerance and fructosuria. Blood sugar homeostasis: Role of tissues and hormones in the maintenance of blood sugar. Hypoglycemia, hyperglycemia, glycosuria. Diabetes mellitus – classification, metabolic abnormalities, diagnosis and management. Disorders of lipid metabolism – lipoproteinaemias. Lipid storage diseases – Gaucher's, Tay Sach's Niemann Pick disease. Fatty liver. Atherosclerosis.

Unit II

Disorders of amino acid and nucleic acid metabolism Disorders of amino acid metabolism– amino aciduria, Phenylketonuria, Hartnup disease, alkaptonuria, albinism, cystinuria, cystinosis, homocystinuria and maple syrup urine disease. Disorders of purine, pyrimidine metabolism: Hyperuricemia and gout. Hypouricemia. Orotic aciduria. Serology: C reactive protein test, Rheumatoid arthritis (RA) test.

Unit III

Liver function test and gastric function test Jaundice- Causes, consequences, biochemical findings, treatment in jaundice, hepatitis and cirrhosis. Liver function test. Tests related to excretory (bile pigments) synthetic (plasma proteins, prothrombin time) detoxifying (hippuric acid, NH3, aminopyrine) and metabolic (galactose) functions. Gall stones. Gastric function tests- Stimulation tests – insulin and pentagastrin. Peptic ulcer, gastritis and Zollinger Ellison syndrome.

Unit IV

Renal function test and metabolic disorders: Kidney function- Biochemical findings in glomerulonephritis, renal failure and nephritic syndrome. Nephrolithiasis. Kidney function tests - Glomerular function tests – inulin, urea and creatinine clearance tests, renal plasma flow, plasma microglobulin. Tubular function tests – water load, concentration and acid excretion tests. Abnormal constituents of urine. Clinical enzymology - Serum enzymes and isoenzymes in health and disease – Transaminases (AST, ALT) acid. Alkaline phosphatases, amylase, LDH and CK.

Unit V

Oncology: Cancer cell – morphology and growth characteristics. Biochemical changes in tumor cells. Differences between benign and malignant tumors. Tumor markers – AFP, CEA and HcG Agents causing cancer – radiation, viruses, chemicals. Multistep carcinogenesis – initiation, promotion, progression. Oncogenes and proto- oncogenes – mechanisms of proto-oncogene activation. Tumor suppressor genes – p53.

Reference Books:

1. Clinical Chemistry in diagnosis and treatment, Philip. D. Mayne & Edward Arnold, 6th ed ELBS.1994.
2. Textbook of Clinical Chemistry, 3rd ed- Tietz, WB Saunders, Burtis & Ashwood, 1999.
3. Principles of Internal Medicine. Harrison's Vol 1 & 2, 16th edition Mc Graw Hill.2005.
4. Biochemistry and disease.Cohn and Roth, Williams and Wilkins, 1996.
5. The Metabolic & Molecular Basis of inherited Diseases, Vol 1 - 4 8th ed Serives, Vallersty, Tata McGraw Hill Companies, 2001.
6. Clinical Biochemistry – Metabolic & Clinical Aspects, William J.Marshall, Stephen K.Bansert, Churchill Livingstone, 1995.
7. Clinical Chemistry – Principles, procedures, correlations – Bishop, Lippincott.2000.
8. Textbook of Biochemistry with Clinical Correlation Thomas M Devlin 2nd ed Wiley & Sons. 2006
9. Clinical Biochemistry-Allan GAW Michael J, an Illustrated Colour Text, 5th Edition, 2013.
10. Harper's Biochemistry 25th Edition-Peter A. Mayes (Author), Robert K. Murray, 1999.

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CORE PRACTICAL III

CLINICAL BIOCHEMISTRY

Objectives:

To study the various diagnostic and therapeutic methodologies available for diseases and disorders.

I. Hematological studies

1. Blood Grouping and Rh typing.
2. Estimation of hemoglobin content.
3. Total RBC count.
4. Total WBC count.
5. Determination of clotting time
6. Total platelet count.
7. Determination of Prothrombin time
8. Determination of ESR.

II. Biochemical analysis of urine & blood

Collection, preservation (blood and urine)

1. Estimation of blood glucose
2. Estimation of serum total proteins and A: G ratio
3. Estimation of serum cholesterol
4. Estimation of blood and urine urea
5. Estimation of serum and urine calcium
6. Estimation of serum and urine uric acid
7. Estimation of serum bilirubin.
8. Estimation of serum creatinine
9. Estimation of serum AST / ALT
10. Estimation of serum acid phosphatase / alkaline phosphatase

III. Urology

Urine - Qualitative tests of urine. Abnormal constituents - Reducing sugar-Benedict test, protein: -Heat and acetic acid test, and sulfosalicylic acid method, Ketone bodies-Rothera's test, Bile pigment (Fouchet method), bile salt (Hay's test), Urobilinogen-Ehrlich aldehyde test and Bence Jones protein test.

Reference Books

1. Practical Clinical Biochemistry- Varley's by Alan H Gowenlock, published by CBS Publishers and distributors, India Sixth Edition ,1988.
2. Laboratory manual in Biochemistry, T.N.Pattabiraman. All India publishers, 1998.
3. Practical Biochemistry for Students, Varunkumar Malhotra, Jaypee Bros, 1986.
4. Laboratory Manual in Bio Chemistry, Jayaraman, New Age International Pub, 2000.
5. Medical Lab Technology Vol I& II, Kanai L Mukerjee New Delhi: Tata Mcgraw Hill Publishing Company, 1996.
6. Practical Biochemistry – Plummer, New Delhi: Tata Mcgraw Hill Publishing Company, 2000.
7. Introductory practical Biochemistry – S.K. Sawhney, Randhir Singh, 2nd ed, 2005.

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ELECTIVE III

GENETIC ENGINEERING

Objective:

To understand and learn the emergence and early development and application of technology.

UNIT I

Introduction to genetic engineering and rDNA technology, gene cloning, specialized tools and techniques, benefits of gene cloning. Isolation and purification of DNA: Preparation of total Cellular DNA, plasmid DNA, bacteriophage DNA, plant cell DNA, isolation of mRNA from mammalian cells.

UNIT II

Vectors and enzymes in cloning: Cloning and Expression vectors- Plasmids pBR, pUC, phages (M3, λ), yeast vectors, cosmids, phagemids, agrobacterium, PAC, BAC, YAC, MAC, HAC vectors, Plant and Animal viruses as vector, binary and shuttle vectors, expression vectors for prokaryotes and eukaryotes, expression cassettes. Restriction endonucleases, ligases, S1 nuclease, reverse transcriptase, polymerase, alkaline phosphatase, terminal transferase, methods of ligation.

UNIT III

Construction of genomic and cDNA libraries, selection and screening of recombinants, probes- types, synthesis and uses of probes. Blotting techniques (Southern, Northern and Western), PCR- types and applications, Sequencing: DNA and RNA, site directed mutagenesis. Chromosome walking, jumping, DNA finger printing and foot printing.

UNIT IV

Methods of gene transfer: Microinjection, electroporation, particle bombardment gun (biolistic), ultrasonication, liposome mediated and direct transfer. Restriction analysis of DNA, molecular markers- RFLP, RAPD, VNTR, SSR, AFLP, STS, SCAR, SNP. Microarrays. Genomics (human genomic project) and proteomics – types and applications.

UNIT V

Applications of Genetic Engineering: Recombinant insulin, somatotropin, vaccines, role of genetic engineering in diagnosis and cure of diseases, gene therapy, transgenic plants (herbicide resistant, pesticide resistant, and antisense RNA technology and its application). Transgenic animals. IPR, Patenting, Ethical, legal issues and hazards of genetic engineering.

Reference Books:

1. Principles of Gene Manipulation and Genomics, Seventh edition, S.B. Primrose and R.M. Twyman, 2006 Blackwell Publishing, USA.
2. Molecular Biotechnology- Principles and applications of Recombinant DNA, Bernard R. Glick, Jack J. Pasternak, and Cheryl L. Patten. — 4th ed., ASM Press, Washington, DC , USA
3. Gene cloning and DNA analysis : an introduction / T.A. Brown.—6th ed- Brown, T.A. (Terence A.) , Wiley-Blackwell. 2010.
4. Elements of Biotechnology, P.K. Gupta, Rastogi Publications, 2nd edition 3rd reprint, 2015-2016.
5. A text book of Biotechnology, R.C.Dubey, S.Chand Publications, 2014
6. An Introduction to Genetic Engineering, Third Edition, Desmond S. T. Nicholl, Cambridge University Press, USA
7. Genetic Engineering – Basics, New Applications and Responsibilities, Edited by Hugo A. Barrera-Saldaña, Published by InTech, Croatia, 2011.

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ELECTIVE IV

DEVELOPMENTAL BIOLOGY

Objectives:

1. To study the cellular basis of development.
2. To elucidate the early development process of humans.

Unit I

Basic concepts: General concept of organisms development: Potency, commitment, specification, induction, competence, determination & differentiation; morphogenetic gradients; cell fate & cell lineages; genomic equivalence and cytoplasmic determinants; imprinting. General principles of cell-cell communication in development: cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, paracrine factors.

Unit II

Fertilization, development and sex determination in humans: Gametogenesis - Sperm & Egg formation; ultra structure of sperm and ovum, egg types, egg membrane. Fertilization, cleavage, Morula, Implantation, blastulation, gastrulation, formation of germ layers, axis formation - anterior and posterior. Sex determination - chromosomes and environment.

Unit III

Morphogenesis and organogenesis in animals: Cell aggregation and differentiation in Dictyostelium; axes and pattern formation in Drosophila, amphibia and chick; organogenesis – vulva formation in Caenorhabditis elegans; eye lens induction, limb development and regeneration in vertebrates; differentiation of neurons, post embryonic development-larval formation, metamorphosis; environmental regulation of normal development; sex determination.

Unit IV

Morphogenesis and organogenesis in plants: Organization of shoot and root apical meristem; shoot and root development; leaf development and phyllotaxy; transition to flowering, floral meristems and floral development in Arabidopsis and Antirrhinum.

Unit V

Implications of developmental biology: Medical implications of developmental biology - genetic disorders in human development, environmental assaults on human development, Future therapies, Environmental regulation of animal development - Environment as a part of normal development, Polyphenisms, plasticity and Learning.

Reference Books

1. Developmental Biology, (Ed: 9) - Gilbert S.F. Sinauer Associates Inc. Massachusetts, USA, 2010.
2. Developmental Biology, TMH Edition, Berrill N.J, 1974.
3. Animal Regeneration- Diwan A.P., Dhakad N.K., Anmol Publications Ltd, India, 1996.
4. Developmental Biology- Browder L.W., Erickson C.A., and Jeffery W.R, Saunder College Publishing House, Philadelphia, USA, 1991.
5. Genetics, 3rd edition- Strickberger, Prentice Hall of India, 2002.
6. Genes VII- Benjamin Lewin, Oxford University Press, 2000.
7. Genetics- Sarin C, Tata McGraw–Hill Publishing Co., Ltd., New Delhi, 1990.
8. Genetics- Gupta PK, Rastogi Publications, Meerut, India, 1996.
9. Molecular Biology of the Cell, (Ed: 3) - Alberts B, Garland Science, USA, 2002.
10. Evolutionary Developmental Biology (2nd edition) - Brian K. Hall, Kluwer Academic Publishers, 1999.

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CORE COURSE IX

ENDOCRINOLOGY

Aim:

To obtain sound knowledge in Hormonal Biochemistry.

Objective:

1. Inculcate through understanding of mechanism of action of Hormones.
2. Clinical endocrinology plays a vital role in clinical Biochemistry and Metabolism.
3. This syllabus substantiate understanding other subject

Unit I

Hypothalamic and pituitary hormones: Hormones – classification, biosynthesis, circulation in blood, modification and degradation. Hormone receptors – structure and regulation. Mechanism of hormone action. Hypothalamic and pituitary hormones. Hypothalamic releasing factors. Anterior pituitary hormones: biological actions, regulation and disorders of growth hormones, ACTH, gonadotrophins and prolactin. Leptin. Posterior pituitary hormones – biological actions and regulation of vasopressin. Diabetes insipidus and SIADHsecretion. Oxytocin. Hypopituitarism.

Unit II

Thyroid and parathyroid hormones: Thyroid hormones – synthesis, secretion, regulation, transport, metabolic fate and biological actions. Antithyroid agents. Thyroid functions tests. Hyper and hypothyroidism. Hormonal regulation of calcium and phosphate metabolism. Secretion and biological actions of PTH, calcitonin and calcitriol. Hypercalcemia and hypocalcemia Rickets and osteomalacia.

Unit III

Adrenal hormones: Adrenal cortical hormones.Synthesis, regulation, transport, metabolism and biological effects. Adrenal function tests. Cushing's syndrome, aldosteronism, congenial adrenal hyperplasia, adrenal cortical insufficiency. Adrenal medullary hormones – synthesis, secretion, metabolism, regulation and biological effects of catecholamines. Phaeochromocytoma.

Unit IV

Gonadal, G.I. and pancreatic hormones: Gonadal hormones: Biosynthesis, regulation, transport, metabolism and biological actions of androgens. Hypogonadism and gynecomastia. Biosynthesis, regulation, transport, metabolism and biological effects of oestrogen and progesterone. The menstrual cycle. Pregnancy – diagnostic tests and biochemical changes.

Foetal monitoring. Amenorrhea. Pancreatic hormones – synthesis, regulation, biological effects and mechanism of action of glucagons, somatostatin and insulin. Insulin receptor. Brief account of gastrointestinal hormones.

Unit V

Signal transduction: Fundamental concepts and definitions of signals, ligands and receptors, endocrine, paracrine and autocrine signaling. Receptors and signaling pathways – cell surface receptors, ion channels, G-protein coupled receptors, receptor kinases (tyr, ser/thr).Signal transduction through cytoplasmic and nuclear receptors. The Ras-raf MAP kinase cascade, second messengers – cyclic nucleotides, lipids and calcium ions. Crosstalk in signaling pathways.

Reference Books:

1. Williams Textbook of Endocrinology – Wilson and Foster 13th ed. 2015.
2. Mechanisms of hormone action – Autind and Short, 1980.
3. Harper's Biochemistry – Murray et al. 26th ed. McGraw Hill, 2003.
4. Principles of Biochemistry – Mammalian Biochemistry, Smith et al. McGraw Hill, 1983.
5. Williams et al, Textbook of Endocrinology, 2015.

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CORE COURSE X

BIOINFORMATICS

Objective:

1. The purpose of studying this paper is to apply computational facility in different fields of life sciences, physical and chemical sciences.
2. After completion, students could learn drug designing through computer based modification programs using synthetic or natural source.
3. Most important application of Bioinformatics is in the field of drug discovery where it reduces more than 60% of the time, money and labor.

Unit I

Bioinformatics – An overview, Definition & History; Bioinformatics databases & tools on the Internet- NCBI, EBI, PIR, Swiss-Prot, GenBank; pattern and motif searches- BLOCKS, PRINTS, PFAM

Unit II

Proteins – Amino acids — Levels of protein structure – Ramachandran Map. Protein Secondary structure prediction - Chou-Fasmann rules, Gamier-Osguthorpe-Robson (GOR) methods; Predicting 3D structure – homology modeling, threading - fold recognition and ab initio methods - Rosetta – CASP.

Unit III

Biological Sequence analysis – Pairwise sequence comparison – Sequence queries against biological databases – BLAST and FASTA - Multiple sequence alignments – Phylogenetic alignment.

Algorithms and Matrices: Scoring matrices- PAM and BLOSUM; dynamic programming Algorithms, Needleman and Wunsch, Smith-Waterman;

Unit IV

Protein structure visualization tools – RasMol, HEX, Argus Lab Swiss PDB Viewer - Structure –Classification, alignment and analysis – SCOP, CATH, FSSP, UNIX.

Unit V

Functional Genomics (Metabolism and Regulation) in Biochemistry – Sequencing genomes– Genome databases on the web, Prokaryotic Genome Database with comparison with Human genome, HGP, GENECLUSTER, DNA Microarray, SWISS-2DPAGE Database, TIGR,WIT, CYTOSCAPE and DRUG DISCOVERY.

Reference Books

1. Bioinformatics-Sequence and Genome Analysis- David W.Mount, Cold Spring Harbor Laboratory Press (2004).
2. Introduction to Bioinformatics, Attwood, T.K. and D.J. Parry-Smith, Pearson Education Ltd., New Delhi (2004).
3. Bioinformatics – Westhead, D.R., Paris J.H. And R.M. Twyman, Instant Notes: Viva Books Private Ltd, New Delhi (2003).
4. Introduction to Bioinformatics, Arthur M. Lesk, Oxford University Press, New Delhi (2003).
5. Bioinformatics- Sequence, structure and databanks, Higgins D. and W. Taylor (Eds), Oxford University Press, New Delhi (2000).
6. Bioinformatics; A practical Guide to the Analysis of Genes and Proteins, Wiley-Interscience, Baxevanis, A. and B.F. Ouellette , Hoboken, NJ (1998).
7. Introduction to computational Biology, Michael, S. Waterman, Chapman & Hall, (1995).

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CORE PRACTICAL IV

PHYTOCHEMISTRY, SOIL ANALYSIS AND IMMUNOLOGICAL

Objectives:

1. To learn the strategies of biochemical research.
2. To provide ample opportunity for the students to specialize in basic and advanced methods used in investigation focusing on biology applications.

Practical:

1. Qualitative and quantitative phytochemical analysis - alkaloids, flavanoids, steroids, tannins, Saponins
2. Antibacterial activity by disc diffusion method
3. *In vitro* antioxidant activity – any two methods
4. Estimation of soil mineral contents-pH, nitrate, nitrite, sulphate, phosphate, calcium, magnesium, chloride, fluoride, silica and ammonia

Immunology

1. Laboratory safety precautions and good laboratory practices
2. Haemagglutination titration
3. Widal test - rapid slide test for typhoid
4. VDRL test - test for syphilis
5. Latex agglutination test for rheumatoid factor and Pregnancy
6. Immunoelectrophoresis
7. Skin Prick Test.

Reference Books:

1. Laboratory manual for Analytical Biochemistry & separation Techniques, P.Palanivelu, MKU University, Madurai.2001.
2. Manuals in Biochemistry – Dr. J. Jayaraman, New Age International Pub, 2000.
3. Practical Biochemistry – Plummer, New Delhi: Tata Mcgraw Hill Publishing Company, 2000.
4. Introductory practical Biochemistry – S.K. Sawhney, Randhir Singh, 2nd ed, 2005.
5. Biochemical methods – S.Sadasivam, New Age International Pub, 2000.
6. Microbiology Lab Manual - John P. Harley 7th edition McGraw Hill Medical Publication division.2007.
7. Diagnostic Enzymology – D.Hawcroft, John Wiley & sons, 1987.
8. Lab Manual in General Microbiology - N Kannan, Palaniappa Brothers, 2000.
9. Lab Manual in Microbiology - Dr P Gunasekaran, New Age International Pub, 2000.

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ELECTIVE COURSE V

ECOLOGY AND ENVIRONMENTAL SCIENCES

Objectives:

To study the physical and biological characters of the environment and the inter-relationship between biotic and abiotic components of nature as well as relationship among the individuals of the biotic components

Unit I

Environment – Physical environment: atmosphere (air), hydrosphere, lithosphere properties, interelationship with living organisms. Abiotic and biotic environment and their interactions. Species interactions; types, interspecific competition, herbivory, carnivory, pollination, symbiosis. Population ecology – Population characteristics, population growth curve, population regulation, life history strategies (r and K selection); concept of meta population demes and dispersal, interdemic extinctions, age structured populations.

Unit II

Community ecology: Nature of communities, community structure and attributes, levels of species diversity and its measurement, edges and ecotones. Concept of habitat and niche, types of niche, niche width and overlap, fundamental and realized niche, resource partitioning, character displacement.

Unit III

Ecological succession and Ecosystem Ecology: Ecological succession types, mechanisms, changes involved in succession, concept of climax. Ecosystem structure, function, energy flow and mineral cycling (C, N, P, S), primary production and decomposition, structure and function of terrestrial (forest, grassland) and aquatic (fresh water, marine, estuarine) ecosystem.

Unit IV

Pollution: Environmental pollution, global environmental change, biodiversity; status, monitoring and documentation, major drivers of biodiversity change, biodiversity management approaches.

Unit V

Biogeography and Conservation Biology ; Major terrestrial biomes, theory of island biogeography, biogeographically zones of India. Principles of conservation, major approaches to management, Indian case studies on conservation/management strategy (Project Tiger, Biosphere reserves).

Reference books

1. Cell Biology, Genetics, Molecular Biology, Evolution And Ecology, P.S. Verma and V.K.Agarwal, S. Chand Company Ltd 2005.
2. Ecology and Environmental Biology, T.K.Saha, Books and Allied (P) Ltd, Kolkata 2011.
3. Modern concepts of Ecology, H.D.Kumar, 8th ed, Vikas Publishing House Pvt Ltd, 2008.
4. Fundamentals of Environment Biology, Dr. Biswarup Mukherjee, Silverline publications, 2008.
5. A Hand Book of Environmental Science, S S Negi, 2008.
6. A Text Book of Environmental Pollution, P.Panday, 2010.
7. A Text Book of Environmental Science, V. Thakur, 2012.
8. A Textbook of Environmental Science, Prabhat Patnaik, 2011.
9. A Textbook of Ecology, S.K. Dubey, 2012.

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BHARATHIDASAN UNIVERSITY TIRUCHIRAPPALLI – 620 024

M.Sc. Biotechnology Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course - I (CC)	Cell Biology	6	4	3	25	75	100
	Core Course - II (CC)	Microbiology	6	4	3	25	75	100
	Core Course - III (CC)	Biochemistry	5	4	3	25	75	100
	Core Course - IV (CC)	Molecular Biology	5	4	3	25	75	100
	Core Practical - I (CP)	Cell Biology, Microbiology, Biochemistry & Molecular Biology (P)	8	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course - V (CC)	rDNA Technology	6	5	3	25	75	100
	Core Course - VI (CC)	Immunology	6	5	3	25	75	100
	Core Practical - II (CP)	rDNA Technology & Immunology (P)	8	4	3	40	60	100
	Elective Course - I (EC)	Bio Instrumentation	5	5	3	25	75	100
	Elective Course - II (EC)	Bio Informatics	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII(CC)	Plant Biotechnology	6	5	3	25	75	100
	Core Course – VIII (CC)	Animal Biotechnology	6	5	3	25	75	100
	Core Practical - III (CP)	Plant and Animal Biotechnology (P)	8	4	3	40	60	100
	Elective Course – III (EC)	Biostatistics, Bioethics and IPR	5	5	3	25	75	100
	Elective Course - IV (EC)	Biotechnology for Entrepreneurs	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course - IX (CC)	Bioprocess Technology	5	5	3	25	75	100
	Core Course - X (CC)	Food Technology	5	5	3	25	75	100
	Core Practical - IV (CP)	Bioprocess and Food Technology (P)	8	4	3	40	60	100
	Elective Course - V (EC)	Environment Biotechnology and Nanotechnology	5	4	3	25	75	100
	Project		7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Note:

Project : 100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers	- 10
Core Practical	- 4
Elective Papers	- 5
Project	- 1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

CELL BIOLOGY

PREAMBLE

Scope: This paper provides a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.

Objective: Understanding the structural and functional aspects of the cell provides the student with a strong foundation in the molecular mechanisms underlying cellular function.

Goal: Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields.

Unit I Cell structure

Introduction to cell: Prokaryotic, akaryotic and eukaryotic cell. Biosis, viroid, mycoplasmas and cyanobacteria (gene organization only). Difference between plant and animal cell at different level.

Plasma Membrane: The lipid layer, membrane proteins, membrane carbohydrate, membrane transport of small molecules, cell adhesion, cell junction and extra cellular matrix.

Cell Wall: Chemical composition, cross linkage, porosity, tensile strength, turgor modifications in special types of cells. Plasmadesmeta and fluid transport between cells.

Unit II Cell Organelles

Endoplasmic Reticulum: Types – rough & smooth. Ultra structure. Role in compartmentalization, intracellular transport & lipid biosynthesis.

Ribosomes: Ultra structure, general chemistry, assembly and function.
Golgi Apparatus: Structure and functions.

Mitochondria: Ultra structure and membrane organization. Role of mitochondria in cellular energies & biogenesis.

Chloroplast: Structure and function. Photosynthesis. Photosynthetic units and reaction centers. Photophosphorylation. CO_2 fixation and synthesis of carbohydrates. Importing proteins in chloroplast and biogenesis.

Lysosomes: General organization, polymorphism, enzyme systems and their functions. Vacuoles and ergastic substances.

Peroxisomes: Formation, enzyme content and role.

Unit III Nuclear Material

Cytoskeleton: Microtubules, microfilaments & associated proteins – actin, myosin and intermediate filaments. 3 dimensional organization of cytoskeleton.

Nucleus: Nucleus, nuclear envelops, nucleoplasam, chromatin and chromosomes. Nuclear division.

Unit IV Organization of Chromosomes, Cell Division & Cell Cycle

Specialized chromosomes, chromosomal abnormalities and qualitative inheritance. Population genetics and developmental genetics using *Drosophila melanogaster* as model system. Somatic cell genetics.

C**ell Division**: Mitosis, meiosis and binary fission. Cell cycle, cell cycle clock & check points.

Cell Cycle and Cell Growth Control: Overview of cell cycle; molecular mechanisms for regulating mitotic events; check points in cell cycle regulation; meiosis; cell birth, lineage and death; Cancer – genetic basis of cancer; Oncogenes and tumour suppressor genes.

Unit V Microbial Cell Biology

Structural organization of prokaryotic cell. Cell appendages – cilia, pili, fimbriae & flagella. Cell wall structure and bacterial surface layers. Cytoplasm. Bacteria as example for prokaryote. Eukaryotic cell organization – filamentous fungus and yeast as example.

Text Books

1. Freifelder D. 1985. Molecular Biology, Narosa Publishing House. New Delhi.
2. Lewin B. 2007. Genes IX. Oxford University Press, London.
3. Ajoy Paul. 2011. Textbook of Cell and Molecular Biology. Books and Allied Ltd.
4. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. 2008. Molecular Biology of Cell. 6th Edition. Garland Science, Taylor & Francis group Publishers.
5. Harvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell. 1995. Molecular Cell Biology. 3rd Edition. W.H. Freeman Publishers.

Reference Books

1. Watson JD, Gilman M, Witkowski J and Zoller M. 1992. Recombinant DNA. Scientific American Books. 2nd Edition. New York.
2. Blackburn GM and Gait MJ. 1996. Nucleic Acids in Chemistry and Biology. Oxford University Press.
3. Lodish H, Baltimore D, Beck A, Zipursky SL, Matsudaria P and Darnell J. 1995. Molecular Cell Biology. Scientific American Books.
4. Cooper M 1995. The Cell Molecular Approach. 2nd Edition. ASM Press.
5. Lewis J Kleinsmith and Valerie M Kish. 1980. Principle of Cell and Molecular Biology 2nd Edition. Benjamin-Cummings Publishing Company.
6. De Robertis, EDP and E.M.F Robertis. 1980. Cell and Molecular Biology. 7th Edition. Saunders Company.
7. T.A. Brown. 2011. Introduction to genetics: A molecular approach. 1st Edition. Garland Science.
8. J.D.Watson, Tania A. Baker, Stephen P. Bell, Michael Levine and Richard Losick. 2013. Molecular Biology of the Gene. 7th Edition. Benjamin/Cummings Publ. Co., Inc., California.
9. Benjamin Lewin. 2008. Genes XI. 9th Edition. Jones & Bartlett Learning.
10. R.A. Meyers. 1995. Molecular Biology and Biotechnology. A comprehensive desk reference. (Ed) Wiley-Blackwell Publishers.

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CORE COURSE II

MICROBIOLOGY

Scope: This paper deals with various types of classification of microbes. The paper also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.

Objective: To impart knowledge on classification of microbes. This paper is also designed to provide knowledge on metabolic function and biochemical reaction going on inside the microbial cell

Goal: This paper enables the students to identify any microorganisms. The students will be able to understand and predict the intermediate metabolism of any microbe used in industrial production processes

Unit I Introduction to Microbiology

Discovery of microbial world, the experiment of Pasteur, the era of discovery of antibiotics and anaerobic life. Types and classification of microbes. Isolation, identification, characteristics and ultra structure of microbes – Viruses, Bacteria, Fungi and Algae. Various associations of microbes.

Unit I1 Microbial Biodiversity, Growth and Molecular Systematic

Origin and evolution of microorganisms. Concepts of species and hierarchical taxa. Bergy's system of classification – Viruses, Bacteria, Fungi. Biological nomenclature - Measurement of species richness and evenness. Simpson's diversity index – Multivariate analysis.

Microbial Nutrition and Growth: Principles of microbial nutrition – carbon, nitrogen, sulphur, growth factors, nutritional requirements of Bacteria. Nutritional uptake and transport. Nutritional classification of Bacteria. Culture media preparation. Types of media - Selective media, Enrichment media and Differential media.

Molecular Systematic: Polyphasic approach –16S rRNA gene sequencing, Phylogenetic grouping. Mol % G+C analysis, DNA-DNA hybridization, Fatty Acid Methyl Ester (FAME) analysis, peptidoglycan, Isoprenoid and quinines. Microbial Community analysis: DGGE, TGGE, SSCP, T-RFLP, FISH.

Unit III Microbial Metabolism

Influence of environment on microbial physiology. Physical factors – radiations, temperature, pH and pressure. Chemical factors – nutrients, water, C, H, O, N, P, S. Growth factors - amino acids, purines, pyrimidines, nucleosides, nucleotides, vitamins, lipids, inorganic nutrients. Antimicrobial compounds, metabolic inhibitors. Response to environment – growth and reproduction; growth inhibition and death, movement, differentiation. Modification to the environment – changes in chemical composition, changes in physical properties. Quantitative measurement of bacterial growth by cell mass, cell number and cell activity. Maintenance and preservation of cultures.

Unit - IV Methods in Microbiology

Isolation of microbes from various sources - serial dilution, pure culture and culture préservation techniques. Microbial culture collection centers. **Staining techniques** – Simple & differential - Gram, endospore, negative, flagellar staining. **Sterilization**

techniques: 1. Concept of sterilization, disinfection, asepsis and sanitation. Moist heat; dry heat, pasteurization, Richards' rapid method - HTST (high temperature/short time) treatments; filter sterilization. 2. Sterilization methods - batch sterilization, continuous sterilization of medium and air. Physical methods of control - temperature, radiation, desiccation, osmotic pressure and filtration. Chemical methods of control - phenol, alcohol, halogens, heavy metals, dyes, detergents, quaternary ammonium compounds, aldehydes and gaseous chemosterilizers. Evaluation of antimicrobial potency of disinfectants and antiseptics - tube dilution, agar diffusion. phenol coefficient.

Unit V Microbial Genetics

Genetic system of bacteria – transformation, transduction, recombination. Extra cellular genetic material - plasmids and transposons. Genetic systems of viruses – Phage I, RNA viruses and retroviruses. Genetic system of fungi – Yeast and Neurospora. Genetic system of protozoa and mycoplasma. Gene regulation - prokaryotic gene regulation. Operon concept -lac operon and tryptophan operon.

Metagenomics - Culture Independent Studies: Exploring and exploiting the microbial gene pool. Methods to detect and quantify bacteria in various ecological niches. Analysis of microbial communities in microhabitats using FISH. Functional characterization of microbial communities by mRNA analysis. Detection of active bacterial populations in soil.

Text Books

1. Prescott, Harley, Klein. 2003. Microbiology. 5th Edition. McGraw Hill Publ.
2. Bernard R. Glick & Jack J. Pasternak. 2002. Molecular Biotechnology. Indian edition. Panima Publishing Corporation.
3. Pelzer, Chan and Kreig. 1986. Microbiology. 5th Edition. McGraw-Hill.

Reference Books.

1. Tortora, G.J., Funke, B.R. and Case, C.L. 2012. Microbiology - An Introduction. 11th *Edition.* Pearson Education.
2. Stainer, Ingharam, Wheelis and Painter. 1987. General Microbiology. 5th Edition. Macmillan Education, London.
3. A.J. Salle. 1974. Fundamental Principles of Bacteriology. Tata McGraw – Hill Edition.
4. AH Rose. 1977. Chemical Microbiology – An introduction to microbial physiology. Butterworth, London.
5. S. Meenakumari. 2006. Microbial Physiology. MJP Publishers.
6. MT Madigan, JM Martinko and Jack Parker. Brock Biology of Microorganisms. 10th Edition. Pearson and Education Inc., New Jersey.
7. David Freifelder, David M. Freifelder and John E. Cronan. 1994. Microbial genetics. 2nd Edition. Jones & Bartlett Publishers.
8. R.W. Old and S.B. Primrose. 1985. Principles of gene manipulation. Blackwell Scientific Publications.
9. Benjamin Lewin. 2006. Genes IX. 9th Edition. Jones and Bartlett publishers.
10. R.A. Atlas. 1998. Microbiology, Fundamental and Applications. 2nd Edition. McMillan Publishers.
11. Powar and Daginawala. 2010. General Microbiology. Volume – I. Himalaya Publishing House.

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CORE COURSE III

BIOCHEMISTRY

Objectives

This paper aims to study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.

Unit I Introduction

Chemical basis of life and composition of living matter. Biomolecules - chemical composition and bonding. Properties of water, acids, gases and buffer. pH, ionization and hydrophobicity. Emergent properties of biomolecules in water and bimolecular hierarchy. Macromolecules and molecular assemblies – relationship between structure and function. Structure and biochemical organization of amino acids, proteins, carbohydrate, fatty acids nucleic acids and vitamins.

Unit II Amino Acids, Proteins and Enzymes

Amino acids - Structure and functional group, properties. Biosynthesis, types, properties and metabolism of amino acids.

Proteins - Peptides and covalent structure of proteins. Elucidation of primary and higher order structures. Ramachandran plot, structural characteristics of protein. Structure - function relationship in model proteins like ribonuclease A, myoglobin, hemoglobin and chymotrypsin. Tools to characterize the expressed proteins.

Enzymes - Nomenclature, classification, properties, structure and functional relationship. Enzyme catalysis and general principles of catalysis. Quantification of enzyme activity and efficiency. Enzyme characterization and Michaelis-Menten kinetics. Relevance of enzymes in metabolic regulation, activation, inhibition and covalent modification. Single substrate and multi-substrate enzymes. Mechanism of action.

Unit III Carbohydrates and Lipids

Carbohydrates - Structure and classification. Sugars - mono, di, and polysaccharides, chemical composition and bonding. Cellular structure, energy storage and signaling. Glycosylation of biomolecules – glycoproteins and glycolipids. Glycolysis, Kreb's cycle, Gluconeogenesis and HMP pathway.

Lipids - Structure, classification and properties. Lipid metabolism. Oxidation - Fatty acids and cholesterol. Biosynthesis of lipids. Lipid storage and membrane lipids. Lipoproteins. Biomembrane organization - sidedness and

function. Membrane bound proteins - structure, properties and function. Transport phenomena of nucleosides and nucleotides.

Unit IV Nucleic Acids and vitamins

Nucleic acids - Structure, diversity and function. Sequencing of nucleic acids. Brief overview of central dogma.

Vitamins - Classification and derivatives. Secondary metabolites from plants.

Unit V Law of Thermodynamics

Bioenergetics - basic principles, equilibrium and concept of free energy, redox potential and their applications. Coupled processes - process of photosynthesis. Logic and integration of central metabolism – entry and exit of various biomolecules from central pathways. Principles of metabolic regulation. Regulatory steps, signals and secondary messengers.

Texts Books

1. L. Lehninger. 2004. Principles of Biochemistry, 4th Edition. W.H Freeman and Company.
2. Stryer. 2002. Biochemistry. 5th Edition. W.H. Freeman and Company.
3. M.N. Chattergea Rana Shinde. 2011. Text book of Medical Biochemistry. 8th Edition.J.P. Medical Ltd.

References Books

1. Donald Voet and Judith G.Voet. 2004. Biochemistry. 3rd Edition. John Wiley, New York.
2. Allan Fershi. 1984. Enzyme structure and mechanism. 2nd Edition. W.H.Freeman & Co. Ltd., USA.
3. Trevor Palmer. 1985. Understanding Enzymes. 2nd Edition. Ellis, Horwood Limited.
4. Victor W. Rodwell, David A Bender, Kathleen M. Botham, Peter J. Kennelly and Anthony P. Weli. 2015. Harper's Illustrated Biochemistry. 30th Edition. Mc Graw Hill Lange Medical Books.

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CORE COURSE IV

MOLECULAR BIOLOGY

Objectives

This paper is aimed to understand the basic structure and functioning of the genetic materials – DNA, RNA and to understand the changes in the genetic material and the consequences.

Unit I Introduction

Nucleic Acid, Bases, Nucleoside, Nucleotide Types: Overview of Molecular biology, discovery of DNA as genetic material and structure of DNA - Watson and Crick model. DNA & its types. RNA & its types, structure and function. Chromosomes, chromatin and their function. Prokaryotic replication of DNA/RNA and enzymes involved. DNA repair mechanisms and recombination.

DNA Replication: Prokaryotic and Eukaryotic DNA replication. Mechanism of DNA replication. Enzymes & proteins involved in DNA replication. Models of replication - Semi-conservative, unidirectional, bidirectional, rolling circle mechanism. Inhibitors of DNA replication.

Unit II Central Dogma - Transcription & Translation.

Transcription: Prokaryotic transcription, transcription unit, promoters - constitutive and inducible, operators and regulatory elements. Initiation, elagation, termination, Rho-dependent and independent and anti - termination. Post transcriptional modifications. Processing of hnRNA, tRNA, rRNA, 5' cap formation, 3' end processing and polyadenylation. Splicing, RNA editing, nuclear export of mRNA, mRNA stability and catalytic RNA.

Translation : Translation machinery, ribosomes, composition and assembly. Universal genetic code, degeneracy of codons and termination codons, isoaccepting tRNA and Wobble hypothesis. Mechanism of initiation, elongation and termination. Co and post translational modifications. Transport of proteins and molecular chaperones. Protein stability, protein turnover and degradation.

Unit III Mutation

Mutation. Types - Non sense mutation, missense mutation and point mutations, intragenic and intergenic suppression and frame shift mutations. Physical, chemical and biological mutagens. Transposition, mechanisms of transposition and role of transposons in mutation. Gene as unit of mutation and recombination. Molecular nature of mutation, mutagen and origin of spontaneous mutations. Gene transfer mechanisms - transformation, transduction, conjugation, transfection and their applications. **Regulation in eukaryotes:** gene loss, gene amplification, gene rearrangement. Regulation of synthesis of primary transcripts, transcriptional control by hormones.

Unit IV Extra-chromosomal hereditary materials & transposable genetic elements

Extra-chromosomal hereditary material

Plasmids: Biology of plasmids, discovery, types and structure of R, Rif, Col factors & Ti plasmids. Replication, incompatibility and copy number. Natural & artificial plasmids. Plasmid curing, plasmid transfer and their applications.

Transposable genetic elements: Discovery, early experiments of McClintock in maize. Insertion sequence in prokaryotes. Complex transposons (Tn10, Tn3 & Tn9 as examples). Mechanisms, control, consequences and applications of transposition by simple & complex elements. transposable genetic elements in prokaryotes and eukaryotes and their uses in genetic analysis.

Unit - V Genetic analysis of microbes

Genetic analysis of microbes - bacteria and yeast. Bacteriophages, Lyticphages - T 7and T4. Lysogeneic phages - I and P1, M13 and f X174. Life cycle and their uses of microbial genetics. Microbial genetics and design of vaccines for BCG, TB and leprosy. DNA vaccine, designing and advantages.

Text Books

1. Ajoy Paul. 2011. Textbook of Cell and Molecular Biology. Books and Allied Ltd.
2. Benjamin Lewin. 2007. Gene IX. 9th Edition, Jones and Barlett Publishers.
3. J.D.Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner. 2007. Molecular Biology of the Gene. 6th Edition. Benjamin Cummings Publishing Company Inc.
4. Watson JD, Gilman M, Witkowski J, Zoller M. 1992. Recombinant DNA. Scientific American Books.

References

1. Bruce Alberts, Alexander Johnson. Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter. 2014. Molecular Biology of Cell. Garland Science publication.
2. Burton E. Tropp. 2012. Molecular Biology – Genes to Proteins. Jones and Bartlett Publishers.
3. George M. Malacinski. 2013. Freifeder's Essentials of Molecular Biology. Norosa Publishing House.
4. Stanely R. Maloy, Jhon E Cornan Jr, David Freifelder. 1994.Microbial genetics. 2nd Edition. Jones and Bartlett publisher.
5. Uldis N. Streips and Ronalad E. Yasbin. 2002. Modern Microbial Genetics. 2nd Edition. Wiley-Blackwell.
6. Sandy B. Primrose, Richard M. Twyman and Robert W. Old. 2008. Principles of Gene Manipulation. 6th Edition. Blackwell Science.

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CORE PRACTICAL I

CELL BIOLOGY, MICROBIOLOGY, BIOCHEMISTRY & MOLECULAR BIOLOGY (P)

Objectives

In this course the students will get hands on experience in Cell Biology, Microbiology, Biochemistry & Molecular Biology Techniques.

Cell Biology

1. Microtomy – (Demo).
2. Prokaryotic & eukaryotic cell - structure observation.
3. Cell count - prokaryotic & eukaryotic.
4. Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium, squamous epithelium.
5. Leishman staining
6. Giemsa staining
7. Total (WBC, RBC) & differential count of human blood cells.
8. Separation of Peripheral Blood Mononuclear Cells from blood.
9. Osmosis and Tonicity.
10. Cell Division - Cytological preparations of tissues (onion) for mitosis.
11. Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.
12. Cell Division - Binary fission of yeast
13. Polytene and diplotene chromosomes.
14. Temporary and permanent slide preparation.
15. Sub-cellular fractionation.

Microbiology

1. Microscopy - Observation of different microbes.
2. Sterilization techniques – physical, chemical, filtration and irradiation techniques.
3. Preparation of media - simple media and complex media.
4. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate techniques
5. Staining methods – simple, differential, acid - fast & negative
6. Identification - Macroscopic, microscopic, biochemical, serological & generic level.
7. Bacterial growth curve - colony counting, cell counting, spectrophotometric method.
8. Preservation & maintenance.
9. Antibiotic sensitivity test – Kirby - Bauer method.

Biochemistry

1. Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc.
2. Preparation of buffers – PBS, Tris and Acetate buffer.
3. Identification of sugars - reducing & non-reducing sugars.

4. Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method.
5. Estimation of amino acid by Ninhydrin method.
6. Estimation of protein by Lowry's method and Barford Method
7. Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.
8. Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato
9. Estimation of DNA by diphenylamine and RNA by orcinol method.
10. Estimation of lipids - cholesterol, PUFA & steroid.
11. Estimation of vitamins – ascorbic acid, α-tocopherol & β – carotenoids.

Molecular Biology

1. Isolation and purification of genomic DNA from prokaryotes.
2. Isolation and purification of genomic DNA from eukaryotes.
3. Isolation and purification of plasmid DNA.
4. Observation of DNA - Agarose gel electrophoresis.
5. Quantification of nucleic acids – DNA & RNA – Chemical and UV method.
6. Separation of protein by SDS PAGE
7. Protein staining techniques. Amido black, coomosic brilliant blue & $AgNO_3$.
8. Transfer of protein - Western blot.
9. Observation of transferred protein – staining (Indian ink), immunoblot.
10. Bacterial mutagenesis – physical & chemical.
11. Preparation of *E. coli* competent cells.
12. Transformation of bacteria – $CaCl_2$ method.
13. Bacterial conjugation.
14. Transduction.

Reference Books

1. S.Sadasivam., A. Manickam. 1996. Biochemical Methods. 2nd Edition. New Age International (p) Ltd, Publishers.
2. Dr. G.Rajagobal., Dr. B.D.Toora. 2001. Practical Biochemistry. 1st Edition. Ahuja Book Company Pvt.Ltd.
3. J.Jayaraman. 2000. Laboratory Manual in Biochemistry. New Age International Publishers.
4. Plummer Mu, David T. Plummer. 1988. Introduction to Practical Biochemistry. Tata McGraw-Hill Education.
5. Gunasekaran, P. 2009. Laboratory Manual in Microbiology. 1st Edition. New Age International Publishers. Reprint 2009.
6. Dr. T. Sundararaj. Microbiology Laboratory Manual. Dr.A.L. MPGIBMS, University of Madras, Taramani, Chennai – 600 113.
7. Arnold L. Demain & Julian E. Davies. 1999. Manual of Industrial Microbiology and Biotechnology. 2nd Edition. ASM press.
8. M. Mooyoung. 1985. Comprehensive Biotechnology. Vol. 2, 3 & 4. Pergamon press.
9. Dr. David A Thompson. 2011. Cell and Molecular Biology Lab Manual.

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CORE COURSE V

rDNA TECHNOLOGY

Objectives

This paper is aimed to study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology.

Unit I Basics Concepts

DNA structure and properties. Restriction enzymes, DNA ligase, klenow enzyme, T4 DNA polymerase, polynucleotide kinase, alkaline phosphatase, cohesive and blunt end ligation, linkers, adaptors and homopolymeric tailing. Labeling of DNA - nick translation, random priming, radioactive and non radioactive probes, hybridization techniques - northern, southern and colony hybridization, fluorescence *in- situ* hybridization, chromatin immuno-precipitation, DNA - protein interactions, electromobility shift assay, DNeI foot printing and methyl interference assay.

Unit II Cloning Vectors

Plasmids, bacteriophages, M13 mp vectors, PUC19 and blue script vectors. Phagemids, lambda phage vectors, insertion and replacement vectors, EMBL, cosmids, artificial chromosome vectors (YAC, BAC), animal virus derived vectors - SV40, vaccinia/bacculo & retroviral vectors. Expression vectors – pMal, GST and pET based vectors. Protein purification. his-tag, GST-tag, MBP-tag etc., intein-based vectors, inclusion bodies, methodologies to reduce formation of inclusion bodies, baculovirus and pichia vectors system, plant based vectors, Ti and Ri as vectors, yeast vectors and shuttle vectors.

Unit III Cloning Methodologies

Insertion of foreign DNA into host cells, transformation, construction of libraries, isolation of mRNA and total RNA. cDNA and genomic libraries, cDNA and genomic cloning, expression cloning and protein-protein interactive cloning. Yeast two hybrid system, phage display and principles in maximizing gene expression.

Unit IV PCR and its Applications

Primer design, fidelity of thermostable enzymes, DNA polymerases, types of PCR - multiplex, nested, reverse transcriptase, real time, touchdown, hot start, and colony. Cloning of PCR products, T-vectors, proof reading enzymes, PCR in gene recombination, deletion, addition, overlap extension, and site specific mutagenesis. PCR in molecular diagnostics, viral and bacterial detection, PCR

based mutagenesis, mutation detection - SSCP, DGGE, RFLP, oligo ligation assay (OLA), Mismatch Chemical Cleavage (MCC), Allele-Specific Amplification (ASA) and Protein Truncation Test (PTT).

Unit V Sequencing Methods

DNA sequencing - Enzymatic, chemical & automated DNA sequencing and RNA sequencing. Chemical synthesis of oligonucleotides, introduction of DNA into mammalian cells, and transfection techniques. Gene silencing techniques, introduction to siRNA, siRNA technology, micro RNA, construction of siRNA vectors, principle and application of gene silencing. Gene knockouts and gene therapy, creation of knockout mice, disease model, somatic and germ line therapy – *in-vivo* and *ex-vivo*, suicide gene therapy, gene replacement and gene targeting. Transgenics, cDNA and intragenic arrays, differential gene expression and protein array.

Text Books

1. S.B. Primrose, R.M. Twyman and R.W.Old. 2001. Principles of Gene Manipulation. 6th Edition. S.B.University Press.
2. J.D. Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner. 2007. Molecular Biology of the Gene. 6th Edition. Benjamin Cummings Publishing Company Inc.
3. Watson JD, Gilman M, Witkowski J, Zoller M. 1992. Recombinant DNA. Scientific American Books.

Reference Books

1. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. 2002. Molecular Biology of the Cell, 4th Edition. Garland Sciences.
2. Stanley Maloy 1994. Microbial genetics. 2nd Edition. Jones and Bartlett publisher.
3. Uldis N. Streips and Ronalad E. Yasbin. 2002. Modern Microbial Genetics. 2nd Edition. Wiley-Blackwell.
4. Sandy B. Primrose, Richard M. Twyman, Robert W. Old. 2008. Principles of Gene Manipulation. 6th Edition. Blackwell Science.
5. *Brown TA. 2008. Genomes. 3rd Edition.* New York: Garland Publishing Co. New York: *Garland Science.*

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CORE COURSE VI

IMMUNOLOGY

Objectives

This paper is aimed to understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.

Unit I Fundamental Concepts and Anatomy of the Immune System

Terminology – Antigen, immunogen, hapten, allergen, tolarogen, super antigens, antibody, immunoglobulin, antigenigity, immunogenicity. Self & nonself, innate & acquired immunity. Haematopoesis. Organs, tissues, cells and mediators of immune system - primary lymphoid organs, secondary lymphoid tissues, lymphocytes, cytokines and lymphokines. Lymphatic system, lymphocyte circulation and lymphocyte homing. Mucosal and Gut associated lymphoid tissue (MALT&GALT) and mucosal immunity. Principles of cell signaling.

Unit - II Immune Responses Generated by B and T lymphocytes

B cell: B cell development, maturation, activation and differentiation. B cell receptor and determinants. B cell subsets. Immunoglobulins - basic structure, classes & subclasses of immunoglobulins, antigenic determinants, multigene organization of immunoglobulin genes and immunoglobulin super gene family. Generation of antibody diversity.

T cell: T cell development, maturation, activation and differentiation. T cell receptor and determinant. T cell subsets. TCR complex. Antigen processing and presentation - endogenous antigens, exogenous antigens, non-peptide bacterial antigens Cell to cell co-operation and hapten-carrier system.

Unit - III Immune Response

Recognition & response: Non specific and Specific. **Nonspecific**: Natural built-in barrier, phagocytosis. Complements, natural killing, inflammatory response. **Specific:** HI & CMI. Antigen recognition and response. Major Histocompatibility Complex - MHC genes, MHC in immune responsiveness and disease susceptibility. HLA typing. Kinetics of immune response and memory. **Unresponsiveness:** tolerance, suppression and potentiation.

Unit - IV Vaccinology

Active, passive and combined immunization. Live, killed, attenuated, plasma derived, sub unit, recombinant DNA, protein based, plant-based, peptide, anti-idiotypic and conjugate vaccines – production & applications. Role and

properties of adjuvants & ISCOMS. Antibody genes and antibody engineering - chimeric and hybrid monoclonal antibodies, catalytic antibodies and generation of immunoglobulin gene libraries.

Unit - V Clinical Immunology

Immunity to infection, bacteria, viral, fungal and parasitic infections (with examples from each group). Hypersensitivity – Type I, II, III and IV. Autoimmunity and types of autoimmune diseases. Mechanism and role of $CD4^+$ T cells, MHC and TCR in autoimmunity. Treatment of autoimmune diseases. Transplantation – immunological basis of graft rejection, clinical transplantation and immunosuppressive therapy. Tumor immunology, tumor antigens, immune response to tumors and tumor evasion of the immune system. Cancer immunology and immunotherapy. Immunodeficiency - primary immuno - deficiencies, acquired or secondary immuno - deficiencies.

Text Books

1. Peter J. Delves, Seamus J. Martin, Dennis R. Burton and Ivan M. Roitt. 2011. Essential Immunology 12th Edition. Wiley - Blackwell. 2. Charles A Janeway, Jr. Paul Travers, Mark Walport, and Mark J Shlomchik. 1999. Immunobiology. 4th Edition. Journal of Current Biology publications.
2. D. M. Weir and John Stewart. 1997. Immunology. 8th Edition. Churchill Livingstone.
3. P.J.Delves, I S.J.Artin, I D.R.Burton and I.M.Roitt. 2006. Essential Immunology. 11th Edition. Wiley - Blackwell.
4. Richard M. Hyde. 2012. Microbiology and Immunology. 3rd Edition. Springer Science & Business Media.

Reference Books

1. Brostoff J, Seaddin JK, Male D and Roitt IM., 2002. Clinical Immunology. 6th Edition. Gower Medical Publishing.
2. Paul William E. 1999. Fundamental of Immunology. 4th Edition. Lippencott Raven.
3. E Roitt. 2011. Essential Immunology. 12th Edition. Blackwell Publication.

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CORE PRACTICAL II

rDNA TECHNOLOGY & IMMUNOLOGY (P)

Objectives

By studying this paper the students will get trained in immological techniques and basic molecular biology techniques which are essential for them to know about rDNA technology.

rDNA Technology

Unit V Molecular Biology Techniques

1. Isolation of plasmids – small & large scale.
2. Size analysis of plasmids by agarose gel electrophoresis.
3. Restriction digestion, ligation.
4. Preparation of competent *E.coli* cells & transformation of *E.coli* with recombinant DNA.
5. Selection methods (Blue white selection, insertional inactivation).
6. Primer design and PCR amplification of β(beta)- galactosidase.
7. Cloning of PCR product into pBR322.
8. Introduction of cloned genes and analysis by SDS – PAGE.
9. Southern blotting.
10. RFLP Analysis of 18s rRNA of the genome.
11. Genetic diversity of Pseudomonas by RAPD.
12. Reporter gene assay (GUS/ β(beta)- galactosidase).
13. Northen blotting.

Immunology

Basics - Bleeding, separation of serum, plasma. (Hands on).

Precipitation techniques – Agar gel diffusion, counter immuno-eletrophoresis, single radial immuno-diffusion, rocket immuno-electrophoresis (Hands on).

Agglutination techniques
Blood grouping and Rh factor; Latex agglutination – RF, ASLO, HBsAg and CRP (Hands on); Heme agglutination - RPHA / IHA (Hands on)

Labeled Assays

1. Enzyme Linked Immunosorbent Assay (ELISA) (Hands on).
2. Immunoflouresence (IF) (Hands on).
3. Immunohistochemistry (IH) (Demonstration).
4. Immunoperoxidase (PAP) staining.
5. Radioimmunoassays (RIA) (Theory).

Animal Tissue Culture (Demonstration).

1. Preparation of tissue culture media.
2. Separation of Human PBMC & analysis.
3. Types of culture.
4. Maintenance of culture

***In-vivo* Testing (Theory)**

1. Breeding and maintenance of experimental animals.
2. Surgical and experimental techniques – thymectomy, spleenectomy and harvesting of lymphnodes.
3. Isolation and enumeration of immune reactive cells.
4. Immunization techniques and use of adjuvants.
5. Choice of animals, form and dose of antigen, route of immunization, immunization schedule, bleeding schedule.
6. Collection of blood, separation and preservation of serum / plasma.

Text Books

1. Richard A. Goldsby, Thomas J. Kindt. Barbara, A. Osborne, Janis Kuby. 2003. Immunology. 5th Edition, W. H. Freeman & Company.
2. J. Sambrook and D.W. Russel, CSHL. 2001. Molecular Cloning: A Laboratory Manual, Vols 1-3.Cold spring Harbor Laboratory press.

Reference Books

1. J. W. Goding, Academic Press, 1983. Monoclonal Antibodies: Principles and Practice
2. T.A. Springer. 1985. Hybridoma Technology in the Biosciences and Medicine. Plenum Press New York.
3. F.Brown, R.M.Chanock, KA Lerner. 1986. Vaccines, New Approaches to immunization, Cold Spring Harbor Lab.
4. Topley and Wilson. G. Wilson, A.Miles, M.T.Paker. Arnold, Heineman, 1984. Principles of Bacteriology, Virology and immunology. Willy – Blackwell.
5. J.H.Miller. 1999. A short core courses in bacterial genetics. Cold spring Harbor Laboratory.
6. Brenda D. Spangler. 2002. Methods in Molecular Biology and protein chemistry. John Wiley & sons, Ltd.
7. Bruce Rirren/Eric. D. Green. 1997. Genome Analysis – A laboratory manual – vol I Analyzing DNA. Cold spring Harbor Laboratory press.
8. Sambrook et al., 1989. Molecular cloning: A Laboratory manual vol.I – III Cold Spring Harbor Laboratory.
9. Stanley R.Maloy, Valley.J.Stewart. 1996. Genetic analysis of Bacteria. Cold spring Harbor Laboratory press.
10. John M.S.Barlett, David Stirling. 2003. PCR protocols. Humana press Inc.
11. Robert E.Farrel Jr. 1996. RNA Methodologies. 2nd Edition. Academic press Inc.
12. Frederick M. Ausbel, Roger Breut. 2002. Short protocols in Molecular Biology. Vol I & II, 5th Edition. John Wiley & Sons Inc
13. Micheal,A. Immis, David.H.Gelfand. 1995. PCR Strategies. Academic Press, Inc.

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ELECTIVE COURSE I

BIO INSTRUMENTATION

Objectives

This course will give an understanding about the working principles, construction and applications of the instruments often used in the studies related to various disciplines of Biological Sciences.

Unit I Basic Instrumentation (Theory & Demo)

Principles, operation protocol & applications of the following instruments: Weighing balance, pH meter, Polarography, Radioactivity, ECG, FTIR.

Unit II Microscopy (Hands on)

Observation of different microbes. Light – Bright & Dark field; Phase contrast, Inverted Phase contrast; Fluorescent, Electron – TEM & SEM; Confocal

Unit III Spectroscopy (Theory & Demo)

Colorimeter, Spectrometer, UV visible spectrometer, X – ray spectrometer, ELISA reader, Atomic absorption spectrometer, Flame photometer, Flourimeter & Spectro flourimeter.

Unit IV Separation Techniques (Theory & Demo)

Centrifugation - Principle, operation, types & applications.

Chromatography - Principle, operation & applications - Paper – ascending, descending & Circular, TLC, HPTLC, GC, HPLC, Column Chromatography, Ion Exchange & Affinity Chromatography, LC – MS.

Unit V Electrophoresis (Theory & Demo)

Native & denatured - zone, iso-electrofocusing & isotachophoresis, 1D & 2D. PCR, MoldiTof

Reference Books

1. S.SadasivamA. Manickam. 2004. Biochemical Methods. 2nd Edition. New Age International (p) Ltd, Publishers.
2. Dr. G.Rajagopal, Dr. B.D.Toora. 2005. Practical Biochemistry. 2nd Edition. Ahuja Book Company Pvt.Ltd.
3. J.Jayaraman. 2000. Laboratory Manual in Biochemistry. New Age International Publishers.
4. Plummer Mu, David T. Plummer. 1988. Introduction to Practical Biochemistry. Tata McGraw-Hill Education.
5. M. Mooyoung. 1985. Comprehensive Biotechnology. Vol. 2, 3 & 4. 2nd Edition. Pergamon press.

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ELECTIVE COURSE II

BIO INFORMATICS

Objectives

By studying this course the students will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

Unit I Basic Bioinformatics

Aim and branches of Bioinformatics. Application of Bioinformatics. Role of internet and www in bioinformatics. Basic biomolecular concepts: Protein and amino acids. DNA & RNA - Sequence, structure and function. NCBI, EBI, ExPASy, RCSB, DDBJ: The knowledge of databases and bioinformatics tools available at these resources. Organization of databases: data contents, purpose and utility. Algorithms; asymptotic analysis of algorithms; NP complete problems; Algorithm types; Brute force; divide and conquer; sorting algorithms.

Unit II Methods of Sequences

Basic concepts of sequence similarity, identity and homology, definitions of homologues, orthologues, paralogues. Introduction to PAM and BLOSUM matrices; basic concept of a scoring matrix, matrices for nucleic acid and proteins sequences, PAM and BLOSUM series; principles based on which these matrices are derived; differences between distance & similarity matrices.

Unit III Tools

Collecting and storing sequences. Various file formats for bio-molecular sequences: GenBank, FASTA, GCG, MSF, NBRF-PIR etc. Database searching: Using BLAST, FASTA and other sequence analysis tools to assign homology; BLAST algorithms, various versions of basic BLAST, application of methods for sequence analysis including the on-line use of the tools and interpretation of results.

Unit IV Dynamic Programming Algorithm

Pairwise alignment methods such as Smith-Waterman and Needleman-Wunsch. Concepts behind multiple sequence alignment; ClustalW, TCoffee. Sequence patterns and profiles: Basic concept and definition of sequence patterns, motifs and profiles, various types of pattern representations viz. consensus, regular expression (prosite-type) and profiles.

Unit V Phylogenetic Analysis

Phylogenetic tree, Neighbour joining, UPGMA. Use of Hidden Markov model (HMM) in assigning homology. Advantages and disadvantages of various sequence analysis methods.

Text Books

1. J. M.Keith. 2008. Bioinformatics. Vol. 1: Data, sequence analysis & evolution. Humana Press.
2. R. Durbin. 1998. Biological sequence analysis. Cambridge University Press.
3. M. Holmes. 2007. A Cell Biologists' guide to modeling and Bioinformatics. Wiley Interscience.
4. R.C. Elston, W.D. Johnson. 2008. Basic biostatistics for geneticists & epidemiologists – A practical approach. Jhon Wiley & Sons Pvt. Ltd.
5. P. R. Bevington. 1969. Data reduction and error analysis for the physical sciences. McGraw Hill.

Reference Books

1. Teresa K. Attwood, David J. Parry –Smith. 1999. Introduction to bioinformatics. 4th Edition. Pearson Education.

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CORE COURSE VII

PLANT BIOTECHNOLOGY

Objectives

This course will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.

Unit I Basics of Plant Tissue culture

Plant tissue culture techniques. *In-vitro* pollination and fertilization. Embryo culture and its applications. Embryogenesis and organogenesis. Micropropagation, haploids and their applications. Somaclonal variations and applications. Endosperm culture and production of triploids.

Unit II Protoplast – Culture & Genetic Manipulation

Introduction to protoplast isolation, culture and regeneration, methods of fusing protoplasts, somatic hybridization. Protoplast and tissue culture manipulation for genetic manipulation of plants.

Unit III Plant Transgenesis

Agrobacterium mediated gene transfer, *Agrobacterium* based vectors (Ti plasmids and Ri plasmids), viral vectors and their applications. Direct gene transfer methods - electroporation, microinjection and particle bombardment. Characterization of transgenics, screenable and selectable markers. Marker free methodologies and gene targeting.

Unit IV Transgenic plants

Transgenic rice with Vitamin A, transgenic plants with stress tolerance for drought and salinity, crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors. Genetically modified foods - application, future applications, ecological impact of transgenic plants. Organic food, types of organic food, identifying organic food, organic food & preservatives. Genetic modification in food industry – background, history, controversies over risks, application, future applications.

Unit V Plant Molecular Biology Techniques

Quantitative Real time PCR, Southern blotting, Northern blotting, Western blotting, DNA sequencing methods and their applications. DNA finger printing in plants. Marker assisted selection (MAS) for crop improvement.

Text Books

1. Gamborg O.L and Philips, G.C. 1995. Plant Cell, Tissue and organ culture - Fundamental methods. Narosa Publishing House, New Delhi.
2. Slater A., Scott N.W. and Fowler, M.R. 2008. Plant Biotechnology - the genetic manipulation of plants. 2nd Edition. Oxford University press, USA.
3. H.S. Chawla, 2002. Introduction to Plant Biotechnology. Oxford and IBH P Publishing Co. Pvt. Ltd. New Delhi.
4. Monica. A. Hughes. 1999. Plant Molecular Genetics. Pearson Education limited, England.

Reference Books

1. Phundan Singh. 2013. Principles of Plant Biotechnology. Kalyani Publishers, India.
2. V. Kumaresan. 2015. Applied Plant Biotechnology. Saras Publication, India.
3. Singh. 2014. Plant Biotechnology, 2nd Revised Edition, Kalyani Publishers, India.
4. Harvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell. 2000. Molecular cell Biology. 4th Edition, W.H. Freeman & Company.

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CORE COURSE VIII

ANIMAL BIOTECHNOLOGY

Objectives

This course is designed to have an understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.

Unit - I Animal Cell, Tissue and Organ Culture

History – Definitions – steps for preparation of cell culture room, culture Environment (Substrate and Media) – Techniques for establishing of cell lines – insect cell culture – organ and embryo culture – cryo
preservation – valuable products. Artificial insemination (IUI, ICSI) – Embryo transfer – cloning (DOLLY, MOLLY and POLLY). Nuclear transplantation, *in-vitro* fertilization technology. Genetic Engineering in animals: Transformation of animal cells – Cloning vectors – Restriction Endonucleases, expression vectors – RTPCR - animal viral vectors and yeast vectors.

Unit – II Transgenic Animals

Development and uses - mice, cattle, goat, fish and sheep and transgenic pets. Tendered meat production. Transgenic breeding strategies – Molecular farming (products with strategic importance). Insulin production using GMO. Embryonic stem cell preservation and its uses in endangered animals.

Unit - III Pest and Animal Management

Juvenile hormone analogues – pheromones and genetic manipulation. Biotechnology of silkworms. Transgenic silk production – Baculo viruses vector and foreign gene expression. Biotechnological approach to the production of live feed. Animal management: cat, dog, pig, horse using appeasing pheromones and their products.

Unit – IV Molecular Markers

Use of nucleic acid probes and antibodies in clinical diagnosis and tissue typing. Mapping of human genome – HGP (Human genome project), RFLP, RAPD and its applications. Genetic engineering approaches for the correction of genetic disorders. Human cloning, Gene silencing. Animal right activities Blue cross in India – Society for prevention of cruelty against animals. Ethical limits of Animal use –Human Rights and Responsibilities. Proteomics in disease biomarkers indentification.

Unit – V Regulating the use of Biotechnology

Regulating DNA technology – DNA barcoding. Regulating food and food ingredients. Human gene therapy. Initial public concerns – accumulation of defective genes in future generation. Future of gene therapy. Patenting Biotechnology inventions – patenting multi-cellular organisms – patenting of fundamental research. Indian and USA patents.

Text Books

1. B Singh, SK Gautam and MS Chauhan. 2015. Textbook of Animal biotechnology. Teri Publication.
2. M.K. Sateesh. 2010. Biotechnology: V: (Including Animal Cell Biotechnology, Immunology and Plant Biotechnology). 2nd Edition. New Age International Pvt. Ltd. Publishers.

Reference Books

1. Harrison, M.S. and Bal, I.R. 1997. General techniques of all culture Cambridge University press.
2. Prasash M. and Arora. C.K.. 1998. Plant tissue culture, Ammol publication Pvt. Ltd.
3. Darling D.C. and Morgan S.J. 1994. Animal cells, culture Media. Wiley, New York.
4. *In-vitro* cultivation of animal cells. 1994. I. ed., Butter worth – Heinemann Ltd.
5. R. Ian Freshney. 2010. Culture of Animal cells & Manual of basic technique. 6th Edition. Wiley – Blakwell publication.
6. Bernard B. Glick, Jack J. Pastunak. 2009. Molecular Biotechnology principles and application of Recombinant – DNA
7. R. Sasidhara. 2006. Animal Biotechnology. MJP publishers
8. Duhcy R.C. 2007. Text book of biotechnology. S.Chand & Company Ltd.
9. Bobert C. Tait. 1997. An Introduction to Molecular Biology. 1st Edition. Horizon Scientific Press.
10. Bobert Matheson. 1994. Entomology- an introductory course. 2nd Edition. Comstock Publishing Company.

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CORE PRACTICAL III

PLANT AND ANIMAL BIOTECHNOLOGY (P)

Objectives

This course is planned to give hands on training on plant & animal tissue culture and biotechnology

Plant Biotechnology

1. Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo).
2. Aseptic culture techniques for establishment and maintenance of cultures (Hands on).
3. Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on).
4. Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on).
5. Isolation of plant genomic DNA by modified CTAB method (Hands on).
6. Size analysis of DNA by Agarose Electrophoresis (Hands on).
7. The cell cycle, plant vascular system & Photoperiodism.
8. Transformation of leaf discs with Agrobacterium (Hands on).
9. Expression of foreign genes into plant cells: use of *Agrobacterium tumefaciens* (Theory).
10. Morphogenesis in tobacco leaf tissue (Hands on).
11. Regeneration abilities of the Shoot Apical Meristem (SAM).
12. Preparation of chloroplast from pea (Hands on).
13. Effect of different light wavelengths on germinating corn embryos (Hands on)..
14. Measurement of photosynthesis (Hands on).
15. Stomata conductance & transpiration (Hands on).
16. Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis.
17. Isolation of DNA & RNA from light and dark –grown seedlings.

Animal Biotechnology

1. Isolation of DNA from Animal liver
2. Isolation of DNA from human cheek cells
3. Isolation of DNA from blood
4. Quantification of DNA by spectrophotometeric method
5. Size analysis of DNA by Agarose gell electrophoresis
6. Isolation & identification of stem cells

Reference Books

1. M. S. Clark. 1997. *Plant Molecular Biology:* A *Laboratory Manual.* Springer-Verlag.
2. Slater A., Scott N.W. and Fowler, M.R. 2008. Plant Biotechnology - the genetic manipulation of plants. 2nd Edition. Oxford University press, USA.
3. H.S. Chawla, 2002. Introduction to Plant Biotechnology. Oxford and IBH P Publishing Co. Pvt. Ltd. New Delhi.
4. Monica. A. Hughes. 1999. Plant Molecular Genetics. Pearson Education limited, England.
5. Harrison, M.S. and Bal, I.R. 1997. General techniques of all culture Cambridge University press.
6. Prasash M. and Arora. C.K.. 1998. Plant tissue culture, Ammol publication Pvt. Ltd.
7. Darling D.C. and Morgan S.J. 1994. Animal cells, culture Media. Wiley, New York.

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ELECTIVE COURSE III

BIOSTATISTICS, BIOETHICS AND IPR

Objectives

This course is planned to give an understanding about Biostatistics, Bioethics, IPR & Legal Protection, Patent Filing and Infringement and Biosafety.

Unit I Biostatistics

Introduction to Biostatistics – sample, population and statistical inference.
Interval data: construction of histogram; interpretation of histogram, the normal distribution, mean, median, mode and standard deviation. Representing normal curve, uncertainties in estimation of mean, comparison of mean and variance.

Proportion data: examples of proportion data (MPN, sterility testing of medicines, animal toxicity, therapeutic trial of drugs and vaccines, infection and immunization studies) statistical treatment to proportion data. Chi – square data and goodness of fit.

Count data: examples of count data (bacterial cell count, radio activity count, colony and plaque counts) statistical treatment to count data, Poisson distribution, standard error, confidence limits of count.

Unit II Bioethics

Concept, philosophical considerations, epistemology of science, ethical terms, principles and theories and relevance to biotechnology. Ethics and the law issues - genetic engineering, stem cells, cloning, medical techniques, transhumanism and bioweapons. Research concerns - animal rights, ethics of human cloning, reproduction and stem cell research. Emerging issues - biotechnology's impact on society, DNA on the witness stand and use of genetic evidence in civil and criminal court cases. Challenges to public policy, regulations, improving public understanding of biotechnology products to correct misconceptions.

Unit III Introduction to IPR & Legal Protection

Basics of patents, types of patents, Indian Patent Act 1970, recent amendments, filing patent application, precautions before patenting – disclosure and non-disclosure. WIPO treaties, Budapest treaty, PCT and implications, role of a country patent office and procedure for filing a PCT application. Types of IP - patents, trademarks, copyright & related rights, industrial design, traditional knowledge, geographical indications and international framework for the protection of IP. Introduction to history of GATT, WTO, WIPO and TRIPS. Global scenario of patents and Indian position,

patenting of biological materials. IP as a factor in R&D and IP relevance to Biotechnology.

Unit IV Patent Filing and Infringement

Patent application - forms and guidelines, fee structure and time frames. Types of patent applications, provisional and complete specifications, PCT and convention patent applications. International patenting - requirement, procedures and costs. Financial assistance for patenting and introduction to existing schemes. Publication of patents -gazette of India, status in Europe and US. Patenting by research students, lecturers and scientists. University/organizational rules in India and abroad, credit sharing by workers and financial incentives. Patent infringement - meaning, scope, litigation, case studies and examples.

Unit V Biosafety

Introduction and historical background. Introduction to biological safety cabinets, primary containment for biohazards, biosafety levels, biosafety levels of specific microorganisms, recommended biosafety levels for infectious agents and infected animals. Biosafety guidelines by Government of India. Definition of GMOs and LMOs. Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO's applications in food and agriculture. Environmental release of GMOs, risk assessment; risk management and communication. Overview of national regulations and relevant international agreements including Cartagena protocol.

Important Links

1. Bioethics - by Ellen Frankel Paul, Fred D. Miller, Jeffrey Paul, Fred Dycus Miller Cambridge University Press, 2002.
2. Bioethics & Science, John A. Bryant, Linda Baggott la Velle, John F. Searle – 2002.
3. http://www.w3.org/IPR/
4. http://www.wipo.int/portal/index.html.en
5. http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html
6. www.patentoffice.nic.in
7. www.iprlawindia.org/ - 31k - Cached - Similar page
8. http://www.cbd.int/biosafety/background.shtml
9. http://www.cdc.gov/OD/ohs/symp5/jyrtext.htm
10. http://web.princeton.edu/sites/ehs/biosafety/biosafetypage/section3.htm l
11. http://www.accessexcellence.org/RC/AB/IE/#Anchor-Bioethics-6296 ww.bioethics.net
12. http://www.americanprogress.org/issues/domestic/science?_kk=bioethics
13. http://www.billmuehlenberg.com/2005/09/02/the-stem-cell-debate/

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ELECTIVE COURSE IV

BIOTECHNOLOGY FOR ENTREPRENEURS

Objectives

This purpose of this course is to give an understanding about biotechnology based entrepreneurship among students.

Unit I Introduction to Entrepreneurship

Entrepreneurship definition, factors necessary for entrepreneurship, desirables in a startup, mistakes to be avoided, pillars of bio-entrepreneurship, promoting bio-entrepreneurship, biotech company roadmap, legal, regulatory and other business factors.

Unit II Identification of a Project

Project management: Search for a business idea, concept of project and classification, project identification, project formulation, project design and network analysis, project report, project appraisal.

Unit III Assessment of a Project

Financial analysis: Ratio analysis, Investment process, Break even analysis, Profitability analysis, Budget and planning process. Sources of finance: Source of development finance, Project financing, Institutional financing to Entrepreneurs, Financial institutions, Role of consultancy organizations. Marketing channels: Methods of marketing, marketing channels, Marketing institutions and assistance.

Unit IV Generation of Fund

Funding of biotech business (Financing alternatives, VC funding, funding for biotech in India, Exit strategy, licensing strategies, valuation), support mechanisms for entrepreneurship (Bio-entrepreneurship efforts in India, difficulties in India experienced, organizations supporting biotech growth, areas of scope, funding agencies in India, biotech policy initiatives), Role of knowledge centers and R&D (knowledge centers like universities and research institutions, role of technology and upgradation).

Unit V Biotech enterprises

Setting up Small, Medium & Large scale industry, Quality control in Biotech industries, Location of an enterprise, steps for starting a small industry, incentives and subsidies, exploring export possibilities.

Text Books

1. D. Hyne & John Kapeleris. 2006. Innovation and entrepreneurship in biotechnology: Concepts, theories & cases.
2. Richard Dana Ono. 1991. The Buisiness of Biotechnology: From the Bench of the Street. Butterworth- Heinemann.
3. Martin Grossmann. 2003. Entrepreneurship in Biotechnology: Managing for growth from start-up to Initial Public Offering

Reference Books

1. Yali Friedman. 2008. Best Practices in Biotechnology Education. Logos Press.
2. Robert Nicholas Trigiano and Dennis John Gray. 2004. Plant Development and Biotechnology CRC Press. 358 pages.
3. Vasant Desai. 2005. Dynamics of Entrepreneurial Development and Management. 6th Edition. Himalaya Publishing House, 2005.
4. Prasannan. Projects: Planning Analysis, Selection, Implemantation & Review. 7th Edition.

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CORE COURSE IX

BIOPROCESS TECHNOLOGY

Objectives

This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.

Unit I Basic principle of Biochemical engineering

Isolation, screening and maintenance of industrially important microbes. Microbial growth and death kinetics (an example from each group, particularly with reference to industrially useful microorganisms). Strain improvement for increased yield and other desirable characteristics.

Microbial Growth and Preservation

Mathematical expression of bacterial growth, generation time and growth rate. Different phases of growth & growth curve and. Batch, continuous and synchronous cultures. Diauxic growth and factors affecting microbial growth. Stress response. Microbial death curve under adverse conditions.

Unit II Concepts of basic mode of fermentation processes

Bioreactor designs and types of fermentation and fermentors. Concepts & basic modes of fermentation - Batch, fed batch and continuous fermentation. Conventional fermentation versus biotransformation. Solid substrate, surface and submerged fermentation. Fermentation economics and fermentation media. Fermenter design - mechanically agitated, pneumatic and hydrodynamic fermenters. Large scale animal and plant cell cultivation and air sterilization. Upstream processing - media formulation, sterilization, aeration and agitation. Measurement and control of bioprocess parameters, scale up and scale down process.

Unit III Downstream processing

Bioseparation - filtration, centrifugation, sedimentation, flocculation, microfiltration, sonication. Cell disruption – enzymatic lysis and liquid-liquid extraction. Purification by precipitation (ammonium sulfate, solvent), electrophoresis and crystallization. Extraction (solvent, aqueous two phase, super critical) and chromatographic techniques. Reverse osmosis and ultra filtration. Drying, crystallization, storage and packaging. Treatment of effluent and its disposal.

Unit IV Applications of enzymes in food processing

Mechanism of enzyme function and reactions in food processing. Enzymic bioconversions e.g. starch and sugar conversion processes. High fructose corn syrup, hydrolyzed protein and their downstream processing. Baking by amylases, deoxygenation and de-sugaring by glucose oxidase, beer mashing and chill proofing; cheese making by proteases and various other enzyme catalytic actions in food processing.

Unit V Applications of Microbes in food processing and production

Fermented foods and beverages, food ingredients and additives used in fermentation and their purification. Fermentation as a method of preparing and preserving foods. Microbes and their use in pickling, producing colours and flavours, alcoholic beverages and other products. Process wastes - whey, molasses, starch substrates and other food wastes for bioconversion to useful products. Bacteriocins from lactic acid bacteria – production and applications in food preservation.

Text Books

1. Jackson AT. 1991. Bioprocess Engineering in Biotechnology. Prentice Hall, Engelwood Cliffs.
2. Shuler ML and Kargi F. 2002. Bioprocess Engineering: Basic concepts, 2nd Edition, Prentice Hall, Engelwood Cliffs.

Reference Books

1. Young M.M. and Reed. 2004. Comprehensive Biotechnology: The Principles, Applications and Regulations of Biotechnology in Industry, Agriculture and Medicine. Vol 1, 2, 3 and 4. Elsevier India Private Ltd, India.
2. Mansi EMTEL and Bryle CFA. 2007. Fermentation Microbiology and Biotechnology. 2nd Edition, Taylor & Francis Ltd, UK.

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CORE COURSE X

FOOD TECHNOLOGY

Objectives

This course is designed to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

Unit I Basics of Food Technology

Food chemistry: constituents of food - contribution to texture, flavour and organoleptic properties of food. Food additives - intentional and nonintentional and their functions. Enzymes in food processing.

Unit II Microbiology of Food

Sources and activity of microorganisms associated with food. Food fermentation & food chemicals. Food borne diseases - infections and intoxications. Food spoilage - causes.

Unit III Food Processing

Raw material characteristics; cleaning, sorting and grading of foods; physical conversion operations - mixing, emulsification, extraction, filtration, centrifugation, membrane separation, crystallization, heat processing.

Unit IV Food Preservation

Use of high temperatures - sterilization, pasteurization, blanching, canning - concept, procedure & application; Low temperature storage - freezing curve characteristics. Factors affecting quality of frozen foods. Irradiation preservation of foods.

Unit V Manufacture of Food Products

Bread and baked foods. Dairy products - milk processing, cheese, butter, ice-cream. Vegetable and fruit products. Edible oils and fats. Meat, poultry and fish products. Confectionery, beverages.

Text Books

1. Crosby, N.T. 1981. Food packaging Materials Applied Science Publishers, London.
2. David, S. Robinson. 1997. Food Chemistry and nutritive value. Longman group, UK.
3. Frazier, W.C. and Westhoff, D.C. 1988. Food Microbiology, 4th Edition. McGram-Hill, New York.
4. Pyke, M. 1981. Food Science and Technology, 4th Edition. John Murray, London.
5. Sivasankar, B. 2002. Food processing and preservation. Prentice Hall, New Delhi.

Reference Books

1. Brenner, J.G., Butters, J.R., Cowell, N.D. and Lilly, A.E.V. 1979. Food engineering operations, 2nd Edition. Applied Sciences Pub. Ltd., London.
2. Desrosier, N.W. and Desrosier, J.N. 1987. The Technology of Food Preservation, CBS Publishers and Distributors, New Delhi.
3. Fennema, O.R. 1976. Principles of food science: Part I, Food chemistry, Marcel Dekker, New York.
4. Lindsay, W. 1988. Biotechnology, Challenges for the flavor and food Industries, Elsevier Applied Science.
5. Shakuntala, N. and Shadaksharaswamy, M. 1997. Foods; Facts and principles. 2nd Edition. New Age International Publishers, New Delhi.

CORE PRACTICAL IV

BIOPROCESS AND FOOD TECHNOLOGY (P)

Objectives

By doing this course the students will get hand on exposure & understand the chemical nature and associated microbes of food and the principles of food processing, preservation and manufacture.

1. Isolation of industrially important microorganisms.
2. Selective isolation of actinomycetes – study their growth characteristics.
3. Isolation and enumeration of lactic acid bacteria.
4. Ethanol production by yeast.
5. Wine production by yeast – setting up a lab experiment.
6. Estimation of alcohol content by colorimetric method and GLC.
7. Enzyme production – amylase production.
8. Production of organic acids – citric acid production by solid state fermentation.
9. Antibiotic production by different strains of microbes (Theory).
10. Test for sensitivity of microorganisms.
11. Down stream processes of enzymes – dialysis.
12. Ion exchange chromatography – drying – cellulose column chromatography.
13. Immobilization of yeast cell by alginate beads
14. Bioassay techniques for antibiotics.
16. Large scale production of organic acids, large scale production of solvents using fermentor (Demo).
17. Visit to Distillery unit; alcohol production and pharmacological industries. Pasteur Institute (Field visit).
18. Isolation & identification microbes from spoiled food.
19. Production of yogurt, butter.

Reference Books

1. E Mans, E.M.T. and C.F.A. Bryce, Taylor and Francis, UK. 2002. Fermentation technology and Biotechnology.
2. Ghose, T.K and P.Ghose. 2003. Biotechnology in India. Springer Publishers, India.
3. Glazer, A.N and H. Nikaido. 1995. Microbial Biotechnology. W.H. Freeman and Co., New York.
4. Stanbury, P.F., A. Whitaker ans S.J. Hall. 1995. Principles of fermentation Technology, Pergamon, UK.
5. Wolf. Cruzer and Annalise Cruzer. 2000. Biotechnology Text Book of Industrial Microbiology. Panima Publishing House, New Delhi.
6. Patel, A.H. 2001. Industrial Microbiology, Mac-Millan India Ltd.

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ELECTIVE COURSE V

ENVIRONMENT BIOTECHNOLOGY AND NANOTECHNOLOGY

Objectives

This course to planned to give an idea about Pollution, types of pollution, management to waste. Synthesis of nanomaterials, charecterisation and their application is also planned.

UNIT I Introduction to Pollution

Introduction - Types of pollution – Air, water, sound pollution. Measurement of pollution. Global environmental problems - ozone depletion, green house effect and acid rain. Control of pollution through Biotechnology.

UNIT II Water Pollution

Water management, measurement and sources of water pollution. Waste water treatment - physical, chemical and biological treatment processes. Biotechnological approaches for industrial waste water treatment - dairy, distillery, tannery, sugar, and pharmaceutical industries. Biodegradation of inorganic and organic wastes, lignin, tannin. Bioremediation of oil spills. Biomonitoring of water pollution using algae, bacteria, plankton, macrophytes, invertebrates, fishes (Bioindicators). Management for effluent toxicity, heavy metal pollution, thermal and radioactive pollution.

UNIT III Solid waste management

Types of solid wastes. Solid waste characteristics and its impact on environment. Solid waste disposal - land filling, incineration, composting, mushroom farming, vermiculture and biogas production. Processing of sugar factory wastes, residential and municipal wastes, coir wastes and mycostraw wastes. Biodegradation of xenobiotics compounds. Biotechnological methods for hazardous waste management.

Conservation Biotechnology: Biodiversity - types, uses and values. Loss of Biodiversity. Conservation and sustainable management of Biodiversity - In *situ* and *Ex-situ* ecorestoration. Environmental and biodiversity laws, environmental education.

UNIT IV Synthesis of Nano Materials & Characterisation

Definition of a nano system - dimensionality and size dependent phenomena, Quantum dots, Nanowires and Nanotubes, 2D films. Methods for synthesis of Nanoscale Materials. Aspects of Nanofluidics. Basic concepts and properties of nanostructured materials. Gold Nanoparticles. Nanopores.
Characterisation of Nanomaterials: Scanning electron microscopes, transmission electron microscopes, scanning probe microscopy, atomic force microscopy, scanning tunneling microscope, Scanning Non-linear Dielectric microscopy, Nuclear Magnetic Resonance Spectroscopy, Nuclear Quadrupole Resonance Spectroscopy Mossbauer & Microwave Spectroscopy and Electron Spin Resonance Spectroscopy, IR & Raman Spectroscopy.

UNIT V Applications of nanotechnology

Nanosensors - types and its applications. Nanocarriers for Drug Delivery - Polymeric Nanoparticles as Drug Carriers. Micelles for Drug Delivery. Micro-array and Genome Chips. Polymer Micelles as Drug Carriers. Microemulsions as Drug Delivery Vehicles. Lipoproteins as Pharmaceutical Carriers. Solid Lipid Nanoparticles as Drug Carriers. Nanocapsules – preparation, characterization and therapeutic Applications. Nanomedicine - Bio-Pharmaceuticals, Implantable Materials, Implantable Devices, Surgical Aids, Diagnostic Tools, Genetic Testing, Imaging, Nanoparticles Probe. Nanotechnology for Cancer Research and Therapy. Nanotechnology for Imaging and Detection. Environmental Nano Remediation Technology - Thermal, Physico-Chemical, and Biological Methods. Nano Filtration for the Treatment of Wastes, Removal of Organics, Inorganics and Pathogens. Nanotechnology for Water Purification.

Text Books

1. Jogdand, S.N. 1995. Environmental Biotechnology. 1st Edition. Himalaya Publishing House, Bombay.
2. Technoglous, G., Burton, F.L. and Stensel, H.D. 1995. Wastewater Engineering – Treatment, Disposal and Reuse. 3rd Edition. Metcalf and Eddy, Inc., Tata Mc Graw Hill, New Delhi.
3. Jain, K.K. 2006. Nanobio-Technology in Molecular Diagnostics: Current Techniques and Applications. Horizon Biosciences, India.
4. Parag Diwan and Ashish Bharadwaj. 2006. Nano Medicines Pentagon Press. ISBN 81-8274-139-4.

Référence Books

1. Alan Scragg. 1999. Environmental Biotechnology. Pearson Education Limited, England.
2. De, A.K. 2004. Environmental Chemistry. Wiley Eastern Ltd. New Delhi.
3. Allsopp, D. and K.J. Seal. 1986. Introduction to Biodeterioration. ELBS/Edward Arnold, London.
4. Ratner, M. and Ratner, D. 2005. Nanotechnology: A Gentle Introduction to the Next Big idea. Pearson Education, Inc. NJ, USA.
5. Christef M. Niemeyer, C. A. Mirkin. 2004. Nanobiotechnology: Concepts, Application and Properties. Wiley – VCH Publishers, New York.
6. Tuan Vo-Dinh. 2007. Nanotechnology in Biology and Medicine: Methods, Devices and Applications. Taylor and Francis Inc., London.
7. Pradeep, T. 2006. NANO. Tata McGraw Publishers, New Delhi, India
8. Challa S.S.R. Kumar (Ed). 2006. Biological pharmaceutical Nanomaterial, Wiley-VCH Verlag Gmbh & Co, KgaA. Weinham, Germany.
9. Vladimir P.Torchilin (Ed.). 2006. Nanoparticulates as Drug Carriers. Imperial College Press, North Eastern University, USA. ISBN 1-86094.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Botany Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem-ester	Course	Course Title	Ins. hr/ week	Cre-dit	Exam hr	Marks		Total
						Int.	Ext.	
I	Core Course I (CC)	Plant Biodiversity I (Algae, Fungi, Lichens and Bryophytes)	6	5	3	25	75	100
	Core Course II (CC)	Plant Biodiversity II (Pteridophytes, Gymnosperms and Paleobotany)	6	5	3	25	75	100
	Core Course III (CC)	Microbiology, Plant Pathology and Immunology	6	4	3	25	75	100
	Core Course IV (CC)	Biofertilizers and Mushroom Technology	6	4	3	25	75	100
	Core Practical I (CP)	Plant Biodiversity I & II, Microbiology, Plant Pathology and Immunology & Biofertilizers and Mushroom Technology (P)	6	4	3	40	60	100
	Total		**30**	**22**				500
II	Core Course V (CC)	Anatomy, Embryology and Morphogenesis	6	5	3	25	75	100
	Core Course VI (CC)	Angiosperm Taxonomy, Ecology and Conservation	6	5	3	25	75	100
	Core Practical II (CP)	Anatomy, Embryology and Morphogenesis & Angiosperm Taxonomy, Ecology and Conservation (P)	6	4	3	40	60	100
	Elective Course I (EC)	Forestry and Wood Science	6	4	3	25	75	100
	Elective Course II (EC)	Industrial Microbiology	6	4	3	25	75	100
	Total		**30**	**22**				500
III	Core Course VII (CC)	Cell Biology, Genetics and Plant Breeding	6	5	3	25	75	100
	Core Course VIII (CC)	Plant Physiology, Biochemistry and Biophysics	6	5	3	25	75	100
	Core Practical III (CP)	Cell Biology, Genetics and Plant Breeding & Plant Physiology, Biochemistry and Biophysics (P)	6	4	3	40	60	100
	Elective Course III (EC)	Genetic Engineering and Biotechnology	6	4	3	25	75	100
	Elective Course IV (EC)	Horticulture and Landscaping	6	4	3	25	75	100
	Total		**30**	**22**				500
IV	Core Course IX (CC)	Plant Tissue Culture	6	5	3	25	75	100
	Core Course X (CC)	Research Methodology	6	5	3	25	75	100
	Core Practical IV (CP)	Plant Tissue Culture & Research Methodology (P)	6	4	3	40	60	100
	Elective Course V (EC)	Food Preservation and Processing	6	4	3	25	75	100
	Project Work	Project Work	6	6	–	-	-	100
	Total		**30**	**24**				500
Grand Total			**120**	**90**				**2000**

ELECTIVE COURSES

The Botany Department offers the following Elective Courses for P.G. Botany students:

- EC-I : Forestry and Wood Science (Semester II)
- EC-II : Industrial Microbiology (Semester II)
- EC-III: Genetic Engineering and Biotechnology (Semester III)
- EC-IV: Horticulture and Landscaping (Semester III)
- EC-V : Food Preservation and Processing (Semester IV)

Core Paper	-	10
Core Practical	-	4
Elective	-	5
Project	-	1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

PLANT BIODIVERSITY I
(ALGAE, FUNGI, LICHENS AND BRYOPHYTES)

Objectives:

This paper provides information pertaining to classification, structure, function and economic importance of Algae, Fungi, Lichens and Bryophytes.

Unit I: ALGAE

General trends and criteria for Algal classification (Bold and Wynne, 1978). Salient features of major classes: Prochlorophyta, Chlorophyta, Charophyta, Xanthophyta, Phaeophyta and Rhodophyta. Ultrastructure of Prokaryotic and Eukaryotic algal cells and their components - cell wall, protoplasm, flagella, eye spots, chloroplast, pyrenoid, nucleus, pigments and reserve foods. Economic importance of algae - Food and feed - Single cell protein - Industrial products (Agar-Agar, Carrageenan, Iodine, Vitamins) - in Medicine and Diatomaceous earth.

Unit II: ALGAE

Range of thallus structure, origin and evolution of sex in algae, phylogeny and interrelationships of algae. Lifecycle patterns in algae and alternation of generations, Fossil algae.

Ecology of Algae: Freshwater algae, marine algae, soil algae, symbiotic algae and parasitic algae. Algae as pollution indicators, algal blooms, algicides culture and cultivation of fresh water and marine algae - Knop's solution and Chu-10 medium (1972).

Unit III: FUNGI

General features, occurrence and distribution. Mode of nutrition in fungi, culture of fungi. Classification of fungi (Alexopoulos and Mims, 1979), recent trends in the classification of fungi. General characters of major classes: Mastigomycotina, Zysomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina. Thallus organization, cell structure and fruit bodies. Phylogeny and interrelationships of major groups of fungi. Economic importance of fungi, in medicine and in industries.

Unit IV: FUNGI

Homothallism and Heterothallism in fungi. Homokaryon and Heterokaryon, Hormonal control in sex organ development in fungi. Physiological specialization and physiological races in fungi. Reproduction, life cycle types, parasexual cycles, reduction in sexuality in fungi. Spore dispersal mechanisms and fungal genetics, Fossil fungi.

LICHENS: General features, classification (Miller, 1984), Distribution, thallus organisation, vegetative and sexual reproduction, lichens as indicators of pollution and economic importance.

Unit V: BRYOPHYTES

General features, distribution, classification (Watson, 1955), General characters of major groups. Marchantiales, Jungermaniales, Anthoceratales, Sphagnales, Funariales and Polytrichales. Range of vegetative structure, Evolution of gametophytes and sporophytes. Reproduction - Vegetative and sexual, spore dispersal mechanisms in bryophytes, spore germination patterns in bryophytes. Ecological and economic importance of bryophytes. Origin and interrelationships, Fossil bryophytes.

REFERENCES

ALGAE

1. Bold, H.C. and Wyne, M.J. (1978). *Introduction of Algae - Structure and Reproduction*. Prentice Hall, New Jersey.
2. Chapman, C.J. and Chapman, D.J. (1981). *The Algae* (2nd ed.). Macmillan, London.
3. Darley, W.M. (1982). *Algal Biology: A Physiological Approach*. Blackwell Scientific Publications. Oxford, London.
4. Fritsch, F.E. (1976). *Structure and Reproduction of the Algae Vols. I & II*. Cambridge University Press, London.
5. Ian Morris (1967). *An Introduction to the Algae*. Hutchinson University Library, London.
6. Kumar, H.D. (1989). *Introductory Phycology*. East-West Press, Madras.
7. Kumar, H.D. and Singh, H.N. (1982). *A Textbook of Algae*. East-West Press, Madras.
8. Lee, R.E. (2008). *Phycology* (4th Edition). Cambridge University Press, New Delhi.
9. Round, F.E. (1981). *The Ecology of Algae*. Cambridge University Press, London.
10. Sharma, O.P. (1986). *Textbook of Algae*. Tata McGraw Hill Co., New Delhi.
11. Smith, G.M. (1976). *Cryptogamic Botany Vol. I. Algae and Fungi*. Tata McGraw Hill, New Delhi.
12. Van Den Hoek, C., Mann, D.G. and Jahns, H.M. (1995). *Algae* (An Introduction to Phycology). Cambridge University Press India Pvt. Ltd., New Delhi.
13. Vashishta, B.R. *et al*. (2008). *Botany for Degree Students – Algae*. S. Chand and Co. Ltd., New Delhi.
14. Venkataraman *et al*. (1974). *Algal Form and Function*. Today and Tomorrow Publishers, New Delhi.

FUNGI

1. Alexopoulus, C.J. and Mims, C.W. (1979). *Introductory Mycology*. Wiley Eastern Ltd., New York.

2. Bessey, E.A. (1979). *Morphology and Taxonomy of Fungi*. Vikas Publishing House Pvt. Ltd., New Delhi.
3. Bold, H.C. *et al.* (1980). *Morphology of Plants and Fungi*. Harper and Row Publishing Inc., New York.
4. Burnet, J.H. (1971). *The Fundamentals of Mycology*. ELBS Publications, London.
5. Mehrotra, R.S and Aneja, K.R. (1990). *An Introduction of Mycology*. Wiley Eastern Ltd., New Delhi.
6. Ringo, J. (2004). *Fundamental Genetics*. Cambridge University Press, United Kingdom.
7. Sharma, P.D. (1987). *The Fungi*. Rastogi and Co., Meerut.
8. Vashishta, B.R. and Sinha, A.K. (2007). *Botany for Degree Students – Fungi*. S. Chand and Co. Ltd., New Delhi.

LICHENS

Hale, M.E.Jr. (1983). *Biology of Lichens*. Edward Arnold, Maryland.

BRYOPHYTES

1. Cavers, F. (1911) *The Interrelationship of Bryophytes*. Cambridge, UK.
2. Ingold, C.T. (1939). *Spore Discharge in Land Plants*. Oxford, UK.
3. Kashyap, S.R. (1972). *The Liverworts of Western Himalayas and Punjab Plains I & II*. Research Company Publications, New Delhi.
4. Parihar, N.S. (1972). *An Introduction to Embryophyta – I: Bryophyta*. Central Book Depot, Allahabad.
5. Prem Puri (1973). *Bryophytes: A Broad Perspective*. Atma Ram and Sons, New Delhi.
6. Smith, G.M. (1971). *Cryptogamic Botany Vol. II. Bryophytes and Pteridophytes*. Tata McGraw Hill, New Delhi.
7. Vashishta, B.R. *et al.* (2008). *Botany for Degree Students: Bryophyta*. S. Chand and Co. Ltd., New Delhi.
8. Watson, E.V. (1971). *The Structure and Life of Bryophytes*. B.I. Publications, New Delhi.

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CORE COURSE II

PLANT BIODIVERSITY II
(PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)

Objectives:

This paper provides information pertaining to classification, structure, function and economic importance of Pteridophytes, Gymnosperms and Paleobotany.

Unit I : PTERIDOPHYTES

General features and origin of Pteridophytes. Classification of Pteridophytes (Reimer, 1954). Range of morphology, structure, reproduction and evolution of gametophytes and sporophytes of the following orders: Rhyniales, Psilotales, Lycopodiales, Selaginellales, Isoetales, Calamitales and Equisetales.

Unit II : PTERIDOPHYTES

Range of morphology, structure, reproduction and evolution of gametophytes and sporophytes of the following orders: Ophioglossales, Marattiales, Osmnndales, Filicales and Salviniales. Stelar evolution in pteridophytes, Heterospory and origin of seed habit. Structure, development and evolution of sorus in Filicales. Phyletic slide, spore germination patterns. Economic importance of Pteridophytes.

Unit III : GYMNOSPERMS

A general account of the characteristic features of Gymnosperms. Origin of Gymnosperms. Classification of Gymnosperms (Sporne, 1965). General structure and interrelationships of Pteridospermales, Bennetittales, Pentoxylales and Cordaitales.

Unit IV : GYMNOSPERMS

A general account on the distribution, morphology, anatomy, reproduction and phylogeny of Cycadales, Coniferales, Ginkgoales, Ephedrales, Welwitchiales and Gnetales. Economic importance of Gymnosperms.

Unit V : PALEOBOTANY

Concepts of Paleobotany, A general account on Geological Time Scale. Techniques for paleobotanical study.
Fossil types: Compressions, incrustation, casts, molds, petrifactions, coalballs and compactions. Age determination and methods of study of fossils. Systematic and Nomenclature of fossil plants. Paloclimates and fossil plants. Role of fossil in oil exploration and coal excavation, Paleopalynology.

REFERENCES

PTERIDOPHYTES

1. Bower, F.O. (1939). *The Ferns Vols. I – III*. Today and Tomorrow's Printers, New Delhi.
2. Eames, A.J. (1936). *Morphology of Vascular Plants - Lower Groups*. Tata McGraw Hill, New Delhi.
3. Ingold, C.T. (1939). *Spore Discharge in Land Plants*. Oxford University Press, Oxford, UK.
4. Parihar, N.S. (1985). *The Biology and Morphology of Pteridophytes*. Central Book Depot, Allahabad.
5. Rashid, A. (1986). *An Introduction to Pteridophyta*. Vani Educational Books, New Delhi.
6. Sharma, O.P. (1990). *Textbook of Pteridophyta*. Macmillan India Ltd., India.
7. Smith, G.M. (1971). *Cryptogamic Botany Vol. II Bryophytes and Pteridophytes*. Tata McGraw Hill, New Delhi.
8. Sporne, K.R. (1972). *The Morphology of Pteridophytes*. B. I. Publications, Madras.
9. Sundararajan, S. (2007). *Introduction to Pteridophyta*. New Age International Publishers, New Delhi.
10. Vashishta, P.C. *et al*. (2008). *Botany for Degree Students: Pteridophyta*. S. Chand & Co. Ltd., New Delhi.

GYMNOSPERMS

1. Chamberlain, C.J. (1957). *Gymnosperms: Structure and Evolution*. University Chicago Press, New York.
2. Coultar, J.M. and Chamberlin, C.J. (1967). *Morphology of Gymnosperms*. Central Book Depot, Allahabad.
3. Foster, A.S. and Gifford, E.M. (1965). *Morphology and Evolution of Vascular Plants*. W. H. Freeman & Co., California.
4. Maheswari, P. and Vasil, V. 1960. *Gnetum: A Monograph*. CSIR Publications, New Delhi.
5. Sporne, K.R. (1974). *The Morphology of Gymnosperms*. B.I. Publications, New Delhi.
6. Vasishta, P.C. *et al*. (2006). *Botany for Degree Students: Gymnosperms*. S. Chand & Co. Ltd., New Delhi.

PALEOBOTANY

1. Nikias, K.J. (1981). *Paleobotany, Paleoecology and Evolution*. Praeger Publishers, USA.
2. Seward, A.C. (1919). *Fossil Plants Vols. I – IV*. Cambridge University Press, London.
3. Seward, A.C. (1931). *Plant Life through the Ages*. Cambridge University Press, London.
4. Shukla, A.C. and Mishra, S.P. (1982). *Essentials of Paleobotany* (2nd ed.). Vikas Publishing House Pvt. Ltd., New Delhi.

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CORE COURSE III

MICROBIOLOGY, PLANT PATHOLOGY AND IMMUNOLOGY

Objectives:

This paper helps

1. To understand the structure, biology, nutrition and reproduction of virus and bacteria
2. Give information on pathogen causing diseases in plants and then mode of action
3. To provide information on immunology.

MICROBIOLOGY

Unit I

Scope, branches of Microbiology. Whittaker's five kingdom concept (1969). Prokaryotic and Eukaryotic microbes. General features of virus, classification, ultrastructure, replication, economic importance, Virions and Prions, Phytoplasma (including Mycoplasma).

Unit II

Bergey's system of Bacterial classification (1984-1991) – Eubacteria, Archaebacteria, Cyanobacteria and Actinomycetes - General account, ultrastructure, nutrition, growth and reproduction. Bacterial culture techniques and Economic importance.

PLANT PATHOLOGY

Unit III

Organisms and causal factors responsible for plant diseases – Methods of studying plant diseases. Koch's postulates. Plant-microbe interactions – mutualism, Mycoparasitism, Antagonism, Commensalism. Defense mechanism in plants. Integrated disease management.

Unit IV

Common Plant Diseases – Tobacco mosaic, Cucumber mosaic, Little leaf disease of Brinjal, Citrus canker, Rice blight, Tikka disease of groundnut, Wilt of cotton, White rust of Mustard, Rust of Wheat, Root Knot of tomato, Red rot of sugarcane.

IMMUNOLOGY

Unit V

General account of immune systems – innate and acquired immunity – Antigen and antibody (types, structure and interactions). Detection of antibody (immuno electrophoresis, ELISA and RIA). Immunohistochemistry – Major and minor Blood groups – ABO and Rh incompatibility.

REFERENCES:

1. Annadurai, B. (2008). *A Textbook of Immunology and Immunotechnology*. S. Chand & Co. Ltd., New Delhi.
2. Bilgrami, K.S. and Dube, H.C. (1990). *A Textbook of Modern Plant Pathology*.
   Vikas Publishing House Pvt. Ltd., New Delhi.
3. Carpenter, P.L. (1987). *Microbiology*. Saunders Co., Philadelphia, USA.
4. Dubey, R.C. and Maheshwari, D.K. (2007). *A Textbook of Microbiology*. S. Chand & Co. Ltd., New Delhi.
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6. Mehrota, R.S. (1994). *Plant Pathology*. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
7. Nandini Shetty (2008). *Immunology - Introductory Textbook*. New Age International Publishers, New Delhi.
8. Pandey, B.P. (1982). *A Textbook of Plant pathology, Pathogen and Plant Diseases*. S. Chand and Co. Ltd., New Delhi.
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11. Rangaswamy, G. (1972). *Diseases of Crop Plants in India*. Prentice Hall of India Pvt. Ltd., New Jersey.
12. Schlegel, H.G. (1993). *General Microbiology* (7th Edition). Cambridge University Press, United Kingdom.
13. Singh, R.S. (1990). *Plant diseases* (6th ed.). Oxford & IBH, New Delhi.
14. Staley, J.T. *et al.*, (1991). *Bergey's manual of Systematic Bacteriology Vols. I – IV*. Williams & Wilkins, London.

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CORE COURSE IV

BIOFERTILIZERS AND MUSHROOM TECHNOLOGY

Objectives:

This paper helps

1. To understand the structure, biology, nutrition and reproduction of virus and bacteria
2. To give information on pathogen causing diseases in plants and then mode of action
3. To provide information on immunology.

BIOFERTILIZERS

Unit I

Biofertilizers: Introduction, scope and general account. Cyanobacterial biofertilizers –organism, medium (BG11), isolation (nitrogen fixing), mass cultivation, career material, field inoculation. Mass cultivation of *Azolla*. Symbiotic association of Cyanobacteria.

Unit II

Bacterial Biofertilizers: Isolation – *Azotobacter* – Ashby's mannitol agar, *Azospirillum* – Semisolid medium – (Bulow and Dobereiner, 1975). *Rhizobium* – Yeast Extract Mannitol Agar medium – Culture characteristics. Mass production of *Azospirillum, Azotobacter* and *Phosphobacteria*. Phosphate solubilization and mobilization – *Azospirillum, Azotobacter, Frankia, Phosphobacteria* and *Rhizobium*.

Unit III

Mycorrhiza: Scope and general account of Ecto, Endo and Arbuscular mycorrhizae (AM). Isolation and inoculation techniques. Legume-AM interaction – National and Regional Biofertilizers production and Development Centres. Methods of collection, wet sieving, and decanting method and inoculums production. Culture of mycorrhizae in Modified Melin – Norkrans (MMN) agar medium.

Mushroom Technology

Unit IV

Mushroom Technology: Introduction and Scope. Edible and Poisonous mushrooms. Structure, Formation and Development of Basidiocarp – *Agaricus.* Importance and nutritive value of edible mushrooms. Isolation and culture of spores, culture media preparation. Production of mother spawn, Multiplication of spawn – Inoculation Technique – Cultivation technology – Substrates, composting technology, bed, polythene bag preparation,

spawning – casing – cropping – mushroom production – Harvest – Storage methods and Marketing.

Unit V

Cultivation of Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajor-caju*) and Paddy straw mushroom (*Volvariella volvacea*). Food Preparation – Soup, cutlet, vegetable curry, samosa, omlette and pickle. Mushroom Research Centres in India.

REFERENCES:

1. Alice, D., Muthusamy and Yesuraja, M. (1999). *Mushroom Culture*. Agricultural College, Research Institute Publications, Madurai.
2. Dubey, R.C. (2008*). A Textbook of Biotechnology*. S. Chand & Co. Ltd., New Delhi.
3. Marimuthu, T. *et al*. (1991). *Oyster Mushroom*, *Development of Plant Pathology*. Tamil Nadu Agricultural University, Coimbatore.
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8. Subba Rao, N.S. (1982). *Advances in Agricultural Microbiology*. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
9. Subba Rao, N.S. (2002). *Soil Microbiology* (4th ed.) *Soil Microorganisms and Plant Growth*. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
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11. Tripathi, D.P. (2005). *Mushroom Cultivation*. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
12. Verma, A. (1999). *Mycorrhiza*. Springer Verlag, Berlin.

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CORE PRACTICAL I

PLANT BIODIVERSITY – I & II, MICROBIOLOGY, PLANT PATHOLOGY AND IMMUNOLOGY & BIOFERTILIZERS AND MUSHROOM TECHNOLOGY (P)

ALGAE

Gleocapsa, Spirulina, Anabaena, Volvox, Spirogyra, Ulothrix, Acetabularia, Nitella, Vaucheria, Cyclotella and *Navicula (Diatoms), Padina, Sargassum, Gelidium* and *Gracilaria*

FUNGI

Pythium, Pilobolus, Taphrina, Xylaria, Pluerotus, Lycoperdon, Cercospora, Fusarium and *Colletotrichum*

LICHENS

Parmelia and *Usnea*

BRYOPHYTES

Morphological and anatomical study of representative members of the following genera: *Marchantia, Lunularia, Targionia, Reboulia, Porella* and *Polytrichum*

PTERIDOPHYTES

Study of morphology and anatomy of the vegetative and reproductive parts of the following genera: *Isoetes, Lycopodium, Angiopteris, Osmunda, Gleichenia, Pteris, Nephrolepis* and *Azolla*

GYMNOSPERMS

Study of morphology and anatomy of the vegetative and reproductive parts of the following genera: *Araucaria, Podocarpus, Ginkgo* and *Ephedra*

PALEOBOTANY

Lepidodendron, Stigmaria, Calamostachys, Lyginopteris, Lagenostoma and *Cordaites*

MICROBIOLOGY

Isolation of microbes from soil – Serial dilution and Plating – Gram's staining of bacteria found in milk, curd, root – nodule – Effect of different antibodies on bacterial growth (antibiotic sensitivity)

PLANT PATHOLOGY

Study of the following diseases:
Rust of wheat, Wilt of cotton, White rust of mustanrd – Citrus canker, Rice blight – Tobacco mosaic, Cucumber mosaic, Little leaf of brinjal, Tikka diseases of ground nut, Root knot of tomato.

IMMUNOLOGY

Blood group determination (Demonstration)

BIOFERTILIZERS

Isolation, identification of *Rhizobium*, VAM, *Azospirillum*

MUSHROOM TECHNOLOGY

Preparation of culture, Spawn production, Cultivation Techniques.

Note:

Duly certified record notebooks should be submitted for all the practical examinations and those who do not submit, need not be permitted to the concerned practical examination.

EVALUATION FOR CORE COURSE – V

- **Internal** (40 marks)
  - Practical skill : 10
  - Submission of observation note books : 10
  - Practical assessment by test : 10
  - Submission of 10 permanent slide of hand/microtome section : 10
  - **Total : 40**

- **External** (60 marks)
  - Practical Examination : 50
  - Record : 10
  - **Total : 60**

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CORE COURSE V

ANATOMY, EMBRYOLOGY AND MORPHOGENESIS

Objectives:

1. To inculcate the basics of tissues and anatomical features of plants.
2. To impart the knowledge about the various aspects of morphogenesis.
3. To understand the key aspects of embryology of angiosperms

Unit I: ANATOMY

General account and theories of organization of apical meristems of shoot apex and root apex, quiescent centre. Structural diversity and phylogenetic trends of specialization of xylem and phloem. Cambium - origin - cellular structure, cell division, storied and non-storied types. Cambium in budding and grafting - wound healing role. Trichomes, periderm and lenticels.

Unit II: ANATOMY

Anatomical characteristics and vascular differentiation in primary and secondary structure of root and stem in Dicot and Monocot. Origin of lateral roots – Root - stem transition - Anatomy of Dicot and Monocot leaves. Anatomy of nodes and petioles. Leaf abscission, stomatal types, vascularization of flower and seedling.

Unit III: EMBRYOLOGY

Microsporangium - Microsporogenesis, Microspores - arrangement - morphology - ultrastructure - Microgametogenesis - Nemec phenomenon – pollen - stigma - Incompatibility - Methods to overcome incompatibility - Megasporangium - Megagametogenesis - Female gametophyte – Monosporic, Bisporic, Tetrasporic and special types - Nutrition of embryo sac and fertilization

Unit IV: EMBRYOLOGY

Endosperm - Types - Endosperm haustoria - Cytology and physiology of endosperms, functions of endosperms - Embryo development in Dicot and Monocot, Nutrition of embryo - Polyembryony - Causes, Apomixis - Causes, Apospory - Their role in plant improvement programmes and seed development.

Unit V: MORPHOGENESIS

Definition - Morphogenesis and its relation to morphology - Turing's diffusion reaction theory - Morphogenetic factors - growth regulators - genetic and environment - polarity.
Molecular basis of morphogenesis - Cytosol and cytoskeleton, microtubules and microfilaments - Cellular level morphogenesis - Nuclear transplantation experiments with *Acetabularia* - Sach's and Errer's laws - Asymmetric

divisions and their significance. Morphogenesis at tissue level - Differentiation, dedifferentiation and redifferentiation of vascular tissue *in vivo, in vitro* and in wounds.

REFERENCES

ANATOMY

1. Clowers, F.A.L. (1961). *Apical Meristems*. Blackwell Scientific Publications, Oxford.
2. Cutter, E.G. (1978). *Plant Anatomy*. Edward Arnold Publishers Ltd., London.
3. Easu, K. (1953). *Plant Anatomy*. John Wiley & Sons Inc., New York.
4. Fahn, A. (1989). *Plant Anatomy*. Maxwell Pvt. Ltd., Singapore.
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6. Pandey, B.P. (1989). *Plant Anatomy*. S. Chand & Co. Ltd., New Delhi.
7. Singh, V., Pande, P.C. and Jain, D.K. (1987). *Anatomy of Seed Plants*. Rastogi Publications, Meerut.

EMBRYOLOGY

1. Agarwal, S.B. (1990). *Embryology of Angiosperms – a fundamental approach*. Sahitya Bhawan, Agra.
2. Bhojwani, S.S. and Bhatnagar, S.P. (1981). *Embryology of Angiosperms*. Vikas Publishing House Pvt. Ltd., New Delhi.
3. Dwivedi, J.N. (1998). *Embryology of Angiosperms*. Rastogi and Co., Meerut.
4. Maheswari, P. (1963). *An Introduction to Embryology of Angiosperms*. International Society of Plant Morphologies, University of Delhi.
5. Raghavan, V. (1976). *Experimental Embryogenesis in Vascular Plants*. Academic Press, London.

MORPHOGENESIS

1. Bard, J. (1990). *Morphogenesis*. Cambridge University Press, London.
2. Bonner, J.T. (1965). *Morphogenesis*. Oxford & IBH Publications, Bombay.
3. Brouder, L.W. (1986). *Development Order: A Comprehensive Treatise Vol.2. The Cellular Basis of Morphogenesis*. Plenum Press, New York.
4. Bryant, J.A. and Francis, D. (1985). *The Cell Division Cycle in Plants*. Cambridge University Press, London.
5. Burgess, J. (1985). *An Introduction to Plant Cell Development*. Cambridge University Press, London.
6. Ebert, J.D. *et al*. (1970). *Interacting Systems in Development*. Holt, Reinhart & Win Inc., New York.
7. Murphy, T. M. and Thompson, W. F. (1988). *Molecular Plant Development*. Prentice Hall of India Pvt. Ltd., New Jersey.

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CORE COURSE VI

ANGIOSPERM TAXONOMY, ECOLOGY AND CONSERVATION

Objectives:

This paper covers all the aspects pertaining to

1. Different systems of classification of Angiosperms, taxonomic literature, botanical nomenclature
2. Preparation of description of plant species, herbarium techniques and interpretation of allied disciplines and molecular taxonomy to resolve the disputes in modern taxonomy
3. Systematic treatment, diagnostic features, characters and economic importance of selected families in Angiosperms
4. Components, dynamics, trophic level and biogeochemical cycles in different ecosystems and their conservation by *in situ* and *ex situ* methods

Unit I

Plant Taxonomy: Objectives, types of botanical classifications; Linnaeus, Bentham and Hooker, Engler & Prantl and Hutchinson, Takhtajan system, Cronquist system, Dahlgrens system, APG III classification. Floras, revisions and monographs. Construction of taxonomic keys --indented and bracketed. International Code of Botanical Nomenclature: type concept, principle of priority, valid publication and starting points of nomenclature.

Unit II

Phytography. Field and Herbarium Techniques; Important herbaria and botanic gardens in India. Modern trends in taxonomy. Anatomy, palynology and embryology in relation to taxonomy. Cytotaxonomy, Biosystematics, Taxometrics, Cladistics, Chemotaxonomy, Serotaxonomy, Numerical Taxonomy, Biosystematics, Molecular Taxonomy applications of RAPD, RFLP, ISSR, SSR, ITS, and QTL, DNA barcoding.

Unit III

Menispermaceae, Polygalaceae, Caryophyllaceae, Portulacaceae, Rhamnaceae, Sapindaceae, Fabaceae (Papilionoideae, Caesalpinioideae, Mimosoideae), Lythraceae, Passifloraceae, Aizoaceae

Unit IV

Sapotaceae, Oleaceae, Gentianaceae, Boraginaceae, Scrophulariaceae, Pedaliaceae, Aristolochiaceae, Loranthaceae, Casuarinaceae, Orchidaceae, Commelinaceae, Cyperaceae

Unit V

Concept and dynamics of ecosystem: Types of ecosystem, components, Food chain, Food web and energy flow - Trophic level, ecological pyramids. Productivity and biogeochemical cycles (N, P, C, S). *In situ*- Protected Areas; Biosphere Reserves, National Parks, Tiger Reserves, Wildlife Sanctuaries. *Ex situ* – selection of superior germplasms. Field gene bank, botanic garden, experimental garden, introduction, reintroduction and *in vitro* conservation of threatened plants.

References

1. Bell, A.D. (1991). *Plant form*. Oxford University Press, Oxford.
2. Benson, E.E. (1999). *Plant Conservation Biotechnology*. Taylor and Francis Ltd., United Kingdom.
3. Benson, L.D. (1962). *Plant Taxonomy: Methods and Principles*. Ronald Press, New York.
4. Bilgrami, K.S. and Dogra, J.V. (1990). *Phytochemistry and Plant Taxonomy*. CBS Publishers, New Delhi.
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6. Cronquist, A. (1981). *An Integrated System of Classification of Flowering Plants*. Columbia University Press, New York.
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10. Gary, K.M. and Carroll, R.C. 1994. Principles of Conservation Biology Sinauer Associates, Inc., Massachusetts.
11. Groombrige, B. (1992). *Global Biodiversity- Status of the Earth's Living Resources*. Chapman & Hall, London.
12. Heywood, V.H. (1967). *Plant Taxonomy*. Edward Arnold Ltd., Great Britain.
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18. Lawrence, G.H.M. (1973). *Taxonomy of Vascular Plants*. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
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22. Minelli, A. (1993). *Biological Systematics*: *The State of the Art*. Chapman & Hall, London.
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41. Willis, J.C. (1973). *A Dictionary of the Flowering Plants & Ferns* (8th ed.). (revised by H.K. Airy Shaw). Cambridge University Press, London.

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CORE PRACTICAL II

ANATOMY, EMBRYOLOGY AND MORPHOGENESIS & ANGIOSPERM TAXONOMY, ECOLOGY AND CONSERVATION (P)

ANATOMY AND EMBRYOLOGY

ANATOMY: Preparation of Transverse sections of the following plant parts to observe and record the internal structure. Monocot and Dicot stem, and leaf (Primary structure), normal secondary thickening in dicot stem and root. Anomalous secondary thickening in *Dracaena*, *Nyctanthes* and *Boerhaavia* stems. Nodal anatomy–uni–& trilacunar.

EMBRYOLOGY: T.S. of anther (young and nature) at various stages of development. Pollen types L.S. of ovule, Types of ovules – orthotropous and Anatropous. Embryogenesis, Embryo Dissection.

TAXONOMY

Study of the plants belonging to the following families:
Menispermaceae, Polygalaceae, Caryophyllaceae, Portulacaceae, Rhamnaceae, Sapindaceae, Fabaceae (Papilionoideae, Caesalpinioideae, Mimosoideae), Lythraceae, Passifloraceae, Aizoaceae, Sapotaceae, Oleaceae, Gentianaceae, Boraginaceae, Scrophulariaceae, Pedaliaceae, Aristolochiaceae, Loranthaceae, Casuarinaceae, Orchidaceae, Commelinaceae, Cyperaceae.

- Identification of binomial of the plants with the help of Gamble Flora.
- ICBN problems to be worked out.
- Submission of 30 herbarium specimens with field note book and tour report.
- The students should undertake as part of their course a tour and field study of vegetation under the guidance of the staff for three to five days within the state and neighbouring states. Students who have not undertaken the above activities shall forfeit the appropriate marks allotted for this purpose (10 marks) for practical examination.

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ELECTIVE COURSE I

FORESTRY AND WOOD SCIENCE

Objectives:

1. To prepare students for careers in the forest services and wood products industry.
2. To educate students to provide technical expertise to the wood industries.

Unit I

World and Indian forest scenario; Forest types of India; Forest influences and protection; Rare and endangered species; Conservation strategies; Exotics and its significance; Silvicultural principles and practices; Genetic Engineering and its application in forestry; Remote sensing and GIS in forestry.

Unit II

Forest Resources and utilization; Forest products; Forest laws and policies, people and Forest; Social and community forestry; Forest industries; Role of social forestry in cottage industry; Role of forestry in Indian economy. Biomass conversion strategies - energy plantations.

Unit III

Nature and properties of wood: physical, chemical, mechanical and anatomy of wood. Durability of wood. Monocot and dicot wood; pycnoxylic and manoxylic wood; dendrochronology; Wood seasoning and preservation; Defects and abnormalities of wood; types of commercial wood species of India.

Unit IV

Wood deterioration- fungi, insects and other agents; Wood protection- Practical methods for preserving and protection, Chemical processing of wood.

Unit V

Composite wood: adhesives-manufacture, properties, uses, manufacture and uses of plywood, fiber boards and particle boards. Present status of composite wood, paper and rayon industries. Present position of supply of raw material to industries and wood substitution.

BOOKS

1. Bowyer, J.L., Shmulsky, R. and Haygreen, J.G. (2007). *Forest Products and Wood Science: An Introduction.* Wiley-Blackwell, Oxford.
2. De Vere Burton L. (2000). *Introduction to Forestry Science*. Delmar Publishers, New York.
3. Franz F.P. Kollmann and Wilfred A. Jr. Cote. (2012). *Principles of Wood Science and Technology: I Solid Wood*. Springer–verlag, Berlin.

REFERENCES

1. Jha, L.K. (1996). *Forestry for Rural Development*. APH Publishing Corporation, New Delhi.
2. Negi, S.S. (1994). *India's Forests, Forestry and Wildlife*. Indus Publishing Co., New Delhi.

***Note*:** No Practical for this paper.

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ELECTIVE COURSE II

INDUSTRIAL MICROBIOLOGY

Objectives:

1. Understand the importance of microbes, basics of a sterilization, fermenter design and types
2. Study the avenues of exploiting microbes in bioconversion technology
3. Study the industrial production and product recovery in fermentation

Unit I

Introduction, history and development of industrial microbiology, scope of industrial microbiology. Microorganisms in industry - sterilization - preparation of media - isolation methods for microorganisms - culture and preservation and stability. Principles of storage of microbes at low temperature in liquid nitrogen, preparation of inoculum.

Unit II

Principal types of fermentation: factors involved in fermenter design, differences between biochemical and chemical processes; biochemical reactions, operational consideration. Fermenter configuration and various types of fermentors; principle of operation characteristics of fermentors.

Unit III

Methylotrophs: methanogens and methylotrophs, mechanism of methane production - Economic importance of methylotrophs. Hydrogen fuel. Microbial leaching. Sulphur utilizing bacteria, sulphate reduction pathway - use of nucleotides as nitrogen source for growth of certain microorganisms (pathway of nucleic acid breakdown).

Unit IV

Microbial production of food; microbial single cell protein (SCP). Fermented dairy products, fermented meats, leavening of breads, alcoholic beverages - beer, distilled liquors and wines, vinegar; fermented vegetables, pickles, olives and soy sauce.

Unit V

Production of pharmaceuticals: antibiotics, steroids, human proteins, vaccines and vitamins, enzymes. antibiotics and their mode of action with reference to penicillin, streptomycin, erythromycin, cephalosporin and griseofulvin.

BOOKS

1. Davis, B.D., Dulbecco, R., Eiser, H.N. and Grinsberh, H.S. (1980). *Microbiology*. Harber Row, New York.
2. Davis, R.W., Bostein, D. and Roth, J.R. (1980). *Advanced Bacterial Genetics*. Cold Spring, Henbor, New York.
3. Ketchum, P.A. (1988). *Microbiology: Concepts and Application*. John Wiley & Sons Inc., New York.
4. Moat, A.G. and Foster, J.W. (1988). *Microbial Physiology*. John Wiley & Sons Inc., New York.
5. Patel, A.H. (1999). *Industrial Microbiology*. Macmillan India Ltd., New Delhi.
6. Pelczar, M.H. and Cahn, E.C.S. (1993). *Microbiology*. Tata-McGraw Hill Publishing Co. Ltd., New Delhi.
7. Power and Daginawala (1994). *General Microbiology*. Himalayan Publishing House, New Delhi.
8. Ringo, J. (2004). *Fundamental Genetics*. Cambridge University Press, United Kingdom.
9. Salle, A.J. (1974). *Fundamental Principles of Bacteriology*. Tata-McGraw Hill Publishing Co. Ltd., New Delhi.
10. Schlegel, H.G. (1993). *General Microbiology* (7th Edition). Cambridge University Press, United Kingdom.
11. Starr, M.P. (1981). *The Prokaryotes: A Handbook on Habitat, Isolation and Identification of Bacteria, Vols. I & II*. Springer Verlag, Berlin.
12. Trevan, M.D. (1987). *Biotechnology: The Biological Principles*. Tata-McGraw Hill Publishing Co. Ltd., New Delhi.
13. Trevan, K. (1991). *Biotechnology*. Wiley Eastern Ltd., New Delhi.

***Note*:** No Practical for this paper.

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CORE COURSE VII

CELL BIOLOGY, GENETICS AND PLANT BREEDING

Objectives:

This paper imparts knowledge on

1. Structure, organization, function, interrelationships of cell membrane and cell organelles and cell communication systems
2. Cell growth and cell division
3. Mendelian and non-Mendelian genetics and linkage and crossing over
4. Genes and genetic variations
5. Plant breeding methods and role of molecular markers in plant breeding

Unit I : CELL BIOLOGY

Structural organization and composition of cell membrane carbohydrates, proteins and lipids. Membrane functions. Structure, function and interrelationships of mitochondria, chloroplast, peroxisomes and glyoxysomes. Genetic systems in mitochondria and chloroplast. Cell communication: general principles, Signaling molecules. Receptors: Cell surface receptors – ion-channel linked receptors, G-protein coupled receptors.

Unit II : CELL BIOLOGY

Cell growth and division - Phases of cell cycle, cell cycle control and regulation systems; extracellular and intracellular signals. Cyclins and Cyclin-dependent kinases. Regulation of plant cell cycle. Programmed cell death – molecular mechanism and control. Cytoskeleton; structure, assembly, disassembly and regulation of filaments involved – actin filaments (microfilaments), microtubules, and intermediate filaments.

Unit III : GENETICS

Mendelism – basic principles (brief study). Non-Mendelian inheritance: cytoplasmic inheritance - cytoplasmic and genetic male sterilities and applications. Sex determination in animals and plants.
Linkage and Crossing over - Stern's hypothesis, Creighton and McClintock's experiments, single cross over, multiple cross over, two-point cross, three-point cross, map distances, gene order, interference and co-efficient of coincidence.

Unit IV : GENETICS

Gene pool, allele and genotype frequency. Hardy-Weinberg law and its applications, estimation of allele and genotype frequency of dominant genes, codominant genes, sex-linked genes and multiple alleles. Genetic equilibrium, genetic polymorphism. Factors altering allelic frequencies

(mutation, genetic drift - bottle neck effect and founder effect, migration, selection, non-random mating and inbreeding coefficient).

Unit V : PLANT BREEDING

Genetic variability and its role in plant breeding - Breeding methods in self-pollinated, cross pollinated, vegetatively propagated and apomictic plants. Inbreeding depression - Role of heterosis in plant breeding. Somaclonal variations in crop improvement. RFLP and SNP in plant breeding.

REFERENCES:

1. Ajay Paul (2007). *Text book of Cell and Molecular biology.* Books and Allied (P) Ltd., Kolkata
2. Allard, R.W. (1995). *Principles of Plant Breeding*. John Wiley and Sons, Inc., India.
3. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter (2002). *Molecular biology of the cell* (IV Edn). Garland Science, Taylor and Francis group, New York.
4. Gardner, E.J., Simmons, M.J. and Snustad, D.P. (1991). *Principles of Genetics* (III Edn). John Wiley and Sons Inc., India.
5. Gerald Karp (2008). *Cell and Molecular biology: Concepts and experiments* (V Edn). John Wiley & Sons, India.
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11. Snustad, D.P. and Simmons M.J. (2010). *Principles of genetics* (V Edn). John Wiley and Sons, India.
12. Strickberger (2005). *Genetics* (III Edn). Prentice Hall of India Pvt. Ltd., New Jersey.
13. Wayne M Becker, Lewis J Kleinsmith, Jeff Hardin (2007). *The world of the cell* (VI Edn). Pearson.

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CORE COURSE VIII

PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS

Objectives:

Students can understand

1. Plant-water relationship, translocation of water and minerals, photosynthesis, respiration and transfer of energy
2. Nitrogen metabolism, plant growth hormones, flowering, dormancy and senescence, stress
3. Chemistry of carbohydrates, proteins, enzymes and lipids
4. Nucleic acids, vitamins and secondary metabolites
5. Bioenergetics, laws of Thermodynamics and photobiology

PLANT PHYSIOLOGY

Unit I

Water relations of plants – Structure and Physicochemical properties of water, chemical potential and water potential in the plant, bulk movement of water, soil-plant atmosphere continuum, stomatal physiology and regulation.

Modern concepts of mineral salt absorption and translocation. Photosynthesis: Photophysical and photochemical phase; Light reactions; sequence of photosynthetic pathway - Electron Transport Chain, Photophosphorylation. Pathways of CO_2 fixation. Respiration: Photorespiration and dark respiration. Cycles of respiration, Oxidative Phosphorylation, Gluconeogenesis.

Unit II

Mechanism of nitrogen fixation, Nitrogen uptake and assimilation. Biosynthesis, storage, breakdown, transport, physiological effects, and mechanism of action of plant growth hormones, elicitors. Phytochrome and hormones in movements and flowering. Physiology of Dormancy break. Senescence and aging. Effect of water and salt stress on crop production.

Unit III

Structure of atoms, molecules and chemical bonds. pH and buffers. Chemistry of biological molecule: Carbohydrates: Classification, structure of mono, di, oligo and polysaccharides. Protein: Classification, structure and composition of amino acids. Enzymes: Classification, mode of action, km value, coenzymes, isoenymes. Lipids: Classification, structure and properties of acyl lipids and phosphates.

Unit IV

Nucleic acids: DNA and RNA structure - Watson and Crick model; A, B and Z forms of DNA - RNA secondary structure. Vitamins – general characters – classification – structure and properties – fat soluble and water soluble vitamins. Secondary metabolites: Classification, biosynthesis, and functions of terpenoids, alkaloids, phenolics, flavonoids, coumarins.

Unit V

Bioenergetics, Energy and work. Laws of Thermodynamics. Energy transductions in biological systems. Redox potential, Redox couples, ATP bioenergetics, Order of reactions. Photobiology: Dual nature of light, characteristics of solar radiation, solar energy - Efficiency of atoms - Absorption spectra in molecules, energy states, De-excitation.

REFERENCES:

PLANT PHYSIOLOGY AND BIOCHEMISTRY:

1. Haynie, D.T. (2008). *Biological Thermodynamics* (2nd Edition). Cambridge University Press India Pvt. Ltd., New Delhi.
2. Hess, D. (2012). *Plant Physiology: Molecular, Biochemical, and Physiological Fundamentals of Metabolism and development.* Springer Science & Business Media, New York.
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4. Jeremy M Berg, John L Tymoczko, Lubert Stryer, Gregory J Gatto Jr. (2007). *Biochemistry*. W H Freeman and company, New York.
5. Michael M Cox, David L Nelson (2008). *Lehninger Principles of Biochemistry* (V Edn). W H. Freeman and company, New York.
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9. Verma, S.K. (1999). *Plant Physiology*. S. Chand & Co., New Delhi.

BIOPHYSICS:

1. Casey, E.J. (1962). *Biophysics: Concepts and Mechanics*. Van Nostrand Reinhold Co. and East-West Press, New Delhi.
2. Lehninger, A.L. (1971). *Bioenergetics: The Molecular Basis of Biological Energy Transformation*. Addison Wiley.
3. Salil Bose, S. (1982). *Elementary Biophysics*. Vijaya Printers, Madurai.

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CORE PRACTICAL III

CELL BIOLOGY, GENETICS AND PLANT BREEDING & PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS (P)

CELL BIOLOGY, GENETICS AND PLANT BREEDING

1. Workout problems related to linkage, crossing over and gene mapping, human pedigree analysis.
2. Workout problems in population genetics - gene and genotype frequency, Hardy Weinberg equilibrium.
3. Hybridization techniques in self and cross pollinated plants
4. Visit a plant breeding station to familiarize with breeding programmes. Submit a report of the visit.

PLANT PHYSIOLOGY

1. Measurement of water potential by gravimetric method.
2. Measurement of Photosynthesis - Hill Reaction.
3. Estimation of total chlorophyll and study of absorption pattern of chlorophyll solution.
4. Survey of C4 plants and CAM plants.
5. Separation of photosynthetic pigments by TLC/paper chromatography and calculating the Rf value
6. Determination of nitrate reductase activity.
7. Extraction and estimation of leghaemoglobin from root nodules.
8. Estimation of proline in plant tissues under various abiotic stresses.
9. Estimation of phenol in plant tissues affected by biotic stress.
10. Determination of peroxidase activity in plant tissues affected by biotic/abiotic stresses.
11. Estimation of free amino acids in senescing leaves to understand the source to sink transformation phenomenon.

BIOCHEMISTRY AND BIOPHYSICS

1. Preparation of molal, molar, normal and percentage solutions and their dilutions.
2. Estimation of proteins by Lowry's method
3. Protein profile (SDS-PAGE).in plants under stress.
4. Extraction and estimation of lipid
5. Determination of reducing sugars in (grapes) fruit
6. Separation and identification of amino acids by chromatography
7. Extraction of amylase and determination of its activity
8. Determination of km-value, V-max, Michael's constant for amylase

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ELECTIVE COURSE III

GENETIC ENGINEERING AND BIOTECHNOLOGY

Objectives:

This paper provides an understanding of basic techniques of genetic manipulation, plasmids and phase vectors, cloning, screening and sequencing strategies of genomic DNA,

Unit I: BASIC TECHNIQUES OF GENETIC MANIPULATION

Basic techniques: Agarose gel electrophoresis, nucleic acid blotting, transformation of *E. coli*, polymerase chain reaction. Cutting and joining DNA molecules: Restriction enzymes, joining DNA molecules with DNA ligases, adaptors, homopolymer tailing, joining DNA molecules without DNA ligases.

Unit II: PLASMIDS AND PHASE VECTORS

pBR322, Ti-plasmid Bacteriophage λ, single standard DNA vectors – phage M_{13}, cosmids, Phagemids BAC, YAC, Expression vectors, Shuttle vectors.

Unit III: CLONING

Cloning strategies: Cloning genomic DNA – Genomic DNA libraries, PCR as an alternative to genomic cloning. Cloning – Properties cDNA libraries, preparation of cDNA for library construction, full-length cDNA cloning.

Unit IV: SCREENING STRATEGIES

Sequence – dependent screening, screening by hybridization, probe design, chromosome walking, screening expression libraries – immunological, south-western, north-western blotting, RAPD, RFLP, DNA foot printing.

Unit V: SEQUENCING STRATEGIES

Basic DNA sequencing – Chain terminator sequencing, automated sequencing, Whole genome sequencing – Analysis of sequence data, DNA sequence databases and data base searches, site–directed mutagenesis. Gene transfer to plants: *Agrobacterium* mediated transformation, direct DNA transformation – Protoplast transformation, particle bombardment, electroporation and microinjection.

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***Note*:** No Practical for this paper.

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ELECTIVE COURSE IV

HORTICULTURE AND LANDSCAPING

Objectives:

To enable the students

1. To understand the main principles and importance of horticulture
2. To develop skill in horticulture techniques
3. To know the various methods of plant propagation
4. To develop potential for self-employment

Unit I

Importance of scope of horticulture – Divisions of horticulture – Climate, soil and nutritional needs – Water irrigation – Plant propagation method – Cutting, layering, grafting, budding. Stock – scion relationship, micropropagation by induction of rooting. Glass houses and green houses

Unit II

Principles and methods of designing outdoor garden – hedges, edges, fences, trees, climbers, rockeries, arches, terrace garden – Lawn making and maintenance – Water garden – cultivation of water plants-common water plants. Layout for a model college garden.

Unit III

Indoor gardening – Foliage plants, flowering plants, hanging basket, Bonsai plants – Training, watering and pruning. Floriculture – Cultivation of commercial flower crops – Rose, Jasmine and Chrysanthemum, Flower decoration – Dry and wet decoration.

Unit IV

Classification of vegetables, cultivation of important vegetable – Tomato, potato, brinjal, onion, cabbage and snake guard. Layout for a model kitchen garden.

Unit V

Fruit crops – Induction of flowering, flower thinning, fruit setting, fruit development. Cultivation of important fruit crops - Mango, Grapes, Sapota and Guava. Cultivation of tree species – Eucalyptus and Teak.

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7. *Note*: No Practical for this paper

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CORE COURSE IX

PLANT TISSUE CULTURE

Objectives:

1. To inculcate the basics of plant tissue culture
2. To impart the knowledge about the various aspects of tissue culture and their applications

Unit I

Introduction - history, scope and concepts of basic techniques in plant tissue culture. Laboratory requirements and organisation. Sterilization-filter, heat and chemical. Media preparation - inorganic nutrients, organic supplements, carbon source, gelling agents, growth regulators and composition of important culture media (MS, White,s and Gamborg's media).

Unit II

Cell, tissue and organ culture - Isolation of single cells, selection and types of cells, tissue explants and organs for culture - paper, raft nurse technique, plating method, microchamber techniques, cell suspension cultures - batch, continuous, chemostat culture - synchronization of suspension culture, cellular totipotency, cytological, cytochemical and vascular differentiations - totipotency of epidermal and crown – gall cells.

Unit III

Micropropagation - clonal propagation of elite germplasm, factors affecting morphogenesis and proliferation rate, technical problems in micropropagation. Organogenesis - formation of shoots and roots - role of growth regulators and other factors, somaclonal and gametoclonal variations. Somatic embryogenesis - Process of somatic embryogenesis, structure, stages of embryo development, factors affecting embryogenesis, synthetic seeds.

Unit IV

Haploid production - androgenesis, gynogenesis - techniques of anther culture – segmentation pattern in microspore - isolated pollen culture - plantlets from haploids - diploidisation - factors influencing androgenesis, haploidy through gynogenesis, haploid mutants, utilization of haploids in plant breeding. *In vitro* pollination - ovule and ovary culture, importance, techniques overcoming incompatibility barriers, embryo rescue. Protoplast culture: Isolation of protoplasts - mechanical and enzymatic sources, culture of protoplasts, viability. Protoplastfusion - spontaneous, mechanical, induced electrofusion, selection of somatic hybrids, cybrids, importance.

Unit V

In vitro production of secondary metabolities - classification of secondary metabolites, biosynthetic pathways, cell suspension cultures, immobilized cell cultures and biotransformation, elicitors and hairy root culture. Cryopreservation and gene bank - Modes of preservation, preparation of materials for deep freezing, cryopotectors, storage strategies, assessment of successful cryopreservation, application and limitations. Application of tissue culture in forestry, horticulture, agriculture and pharmaceutical industry, transgenic plants.

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CORE COURSE X

RESEARCH METHODOLOGY

Objectives:

To enable the students

1. To know principles involved in microscopy, chromatography, spectroscopy and electrophoresis method
2. To make the students apply statistical principles to biological studies
3. To make the students understand the problem selection, project design and thesis writing

Unit I

Microscopy – Principles and applications of light, dark field, phase contrast, fluorescence, polarization, scanning and transmission microscopy – Fixation and staining of materials for electron microscopy.

Unit II

Chromatography – Principles and applications of partition-adsorption – Ion Exchange – Affinity – Gel filtration – TLC–GLC, HPLC, GCMS-Spectroscopy – Colorimeter, UV-Visible Spectrophotometer – Flame photometer – Atomic absorption spectrophotometer, NMR.

Unit III

Electrophoresis – Native PAGE, SDS PAGE, Two dimensional Electrophoresis and Agarose – Radio isotopes – Half-life Tracer techniques, autoradiography – scintillation and GM counter.

Unit IV

Scope of biostatistics – Classification of data-graphical and diagrammatical representation – mean, median, mode-Standard Deviation – Standard Error – Test of significance – 't'–Test – Chi-square test – ANOVA – Simple Correlation – Regression.

Unit V

Thesis writing – Research design-choosing the problem for research – Review of literature – Primary, secondary and tertiary sources, Bibliography – Indexing and abstracting – Reporting the results of research in conference – Oral presentation – Poster presentation – Planning and preparing a thesis, Preparing article for publication, Proof correction, citation index and impact factor

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CORE PRACTICAL IV

PLANT TISSUE CULTURE & RESEARCH METHODOLOGY (P)

RESEARCH METHODOLOGY

1. Sampling by Random Number Table
2. Data Collection
3. Classification of Data: Discrete, continuous and cumulative.
4. Statistical diagrams: Histogram, Frequency curve, Bar chart and Ogive curve
5. Measures of Central Values: Mean, Median and Mode
6. Measures of Dispersion: Range, Mean Deviation and Standard Deviation.
7. Exercises with Tests of Significance
8. Preparation of Index cards
9. Preparation of Bibliography
10. Proof correction
11. Exercises in the calculation of Citation Index.
12. Determination of Impact Factor of Author, Article and Journal.
13. Identification of instruments/their parts and their applications

PLANT TISSUE CULTURE

1. Media preparation-MS, Whites and Gamborg's
2. Sterilization of Ex-plant and inoculation (shoot tip, nodal, leaf)
3. Callus induction
4. Micropropagation
5. Protoplast isolation (Mechanical and enzymatic)
6. Synthetic seed production

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ELECTIVE COURSE V

FOOD PRESERVATION AND PROCESSING

Objectives:

1. To understand the salient features of food preservation and processing.
2. To study the preservation and processing of day to day products by using food additives

Unit I

Food Preservation: principles and methods – perishable, semi–perishable and non-perishable foods – methods of preservation – temporary preservation – asepsis, low temperature, antiseptics, pasteurization, electromagnetic radiation – permanent preservation – sterilization processing by heat, effect of acidification and antiseptics.

Unit II

Preservation by salting, preservation by sugar syrup – preservation by concentration – preparation of jam jelly – role of pectin in jam – preservation by chemicals: benzoic acid, parabenzene, sulphur-di-oxide, sulphites, nitrites diethylpyrocarbonates (DEPC), hydrogen peroxide, chlorine and CO_2.

Unit III

Processing methods: wet heating method by cookers. Microwave heating; processing of fruits and fruit products – canning fruits; preparation of fruit juices: squashes and cordials. Preservation by antibiotics and irradiation.

Unit IV

Vegetable and vegetable products –Canning of vegetables and pickles. Baked products: Classification of wheat – hard wheat, soft wheat, durum wheat, flour preparation, baking formulation, processing. Milk and milk products: butter, ghee, lassi, unfermented milk products, condensed milk, cheese, ice-cream and milk powder.

Unit V

Food additives: definitions, preservatives, antioxidants – colouring agents, emulsifier, stabilizers and thickening, bleaching and maturing agents, clarifying agents, anti– foaming agents, function of additives. Food adulteration – adulterants and simple detection techniques; food grades – standards, laws and regulations.

References

1. Adams, M.R. and Moss, M.O. (1996). *Food Microbiology*. New Age International Pvt. Ltd. Publishers, New Delhi.

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Note: No Practical for this paper.

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BHARATHIDASAN UNIVERSITY **TIRUCHIRAPPALLI – 620 024**

M.Sc. Chemistry **Course Structure under CBCS**

(For the candidates admitted from the academic year 2016-2017 onwards)

Semester	Course	Title	Instruction Hours/ Week	Credit	Exam Hours	Marks Internal	Marks External	Total
I	Core Course – I (CC)	Organic Chemistry –I	6	5	3	25	75	100
	Core Course – II (CC)	Inorganic Chemistry –I	6	5	3	25	75	100
	Core Course – III (CC)	Physical Chemistry –I	6	5	3	25	75	100
	Core Practical – I (CP)	Organic Chemistry Practical –I	6	3	6	40	60	100
	Core Practical – II (CP)	Inorganic Chemistry Practical –I	6	3	6	40	60	100
		TOTAL	**30**	**21**				**500**
II	Core Course – IV (CC)	Inorganic Chemistry –II	6	5	3	25	75	100
	Core Course – V (CC)	Physical Methods in Chemistry –I	6	5	3	25	75	100
	Core Practical – III (CP)	Organic Chemistry Practical – II	6	3	6	40	60	100
	Core Practical – IV (CP)	Inorganic Chemistry Practical –II	6	3	6	40	60	100
	Elective Course – IA (EC) / Elective Course – IB (EC)	(A) Solid State Chemistry / (B) Supramolecular Chemistry	6	5	3	25	75	100
		TOTAL	**30**	**21**				**500**
III	Core Course – VI (CC)	Organic Chemistry – II	6	5	3	25	75	100
	Core Course – VII (CC)	Physical Chemistry – II	6	6	3	25	75	100
	Core Practical – V (CP)	Physical Chemistry Practical – I	6	3	6	40	60	100
	Elective Course – IIA (EC) / Elective Course – IIB (EC)	(A) Pharmaceutical Chemistry / (B) Bio-organic Chemistry	6	5	3	25	75	100
	Elective Course – III (EC)	Analytical Chemistry	6	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – VIII (CC)	Physical Methods in Chemistry – II	6	5	3	25	75	100
	Core Practical – VI (CP)	Physical Chemistry Practical – II	6	3	6	40	60	100
	Elective Course – IVA (EC) / Elective Course – IVB (EC)	(A) Green Chemistry / (B) Industrial Chemistry	6	5	3	25	75	100
	Elective Course – VA (EC) / Elective Course – VB (EC)	(A) Selected Topics in Chemistry/(B) Chemistry of Nanoscience and Nanotechnology	6	5	3	25	75	100
	Project	Dissertation = 80 Marks Viva = 20 Marks	6	6	-	-	-	100
		TOTAL	**30**	**24**				**500**
		GRAND TOTAL	**120**	**90**				**2000**

Project	:100 Marks
(Dissertation	: 80 Marks
Viva Voice	: 20 Marks)

Note:

Core Papers	-	8
Core Practical	-	6
Elective Papers	-	5
Project	-	1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	Internal	40 marks	External	60 marks

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

SEMESTER-I **HOURS/WEEK: 6**
CORE COURSE-I (CC-I) **CREDITS: 5**

ORGANIC CHEMISTRY I

OBJECTIVES

1. To understand the basic concepts of aromaticity.
2. To learn the oxidation and reducing reagents for organic synthesis.
3. To learn stereochemistry of organic compounds.
4. To know the effect of light in organic reactions.
5. To study the concerted pericyclic reactions.

UNIT I: Aromaticity

Aromatic character: Five-, six-, seven-, and eight-membered rings – other systems with aromatic sextets – Huckel's theory of aromaticity, concept of homoaromaticity and antiaromaticity.

Electron occupancy in MO's and aromaticity – NMR concept of aromaticity and antiaromaticity, systems with 2,4,8 and 10 electrons, systems of more than 10 electrons (annulenes), Mobius aromaticity.

Bonding properties of systems with (4n+2)π-electrons and 4nπ-electrons, alternant and non-alternant hydrocarbons (azulene type) – aromaticity in heteroaromatic molecules, sydnones and fullerenes.

UNIT II: Reagents in Organic Synthesis

Oxidation: Baeyer-Villiger, Jacobsen epoxidation, Shi epoxidation, Jones reagent, PCC, PDC, IBX, DMP, CAN, TPAP, NOCl, $Mn(OAc)_3$, $Cu(OAC)_2$, Bi_2O_3, Swern oxidation, Sommelet reaction, Elbs reaction, Oxidative coupling of phenols, Prevost reaction and Woodward modification.

Reduction: palladium / platinum / rhodium / nickel based heterogeneous catalysts for hydrogenation, Wilkinson's catalyst, Noyori asymmetric hydrogenation – reductions using Li/Na/Ca in liquid ammonia.

Hydride transfer reagents from group III and group IV in reductions. (i) triacetoxyborohydride, L-selectride, K-selectride, Luche reduction, Red-Al, $NaBH_4$ and $NaCNBH_3$, trialkylsilanes and trialkylstannane, (ii) stereo/enantioselectivity reductions (Chiral Boranes, Corey-Bakshi-Shibata).

UNIT III: Stereochemistry and Conformational Analysis

Stereoisomerism – symmetry – enantiomers and diastereomers – *R* and *S* nomenclature – optical activity and chirality – types of molecules exhibiting optical activity – absolute configuration – chirality in molecules with non-

carbon stereocenters (N, S and P) – molecules with more than one chiral centre – atropisomerism.

Molecular chirality – allenes, spiranes, biphenyls, helicenes and cyclophanes – methods of determining configuration – *E* and *Z* nomenclature – determination of configuration of geometrical isomers – stereochemistry of addition and elimination reactions – stereospecific and stereoselective synthesis [elementary examples].

Basic concepts of conformational analysis – conformations of cyclopentane, cyclohexane, cyclohexene and fused (decalin) and bridged (norbornane type) ring systems – anomeric effect in cyclic compounds.

UNIT IV: Organic Photochemistry

Organic photochemistry – fundamental concepts – energy transfer – characteristics of photoreactions – photoreduction and photooxidation, photosensitization.

Photoreactions of ketones and enones – Norrish Type I and II reactions – Paterno-Büchi reaction – photo-Fries rearrangement – photochemistry of alkenes, dienes and aromatic compounds – di-π-methane rearrangement.

Reactions of unactivated centres – photochemistry of α,β-unsaturated carbonyl compounds – photolytic cycloadditions and photolytic rearrangements – photo additions – Barton reaction.

UNIT V: Pericyclic Reactions

Concerted reactions – orbital symmetry and concerted symmetry – Woodward and Hoffmann rules – selection rules for electrocyclic reactions – frontier molecular orbital approach – correlation diagram – examples.

Selection rules for cycloaddition reactions – frontier molecular orbital approach – correlation diagram – examples – chelotropic and ene reactions.

Sigmatropic rearrangements – 1,3, 1,5 and 1,7-hydrogen shifts – examples – Cope and Claisen rearrangements – 1,3-dipolar cycloaddition reactions: types of dipoles, selectivity, scope and applications.

REFERENCES

UNIT I and II

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UNIT III

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UNIT IV and V

11. J. D. Coyle, Organic Photochemistry; Wiley, New York, 1998.
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14. S. Sankararaman, Pericyclic Reactions - A Textbook: Reactions, Applications and Theory; Wiley-VCH, New York, 2005.

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SEMESTER-I **HOURS/WEEK: 6**
CORE COURSE-II (CC-II) **CREDITS: 5**

INORGANIC CHEMISTRY I

OBJECTIVES

1. To understand the basic concepts of main group elements.
2. To learn the theories and mechanism of reactions of metal complexes.
3. To study the concepts of photochemistry and its applications.

UNIT I: Main Group Chemistry

Chemistry of boron – borane, higher boranes, carboranes, borazines and boron nitrides – chemistry of silicon – silanes, higher silanes, multiple bonded systems, disilanes, silicon nitrides.

P-N compounds, cyclophosphazanes and cyclophosphazenes – S-N compounds – S_2N_2, S_4N_4, (SN)x, polythiazyl S_xN_4 compounds – S-N cations and anions, S-P compounds – molecular sulphides such as P_4S_3, P_4S_7, P_4S_9 and P_4S_{10} – homocyclic inorganic systems – oxocarbon anion.

Ionic model – lattice energy – Born-Lande equation – Kapustinskii equation – high T_c superconductors – solid state reactions – tarnish reaction decomposition, solid-soild reaction and photographic process – factors affecting reaction rate.

UNIT II: Principles of Coordination Chemistry

Studies of coordination compounds in solution – detection of complex formation in solution – stability constants – stepwise and overall formation constants.

Simple methods (potentiometric, pH metric and photometric methods) of determining the formation constants.

Factors affecting stability – statistical and chelate effects – forced configurations.

UNIT III: Theories of Metal-Ligand Bond

Crystal field theory – splitting of d-orbitals under various geometries – factors affecting splitting – CFSE and evidences for CFSE (structural and thermodynamic effects).

Spectrochemical series – Jahn-Teller distortion – spectral and magnetic properties of complexes – site preferences.

Limitations of CFT – ligand field theory – MO theory – sigma- and pi-bonding in complexes – Nephelauxetic effect – the angular overlap model.

UNIT IV: Reaction Mechanism in Coordination Complexes

Kinetics and mechanism of reactions in solution – labile and inert complexes – ligand displacement reactions in octahedral and square planar complexes – acid hydrolysis, base hydrolysis and anation reactions.

Trans effect – theory and applications – electron transfer reactions – electron exchange reactions – complementary and non-complementary types – inner sphere and outer sphere processes – application of electron transfer reactions in inorganic complexes – isomerisation and racemisation reactions of complexes.

Molecular rearrangements of four- and six-coordinate complexes – interconversion of stereoisomers – reactions of coordinated ligands – template effect and its applications for the synthesis of macrocyclic ligands – unique properties.

UNIT V: Inorganic Photochemistry

Electronic transitions in metal complexes, metal-centered and charge-transfer transitions – various photophysical and photochemical processes of coordination compounds.

Unimolecular charge-transfer photochemistry of cobalt(III) complexes – mechanism of CTTM, photoreduction – ligand-field photochemistry of chromium(III) complexes – Adamson's rules, photoactive excited states, V-C model – photophysics and photochemistry of ruthenium – polypyridine complexes, emission and redox properties.

Photochemistry of organometallic compounds – metal carbonyl compounds – compounds with metal-metal bonding – Reinecke's salt chemical actinometer.

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SEMESTER-I **HOURS/WEEK: 6**
CORE COURSE-III (CC-III) **CREDITS: 5**

PHYSICAL CHEMISTRY I

OBJECTIVES

1. To understand the concepts of group theory and quantum chemistry.
2. To learn the chemical kinetics and statistical thermodynamics.
3. To study the theories of kinetics, photochemistry and radiation chemistry.

UNIT I: Concepts of Group Theory

Symmetry elements and operations – point groups – assignment of point groups to molecules – group postulates and types of groups – group multiplication tables, sub groups, similarity transformations – conjugate elements and classes.

Matrix representation of symmetry operations and point groups – reducible and irreducible representations – properties of irreducible representation.

The great orthogonality theorem – construction of character table – direct product – projection operators – symmetry of hybrid orbitals.

UNIT II: Quantum Chemistry - I

Inadequacy of classical mechanics – black body radiation – Planck's quantum concept – photoelectric effect – Bohr's theory of hydrogen atom – hydrogen spectra – wave-particle dualism – uncertainty principle – decline of old quantum theory.

Schrödinger equation – postulates of quantum mechanics – operator algebra: linear operator, Hermitian operators, eigenfunctions and eigenvalues, angular momentum operator – commutation relations and related theorems – orthogonality and normalization.

Applications of wave mechanics to simple systems – particle in a box, one and three dimensional, particle with finite potential barrier – the quantum mechanical tunneling.

UNIT III: Chemical Kinetics - I

Theories of reaction rate – absolute reaction rate theory (ARRT) – transmission coefficient, reaction coordinate – potential energy surfaces – kinetic isotope effect – Hinshelwood theory – Kassel, Rice and Ramsperger theory (KRRT) – Slater's treatment.

Principle of microscopic reversibility – steady-state approximation – chain reactions: thermal and photochemical reactions between hydrogen and halogens – explosions and hydrogen-oxygen reactions.

UNIT IV: Statistical Thermodynamics

Thermodynamic probability – probability theorems – relation between entropy and probability (Boltzmann-Planck equation), ensembles, phase space, Ergodic hypothesis, microstates and macrostates, Maxwell-Boltzmann distribution law – partition functions – translational, rotational, vibrational and electronic partition functions.

Relationship between partition functions and thermodynamic properties – calculation of equilibrium constants from partition functions – heat capacities of monatomic crystals – Einstein theory and Debye theory.

Quantum statistics – Bose-Einstein (B.E.) and Fermi-Dirac (F.D.) distribution equations – comparison of B.E. and F.D. statistics with Boltzmann statistics – applications of quantum statistics to liquid helium, electrons in metals and Planck's radiation law – concept of negative Kelvin temperature.

UNIT V: Fast Reaction Techniques, Photochemistry and Radiation Chemistry

Introduction – flow methods (continuous and stopped flow methods) – relaxation methods (T and P jump methods) – pulse techniques (pulse radiolysis, flash photolysis) – shock tube method – molecular beam method – lifetime method.

Photophysical processes of electronically excited molecules – Jablonski diagram – Stern-Volmer equation and its applications – experimental techniques in photochemistry – chemical actinometers – lasers and their applications.

Differences between radiation chemistry and photochemistry – sources of high energy radiation and interaction with matter – radiolysis of water, solvated electrons – definition of G value, Curie, linear energy transfer (LET) and Rad – scavenging techniques – use of dosimetry and dosimeters in radiation chemistry – applications of radiation chemistry.

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SEMESTER-I **HOURS/WEEK: 6**
CORE PRACTICAL-I (CP-I) **CREDITS: 3**

ORGANIC CHEMISTRY I (P)

OBJECTIVES

1. To perform the qualitative analysis of a given organic mixture.
2. To carry out the preparation of organic compounds.

1. Qualitative analysis of an organic mixture containing two components

Mixtures containing two components are to be separated (pilot separation) and purified (bulk separation) – The physical constants are to be reported (analysis).

2. Preparation of organic compounds (single stage)

1. Methyl-*m*-nitrobenzoate from methylbenzoate (nitration)
2. Glucose pentaacetate from glucose (acetylation)
3. Resacetophenone from resorcinol (acetylation)
4. Benzophenone oxime from benzophenone (addition)
5. *o*-Chlorobenzoic acid from anthranilic acid (Sandmayer reaction)
6. *p*-Benzoquinone from hydroquinone (oxidation)
7. Phenylazo-2-naphthol from aniline (diazotization)

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SEMESTER-I **HOURS/WEEK: 6**
CORE PRACTICAL–II (CP-II) **CREDITS: 3**

INORGANIC CHEMISTRY I (P)

OBJECTIVES

1. To perform the semi-micro qualitative analysis.
2. To estimate the metal ions using colorimeter.

1. **Semi-micro qualitative analysis** of a mixture containing two common cations (Pb, Bi, Ca, Cd, Fe, Cr, Al, Co, Ni, Mn, Zn, Ba, Sr, Ca, Mg, NH_4) and two less common cations (W, Tl, Se, Te, Mo, Ce, Th, Zr, Ti, V, U, Li).

2. **Estimation** of copper, ferric, nickel, chromium and manganese ions using photoelectric colorimeter

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SEMESTER-II **HOURS/WEEK: 6**
CORE COURSE-IV (CC-IV) **CREDITS: 5**

INORGANIC CHEMISTRY II

OBJECTIVES

1. To understand the role of metal ions in biological process.
2. To learn the basic concepts of chemotherapy.
3. To learn the principle of catalysis and reaction mechanisms of organometallics.

UNIT I: General Principles of Bioinorganic Chemistry

Occurrence and availability of inorganic elements in biological systems – biomineralization – control and assembly of advanced materials in biology – nucleation and crystal growth – various biominerals – calcium phosphate – calcium carbonate – amorphous silica, iron biominerals – strontium and barium sulphate.

Function and transport of alkali and alkaline earth metal ions: characterization of K^+, Na^+, Ca^{2+} and Mg^{2+} – complexes of alkali and alkaline earth metal ions with macrocycles – ion channels – ion pumps, catalysis and regulation of bioenergetic processes by the alkaline earth metal ions – Mg^{2+} and Ca^{2+}.

Metals at the center of photosynthesis – primary processes in photosynthesis – photosystems I and II-light absorption (energy acquisition) – exciton transport (direct energy transfer) – charge separation and electron transport – manganese catalyzed oxidation of water to O_2.

UNIT II: Amines, Proteins and Enzymes

Cobalamines: reactions of the alkyl cobalamines – one electron reduction and oxidation – Co-C bond cleavage – coenzyme B_{12} – alkylation reactions of methylcobalamin.

Heme and non-heme proteins – haemoglobin and myoglobin – oxygen transport and storage – electron transfer and oxygen activation – cytochromes, ferredoxins and rubredoxin – model systems, mononuclear non-heme iron enzymes.

Copper containing proteins – classification and examples – electron transfer – oxygen transport-oxygenation – oxidases and reductases – cytochrome oxidase – superoxide dismutase (Cu, Zn) – nickel containing enzyme: urease.

UNIT III: Medicinal Bioinorganic Chemistry

Bioinorganic chemistry of quintessentially toxic metals – lead, cadmium, mercury, aluminium, chromium, copper and plutonium – detoxification by metal chelation – drugs that act by binding at the metal sites of metalloenzymes.

Chemotherapy – chemotherapy with compounds of certain non-essential elements – platinum complexes in cancer therapy – cisplatin and its mode of action – cytotoxic compounds of other metals.

Gold containing drugs as anti-rheumatic agents and their mode of action – lithium in psychopharmacological drugs – radiopharmaceuticals – technetium.

UNIT IV: Organometallics

The 18 electron rule – applications and limitations – isolobal concept and its usefulness – uses of typical organometallics such as metal alloys and organometallic hydrides in organic synthesis.

Nitrosyl complexes – bridging and terminal nitrosyls, bent and linear nitrosyls – dinitrogen complexes – metallocene and arene complexes – metal carbenes, carbenes, carboxylate anions.

Classification based on captivity and polarity of M-C bond, organometallic compounds of lanthanides and actinides – fluxional organometallic compounds – organometallics in medicine, agriculture, horticulture and industry.

UNIT V: Reactions and Catalysis by Organometallics

Organometallic reactions – ligand association and dissociation – oxidative addition and reductive elimination – insertion reactions.

Reactions of coordinated ligands in organometallics – hydrogenation, hydroformylation, epoxidation, metathesis.

Polymerization of olefins, olefin oxidation (Wacker process) and carbonylation of methanol.

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SEMESTER-II **HOURS/WEEK: 6**
CORE COURSE-V (CC-V) **CREDITS: 5**

PHYSICAL METHODS IN CHEMISTRY I

OBJECTIVES

1. To understand the principles of molecular spectroscopy.
2. To study UV, NMR and IR spectroscopy of organic compounds.
3. To learn the ESR, ORD and Mass spectroscopy of organic compounds.
4. To know the effect of X-ray, electron, neutron diffractions of compounds.

UNIT I: Principles of Molecular Spectroscopy

Interaction of electromagnetic radiation with molecular systems – time evolution of the systems under radiation – Einstein transition probability for induced absorption and spontaneous and stimulated emission – transition moment and oscillator strength.

Microwave spectroscopy – rotational spectra of diatomic molecules, rigid and non-rigid rotors – intensity of spectral lines – effects of isotopic substitution – microwave spectra of polyatomic molecules – linear and symmetric top molecules – infrared spectra – diatomic molecules, simple harmonic and anharmonic oscillators – diatomic vibrating rotator rotation – vibration spectrum of carbon monoxide – interaction of rotation and vibration (breakdown of Born-Oppenheimer approximation) – influence of the rotation on the spectrum of polyatomic molecules, linear and symmetric top molecules, parallel and perpendicular vibrations – influence of nuclear spin.

Raman spectra – rotational Raman spectra of linear and symmetric top molecules – vibrational Raman spectra – rotational fine structure – electronic spectra of diatomic molecules – vibrational coarse structure – intensity of vibrational lines in electronic spectra – rotational fine structure – fortrat diagram.

UNIT II: Nuclear Magnetic Resonance Spectroscopy

^{1}H NMR Spectroscopy – multiplicity – coupling constant – spin-spin splitting – vicinal and geminal coupling constants – Karplus equation – long range coupling constants, influence of stereochemical factors on chemical shift of protons.

Simplification of complex spectra – double resonance techniques, shifts reagents – chemical spin decoupling of rapidly exchangeable protons (OH, SH, COOH, NH, NH_2) – an elementary treatment of NOE phenomenon.

^{13}C NMR Spectroscopy – broad band decoupling – off resonance decoupling – chemical shifts of common functional groups – FT NMR and its importance–

DEPT spectra – identification of small compounds based on NMR data – 2D techniques: $^{1}H–^{1}H$ COSY, $^{1}H–^{13}C$ HETCOSY – NOESY.

UNIT III: UV-Visible and IR Spectroscopy

UV-Visible spectroscopy – introduction – instrumentation, sampling techniques – Woodward-Fieser and Scott's rules for conjugated dienes and polymers, ketones, aldehydes, α,β-unsaturated acids, esters, nitriles, and amides – differentiation of geometrical isomers and positional isomers – disubsitituted benzene derivatives – study of steric effect in aromaticity.

Infrared spectroscopy – Introduction – instrumentation, sampling techniques – factors influencing group frequencies – quantitative studies – hydrogen bonding (intermolecular and intramolecular).

UNIT IV: ESR, ORD and Mass Techniques

ESR – basic principles – comparison between ESR and NMR spectra – hyperfine splitting – applications to organic free radicals.

Optical rotatory dispersion and circular dichroism – introduction to theory and terminology – cotton effect – ORD curves – axial haloketone rule and its applications – the octant rule – its applications – applications of ORD to determine absolute configuration of monocyclic ketones – comparison between ORD and CD – their interrelationships.

Mass Spectrometry – instrumentation – resolution – ESI, EI, CI and FAB methods – base peak, isotopic peaks, metastable peaks – importance of metastable peaks, parent peak, recognition of molecular ion peak – fragmentation – general rules – pattern of fragmentation for various classes of compounds, McLafferty rearrangement – nitrogen rule.

Application of UV, IR, NMR and mass spectroscopy – structural elucidation of organic compounds – (minimum 15 problems should be worked out).

UNIT V: X-Ray Diffraction

X-Ray diffraction by single crystal method – space groups – systematic absences in X-ray data and identification of lattice types, glide planes and screw axes – X-ray intensities – structure factor and its relation to intensity and electron density – phase problem – structure solution by heavy atom method and direct method – determination of absolute configuration of molecules – a brief account of Cambridge Structural Database (CSD) and Protein Data Bank (PDB).

Electron diffraction by gases – scattering intensity vs. scattering angle, Wierl equation – measurement techniques.

Neutron diffraction by crystals – magnetic scattering – measurement techniques – elucidation of structure of magnetically ordered unit cell.

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SEMESTER-II **HOURS/WEEK: 6**
CORE PRATICAL-III (CP-III) **CREDITS: 3**

ORGANIC CHEMISTRY II (P)

OBJECTIVES

1. To carry out the qualitative analysis of an organic mixture.
2. To perform the preparation of organic compounds.

1. Quantitative analysis of organic compounds

Estimation of phenol, aniline, ketone, glucose, nitrobenzene, saponification value of an oil and iodine value of oil.

2. Preparation of organic compounds (double stage)

a. *p*-Bromoacetanilide from aniline (acetylation and bromination)
b. Acetylsalicylic acid from methyl salicylate (hydrolysis and acetylation)
c. 1,3,5-Tribromobenzene from aniline (bromination, diazotization and hydrolysis)
d. *p*-Nitroaniline from acetanilide (nitration and hydrolysis)
e. Benzilic acid from benzoin (rearrangement)
f. *p*-Aminobenzoic acid from p-nitrotoluene (oxidation and reduction)
g. Benzanilide from benzophenone (rearrangement)
h. *p*-Bromoaniline from acetanilide (bromination and hydrolysis)
i. *m*-Nitroaniline from nitrobenzene (nitration and reduction)
j. 1,2,4-Triacetoxy benzene from hydroquinone (oxidation and acylation)

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SEMESTER-II **HOURS/WEEK: 6**
CORE PRATICAL-IV (CP-IV) **CREDITS: 3**

INORGANIC CHEMISTRY II (P)

OBJECTIVES

1. To carry out the titrimetric and gravimetric analyses.
2. To perform the preparation of compounds.

1. Titrimetry and Gravimetry

A mixture of solution(s) should be given for estimation

Cu (V) and Ni (G)
Cu (V) and Zn (G)
Fe (V) and Zn (G)
Fe (V) and Ni (G)
Zn (C) and Cu (G)

2. Preparation of complexes

1. Tris(thiourea)copper(I) chloride
2. Tetraamminecopper(II) sulphate
3. Potassium trioxalatoferrate
4. Potassium trioxalatoaluminate(III)
5. Potassium trioxalatochromate(III)
6. Hexamminecobalt(III) chloride

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SEMESTER-II **HOURS/WEEK: 6**
ELECTIVE COURSE-IA (EC-IA) **CREDITS: 5**

(A) SOLID STATE CHEMISTRY

OBJECTIVES

1. To learn the crystal structures of few inorganic solids.
2. To study the chemistry of crystallization and vapour phase transport.
3. To learn the applications of magnetic materials.
4. To study the chemistry of organic solids.

UNIT I: Crystal Structure and Crystal Engineering of Organic Solids

Types of close packing – hcp and ccp – packing efficiency – SC, BCC, and FCC, radius ratio rule – applications – polyhedral description of solids – structure types: Na_2O, Cs_2O, rutile, perovskite (ABO_3), ReO_3, K_2NiF_4, spinels and antispinels.

Hydrogen bonded supramolecular patterns involving water / carboxyl / halide motifs – concepts of different types of synthons based on non-covalent interactions – principles of crystal engineering and non-covalent synthesis – polymorphism and pseudopolymorphism – supramolecular isomorphism, polymorphism and crystal engineering of pharmaceutical phases.

UNIT II: Metallo Organic Frameworks

M.O.Fs (Metallo Organic Frameworks) – organometallic systems – combinations of different interactions to design molecular rods, triangles, ladders, networks, etc. Design of nanoporous solids.

Interligand hydrogen bonds in metal complexes – implications for drug design – crystal engineering of NLO and OLED materials.

UNIT III: Preparative Methods in Solid State Chemistry

Experimental procedure, coprecipitation as a precursor to solid state reaction, other precursor methods, kinetics of solid state reactions – crystallizations of solutions, melts, glasses and gels, solutions and gels: zeolite synthesis – precipitation from solution or melt: flux method, epitaxial growth of thin layers, verneuil flame fusion method.

Graphite intercalation compounds, transition metal dichalcogenide and other intercalation compounds, ion exchange reaction, synthesis of new metastable phases by 'Chimie Douce'.

Electrochemical reduction methods – preparation of thin films, chemical and electrochemical methods, physical methods – growth of single crystals, Czochralski method, Bridgman-Stockbarger methods – zone melting.

Vapour phase transport, hydrothermal methods, comparison of different methods – high pressure and hydrothermal methods and dry high pressure methods.

UNIT IV: Magnetic Materials and Optical Properties

Selected examples of magnetic materials and their properties – metals and alloys, transition metal oxides, spinels, garnets, ilmenite and perovskites.

Magnetoplumbites – applications – structure/property relations – transformer, information storage, magnetic bubble memory devices, permanent magnets.

Luminescence, Lasers and phosphors – definitions and general comments, configurational coordinate model, some phosphor materials, anti-Stokes phosphors – lasers – the ruby laser, Neodymium lasers

UNIT V: Organic Solid State Chemistry

Topochemical control of solid state organic reactions – intramolecular reactions – conformational effects – intermolecular reactions – molecular packing effects – photodimerization of 2-ethoxycinnamic acid (α form, β form, γ form) – photopolymerization of 2,5-distyrylpyrazine – photopolymerizations of diacetylenes.

Asymmetric syntheses – dimerization of anthracene – control of molecular packing arrangements.

Organic reactions within inorganic host structures – electrically conductive organic solids – organic metals, conjugated systems, doped polyacetylene, polyparaphenylene, polypyrrole – organic charge transfer complexes – new superconductors

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   (ii) Crystal Engineering Communication, http://www.rsc.org /Publishing/ Journals /ce/ index.asp

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SEMESTER-II **HOURS/WEEK: 6**
ELECTIVE COURSE-IB (EC-IB) **CREDITS: 5**

(B) SUPRAMOLECULAR CHEMISTRY

OBJECTIVES

1. To know the fundamentals of supramolecules.
2. To learn co-receptor molecules and multiple recognition
3. To study the supramolecular reactivity and catalysis.

UNIT I: Concepts of Supramolecular Chemistry

Concepts and languages of supramolecular chemistry – various types of non-covalent interactions – hydrogen bonds, C-H···X interactions, halogen bonds – π-π interactions, non–bonded interactions – various types of molecular recognition.

Crystal engineering of organic solids – hydrogen bonded supramolecular patterns involving water / carboxyl / halide motifs – concepts of different types of synthons based on non-covalent interactions – principles of crystal engineering and non-covalent synthesis – polymorphism and pseudopolymorphism – supramolecular isomorphism / polymorphism – crystal engineering of pharmaceutical phases.

UNIT II: Metallo Organic Frameworks

M.O.F (Metallo Organic Frameworks) – organometallic systems – combinations of different interactions to design molecular rods, triangles, ladders, networks, etc. – design of nanoporous solids – interligand hydrogen bonds in metal complexes – implications for drug design – crystal engineering of NLO materials, OLED.

UNIT III: Co-receptor Molecules and Multiple Recognition

Dinuclear and polynulclear metal ion cryptates – linear recognition of molecular length by ditopic co-receptors – heterotopic co-receptors – cyclophane receptors, amphiphilic receptors and large molecular cages – multiple recognition in metalloreceptors – supramolecular dynamics.

UNIT IV: Supramolecular Reactivity and Catalysis

Catalysis by reactive macrocyclic cation receptor molecules – catalysis by reactive anion receptor molecules – catalysis with cyclophane type receptors – supramolecular metallocatalysis – cocatalysis – catalysis of synthetic reactions – biomolecular and abiotic catalysis.

Supramolecular chemistry in solution – cyclodextrin, micelles, dendrimers, gelators – classification and typical reactions – applications.

UNIT V: Supramolecular Devices

Supramolecular devices and sensors – various types of supramolecular devices – an overview – supramolecular photochemistry – molecular and supramolecular photonic devices – light conversion and energy transfer devices – molecular and supramolecular electronic devices – electronic conducting devices – molecular wires, modified and switchable molecular wires – molecular and supramolecular ionic devices – tubular mesophases, molecular protonics – switching devices – electro-photo switch – ion and molecule sensors – role of supramolecular chemistry in the development of nanoscience and technology.

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SEMESTER-III **HOURS/WEEK: 6**
CORE COURSE-VI (CC-VI) **CREDITS: 5**

ORGANIC CHEMISTRY II

OBJECTIVES

1. To understand the nucleophilic and electrophilic substitution reactions.
2. To learn the addition and elimination reactions.
3. To study a variety of heterocycles.
4. To know the chemistry of terpenoids, steroids and alkaloids.

UNIT I: Nucleophilic Substitution Reactions

Aliphatic nucleophilic substitution – mechanisms – S_N1, S_N2, S_Ni – ion-pair in S_N1 mechanisms – neighbouring group participation, non-classical carbocations – substitutions at allylic and vinylic carbons.

Reactivity – effect of structure, nucleophile, leaving group and stereochemical factors – correlation of structure with reactivity – solvent effects – rearrangements involving carbocations – Wagner-Meerwein and dienone-phenol rearrangements.

Aromatic nucleophilic substitutions – S_N1, S_NAr, Benzyne mechanism – reactivity orientation – Ullmann, Sandmeyer and Chichibabin reaction – rearrangements involving nucleophilic substitution – Stevens – Sommelet-Hauser and von-Richter rearrangements.

UNIT II: Electrophilic Substitution Reactions

Aromatic electrophilic substitution reaction – orientation, reactivity and mechanisms based on transition state theory with suitable reactions – substitutions in thiophene and pyridine – N-oxide – quantitative treatment of the structural effects on reactivity.

Substituent effects – origins of Hammett equation – principles of Hammett correlation – effect of structure on reaction mechanisms Hammett parameters – σ and ρ, modified forms of Hammett equation, Taft Equation.

Aliphatic electrophilic substitution – S_E2, S_Ei and S_E1 mechanisms – diazonium coupling reactions – metals as electrophile in substitution reactions and decomposition of diazonium salts.

UNIT III: Addition and Elimination Reactions

Addition to carbon-carbon multiple bonds – electrophilic, nucleophilic and free radical additions – orientation of the addition – stereochemical factors influencing the addition of bromine and hydrogen bromide, hydroxylation, 1,2-

dihydroxylation – hydroboration leading to formation of alcohols – oxidation and ozonolysis.

Addition to carbonyl and conjugated carbonyl systems – mechanism – Grignard reagents – 1,2- and 1,4-additions (lithium dimethylcuprate) – addition to carbon-oxygen double bond – Benzoin, Knoevenagel, Stobbe, Darzens glycidic ester condensation and Reformatsky reactions.

Elimination reactions – mechanisms; E1, E2, E1cB – stereochemistry of elimination, Hofmann's and Zaitsev's rules – competition between elimination and substitution – pyrolytic *cis*-elimination, Chugaev reaction – examples such as dehydration, dehydrohalogenation, Hofmann degradation, Cope elimination – Bredt's rule with examples.

UNIT IV: Heterocycles

Nomenclature: Trivial, systematic and replacement nomenclature – non-aromatic heterocycles – synthesis of tetrahydrofurans – pyrrolidines – tetrahydropyrans – piperidines.

Synthesis and reactivity of heterocycles: aziridines – oxiranes – thiiranes – azetidines – oxetanes – oxazoles – imidazoles – thiazoles – isooxazoles.

Synthesis and reactivity of aromatic heterocycles: pyrazoles – isothiazoles – triazoles – pyrimidines – purines – triazines – pyridazines – pyrazines.

UNIT V: Natural Products

Terpenoids: introduction – biosynthesis of menthol, camphor – total synthesis: Takasago synthesis of menthol, Corey's synthesis of longifolene, Curran's synthesis of hirsutene.

Steroids: introduction – partial synthesis of androsterone and testosterone (from Cholesterol) – total synthesis: Johnson's synthesis of progesterone and Vollhardt's synthesis of estrone.

Alkaloids: introduction – biosynthesis of nicotine, camptothecin – total synthesis: Corey's synthesis of epibatidine, Comin's asymmetric synthesis of Camptothecin and Woodward's synthesis of reserpine.

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SEMESTER-III **HOURS/WEEK: 6**
CORE COURSE-VII (CC-VII) **CREDITS: 6**

PHYSICAL CHEMISTRY II

Objectives

1. To study the applications of quantum chemistry and group theory.
2. To understand electrochemistry, adsorption and classical thermodynamics.

UNIT I: Quantum Chemistry - II and Group Theory

Applications of wave mechanics – the harmonic oscillator, rigid rotator – hydrogen and hydrogen like atoms – shapes and nodal properties of orbitals – space quantization – approximation methods – methods of variation, application to hydrogen and helium atoms – perturbation method – non-degenerate systems – helium atom – effective nuclear charge.

Electron spin – many electron atoms – Pauli's principle – Slater determinants – atomic structure calculation – self-consistent field method – Hartree-Fock method for atoms – angular momentum in many electron systems – spin-orbit interaction, L-S and j-j coupling schemes.

Symmetry adapted linear combinations (SALC) – vibrational spectra – symmetry properties of normal molecules – symmetry coordinates – selection rules for fundamental vibrational transition – IR and Raman activity of fundamentals in CO_2, H_2O, N_2F_2 – the rule of mutual exclusion and Fermi resonance.

UNIT II: Electrochemistry – I

Ion transport in solution – migration, convection and diffusion – Fick's laws of diffusion conduction – Debye-Huckel theory – ionic atmosphere – Debye-Huckel-Onsager equation – verification and extension – Debye-Falkenhagen effect and Wien effect, Debye-Huckel limiting law – activity coefficients and ionic strength – Bjerrum model.

The electrode – electrolyte interface – electrical double layer and multi layers – theories – electrocapillary curves – Lipmann equation and Lipmann potential.

Electrokinetic phenomena – classification – Tiselius method of separation of proteins – membrane potential – electrocatalysis.

UNIT III: Electrochemistry – II

Dynamics of electron transfer – Marcus theory – tunneling – the rate of charge transfer – current density – Butler-Volmer equation – Taft equation –

polarization and overvoltage – mechanism of hydrogen evolution and oxygen evolution reactions.

Principles of electrodeposition of metals – corrosion and passivity – Pourbaix and Evans diagrams – methods of protection of metals from corrosion.

Power storage systems – fuel cells – construction and functioning – applications – photovoltaic cells.

UNIT IV: Surface Chemistry and Chemical Kinetics-II

Surface phenomena – Gibbs adsorption isotherm – solid-liquid interfaces – contact angle and wetting – solid-gas interface – physisorption and chemisorption – Langmuir, BET isotherms – surface area determination.

Kinetics of surface reactions involving adsorbed species – Langmuir-Hinshelwood mechanism, Langmuir-Rideal mechanism – Rideal-Eley mechanism – some interfacial aspects on micelles, reverse micelles, microemulsions and membranes.

Application of ARRT to solution kinetics – effect of solvent and ionic strength, influence of pressure on rates in solution – enzyme catalysis – mechanism of single substrate reactions – Michaelis-Menten law – acidity functions – kinetics of processes in micellar and reverse micellar systems.

UNIT V: Classical Thermodynamics

Third law – thermodynamics – significance – Nernst heat theorem and other forms of stating the third law – thermodynamic quantities at absolute zero – apparent exceptions to the third law.

Thermodynamics of systems of variable composition – partial molar properties – chemical potential – relationship between partial molar quantities – Gibbs-Duhem equation and its applications (the experimental determination of partial molar properties not included).

Thermodynamic properties of real gases – fugacity concept – calculation of fugacity of real gas – activity and activity coefficient – concept – definition – standard states and experimental determinations of activity and activity coefficient of electrolytes.

Thermodynamics of irreversible processes: coupled flow – Onsager's reciprocal relations – entropy production.

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SEMESTER-III **HOURS/WEEK: 6**
CORE PRACTICAL-V (CP-V) **CREDITS: 3**

PHYSICAL CHEMISTRY I (P)

OBJECTIVES

To perform the various techniques of physical chemistry experiments.

Any **ten** experiments (to be decided by the course teacher) out of the following experiments.

a. Kinetics-acid hydrolysis of ester–comparison of strengths of acids.
b. Kinetics-acid hydrolysis of ester–determination of energy of activation (Ea).
c. Kinetics-saponification of ester–determination of ethyl acetate by conductometry.
d. Kinetics-persulfate-iodine reaction –determination of order, effective of ionic strength on rate constant.
e. Determination of molecular weight of substance by transition temperature method.
f. Determination of molecular weight of substances by Rast method.
g. Determination of Critical Solution Temperature (CST) of phenol-water system and effect of impurity on CST.
h. Study of phase diagram of two components forming a simple eutectic.
i. Study of phase diagram of two compounds forming a compound.
j. Study of phase diagram of three components system.
k. Determination of molecular weight of substances by cryoscopy.
l. Determination of integral and differential heat of solutions by colorimetry.
m. Polymerization-rate of polymerization of acrylamide.
n. Distribution law – study of Iodine-Iodine equilibrium.
o. Distribution law – study of association of benzoic acid in benzene.
p. Adsorption – oxalic acid/acetic acid on charcoal using Freundlich isotherm.

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SEMESTER-III **HOURS/WEEK: 6**
ELECTIVE COURSE-IIA (EC-IIA) **CREDITS: 5**

(A) PHARMACEUTICAL CHEMISTRY

OBJECTIVES

1. To understand the basics of pharmaceutical chemistry.
2. To study the antibiotics and their activity.
3. To learn the analgesic and antipyretic activities.
4. To know the activities of anaesthetics and local anaesthetics.
5. To understand concept of clinical chemistry.

UNIT I: Basics of Pharmaceutical Chemistry

Definitions – the terms – drugs, pharmacology, pharmacy, chemotherapy, therapeutics – pharmacologically active principles in plants – first aid – important rules of first aids, cuts, fractures, bleeding for blood, maintaining breathing burns and first aid box – tuberculosis (T.B.), jaundice, piles, typhoid, malaria, cholera – causes – symptoms, diagnosis – prevention and treatment – medicinally important compounds of iron – ferrous gluconate, ferrous sulphate and ferric ammonium citrate.

UNIT II: Antibiotics

Definition – introduction – classification and biological actions – penicillin, chloramphenicol, streptomycin and tetracycline – structure, properties and therapeutic uses – chemical structure and pharmacological activity – effect of unsaturation, chain length, isomerism, halogens, amino groups, hydroxyl groups and acid groups.

UNIT III: Analgesic and Antipyretics

Narcotic analgesic – analgesic action of morphine – derivatives of morphine – heroin and apomorphine – synthetic analgesics – pethidine, methadone – non-narcotic analgesic – aspirin, paracetamol and phenacetin – analgin – preparation, properties and uses – ibuprofen and ketoprofen – structure and uses.

UNIT IV: Anaesthetics and Local Anaesthetics

Characteristics of anaesthetics – classification of anaesthetics – general anaesthetics – volatile anaesthetics – ether, chloroform and halothane – advantages and disadvantages – non-volatile anaesthetics (intravenous anaesthetics) – methohexitone and propanidid – structure and uses – cocaine and amethocaine – structure and uses – benzocaine and procaine – structure, synthesis and uses.

UNIT V: Clinical Chemistry

Determination of sugar (glucose) in serum – *o*-toluidine method – diagnostic test for sugar in urine – Benedict's test – detection of diabetes – detection of cholesterol in urine – detection of anaemia – estimation of haemoglobin (Hb concentration) – red cell count.

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SEMESTER-III **HOURS/WEEK: 6**
ELECTIVE COURSE-IIB (EC-IIB) **CREDITS: 5**

(B) BIO-ORGANIC CHEMISTRY

OBJECTIVES

1. To learn the preparation, properties of amino acids and proteins.
2. To study the activity of enzymes and cofactors.
3. To know basics of lipids and nucleic acids.
4. To learn the concept of bioenergetics.
5. To learn the principles of lead and analogue synthesis.

UNIT I: Amino Acids and Proteins

Structure, classification, synthesis and properties of amino acids – biosynthesis of amino acids – peptides – N-terminal and C-terminal residue analysis – solid phase peptide synthesis.

Proteins – classification and properties (denaturation, isoelectric point and electrophoresis), primary, secondary, tertiary and quaternary structures of proteins – biological roles of proteins.

UNIT II: Enzymes and Cofactors

Chemical nature of enzymes – characteristics of enzymes – colloidal nature, catalytic nature.

Mechanism of enzymes – Michaelis-Menten hypothesis – Fischer's lock and key model – regulation of enzyme activity.

Structure and biological functions of coenzyme A, NAD+, FAD and vitamin B12.

UNIT III: Lipids and Nucleic Acids

Lipids – definition – simple lipids – fats and oils – compound lipids – phospholipids, glycolipids – physical properties – solubility, melting point, surface tension, emulsification and geometric isomerism – chemical properties – reaction involving -COOH group, -OH group and double bonds.

Nucleic Acid – definition – nucleosides and nucleotides – deoxyribonucleic acid (DNA) – internucleotides linkages – base composition – double helical structure.

UNIT IV: Bioenergetics

Concept of energy – thermodynamic principles – first law, second law, combining the two laws – relationship between standard free energy change and equilibrium constant.

Standard free energy values of chemical reactions – Adenosine triphosphate (ATP) as universal currency of free energy in biological systems – ATP hydrolysis and equilibria of coupled reactions – inter conversion of adenine nucleotides.

UNIT V: Lead and Analogue Synthesis

Designing organic synthesis – disconnection approach – synthons and synthetic equivalents – one group disconnections: alcohol, acid and ketone – functional group interconversions.

Asymmetric synthesis – basic principles – stereoselective and stereospecific reactions – reagents, catalysts and their applications (wherever applicable) in alkylation and hydrogenation – Jacobsen's catalyst – Evan's catalyst.

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SEMESTER-III **HOURS/WEEK: 6**
ELECTIVE COURSE-III (EC-III) **CREDITS: 5**

ANALYTICAL CHEMISTRY

OBJECTIVES

1. To learn the instrumental methods
2. To learn the nature of errors and their types.
3. To understand the various techniques in chromatography.
4. To understand the principles and instrumentation of thermoanalytical and fluorescence techniques.
5. To studying detail the electroanalytical techniques.

UNIT I: Instrumental Methods of Analysis

Principles and applications of extended X-ray absorption fine structure (EXAFS) – surface extended X-ray absorption (SEXAFS) – atomic absorption spectroscopy (AAS) – flame emission spectroscopy (FES) – turbidimetry – theory and applications.

UNIT II: Data and Error Analysis

Various types of error – accuracy, precision, significant figures – frequency distributions, the binomial distribution, the Poisson distribution and normal distribution – describing data, population and sample, mean, variance, standard deviation, way of quoting uncertainty, robust estimators, repeatability and reproducibility of measurements.

Hypothesis testing, levels of confidence and significance, test for an outlier, testing variances, means t-Test, paired t-Test – analysis of variance (ANOVA) – correlation and regression.

Curve fitting, fitting of linear equations, simple linear cases, weighted linear case, analysis of residuals – general polynomial equation fitting, linearizing transformations, exponential function fit – r and its abuse – multiple linear regression analysis, elementary aspects.

UNIT III: Chromatography

Solvent extraction – principles of ion exchange, paper, thin-layer and column chromatography techniques – columns, adsorbents, methods, R_f values, McReynold's constants and their uses – HPTLC, HPLC techniques – adsorbents, columns, detection methods, estimations, preparative column – GC-MS techniques – methods, principles and uses.

UNIT IV: Thermoanalytical Methods and Fluorescence Spectroscopy

Principles – instrumentations and applications of thermogravimetry analysis (TGA), Differential Thermal Analysis (DTA) and Differential Scanning Calorimetry (DSC) –thermometric titrations – types – advantages.

Basic aspects of synchronous fluorescence spectroscopy – spectral hole burning – flow cytometry – fluorometers (quantization) – instrumentation – applications.

UNIT V: Electroanalytical Techniques

Electrochemical sensors, ion-sensitive electrodes, glass – membrane electrodes, solid-liquid membrane electrodes – ion-selective field effect transistors (ISFETs) – sensors for the analysis of gases in solution.

Polarography – principles and instrumentation – dropping mercury electrode – advantages – Ilkovic equation – applications of polarography – polarographic maxima – oscillographic polarography, AC polarography – cyclic voltammetry – advantages over polarographic techniques – chronopotentiometry – advantages – controlled potential coulometry – amperometric titrations: principles – techniques – applications – estimation of lead.

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SEMESTER-IV **HOURS/WEEK: 6**
CORE COURSE-VIII (CC-VIII) **CREDITS: 5**

PHYSICAL METHODS IN CHEMISTRY II

OBJECTIVES

1. To understand electronic spectroscopy of metal complexes.
2. To study in detail IR, Raman and NMR of inorganic compounds.
3. To learn the EPR, Mossbauer and magnetic properties of metal complexes.

UNIT I: Electronic Spectroscopy

Microstates, terms and energy levels for d1 – d9 ions in cubic and square fields – intensity of bands – group theoretical approach to selection rules – effect of distortion and spin-orbit coupling on spectra – evaluation of 10Dq and β for octahedral complexes of cobalt and nickel – applications to simple coordination compounds – charge transfer spectra – electronic spectra of $[Ru(bipy)_3]^{2+}$.

Optical rotatory dispersion and circular dichroism and magnetic circular dichroism – applications to metal complexes.

UNIT II: Infrared and Raman Spectroscopy

Vibrations in simple molecules (H_2O, CO_2) and their symmetry notation for molecular vibrations – group vibrations and the limitations – combined uses of IR and Raman spectroscopy in the structural elucidation of simple molecules like N_2O, ClF_3, NO_3^-, ClO_4^- effect of coordination on ligand vibrations – uses of groups vibrations in the structural elucidation of metal complexes of urea, thiourea, cyanide, thiocyanate and dimethyl sulfoxide.

Effect of isotopic substitution on the vibrational spectra of molecules – vibrational spectra of metal carbonyls with reference to the nature of bonding – geometry and number of C-O stretching vibrations (group theoretical treatment) – applications of Raman spectroscopy – resonance Raman spectroscopy.

UNIT III: NMR Spectroscopy

Examples for different spin systems – chemical shifts and coupling constants (spin-spin coupling) involving different nuclei (^1H, ^{19}F, ^{31}P, ^{13}C) interpretation and applications to inorganic compounds – Effect of quadrupolar nuclei (^2H, ^{10}B, ^{11}B) on the ^1H NMR spectra.

Systems with chemical exchange – evaluation of thermodynamic parameters in simple systems – study of fluxional behaviour of molecules – NMR of paramagnetic molecules – isotropic shifts contact and pseudo-contact interactions – lanthanide shift reagents.

UNIT IV: EPR Spectroscopy and Magnetic properties

Theory of EPR spectroscopy – spin densities and McConnell relationship – factors affecting the magnitude of g and A tensors in metal species – zero-field splitting and Kramers degeneracy – spectra of V(II), Mn(II), Fe(II), Co(II), Ni(II) and Cu(II) complexes – applications of EPR to a few biological molecules containing Cu(II) and Fe(III) ions.

Magnetic properties – types of magnetism – dia-, para-, ferro- and antiferro-magnetism – magnetic properties of free ions – first-order Zeeman effect – second-order Zeeman effect – states KT – states<<<KT – determination of magnetic moments and their applications to the elucidation of structures of inorganic compounds – temperature independent paramagnetism – magnetic properties of lanthanides and actinides – spin crossover in coordination compounds.

UNIT V: Mossbauer Spectroscopy

Isomer shifts – quadrupole splitting – magnetic interactions – applications to iron and tin compounds.

NQR spectroscopy – characteristics of quadrupolar nucleus – effects of field gradient and magnetic field upon quadrupolar energy levels – NQR transitions – applications of NQR spectroscopy.

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SEMESTER-IV **HOURS/WEEK: 6**
CORE PRATICAL-VI (CP-VI) **CREDITS: 3**

PHYSICAL CHEMISTRY II (P)

OBJECTIVES

To perform the various electrical experiments.

Any **ten** experiments (to be decided by the course teacher) out of the following experiments.

a. Conductometry – acid-alkali titrations.
b. Conductometry – precipitation titrations.
c. Conductometry – displacement titrations.
d. Conductometry – determination of dissociation constant of weak acids.
e. Conductometry – solubility product of sparingly soluble silver salts.
f. Verification of Onsager equation - conductivity method.
g. Determination of degree of hydrolysis and hydrolysis constant of a substance.
h. Potentiometric titrations – acid alkali titrations.
i. Potentiometric titrations – precipitation titrations.
j. Potentiometric titrations – redox titrations.
k. Potentiometry – determination of dissociation constant of weak acids.
l. Potentiometry – determination of solubility of silver salts.
m. Potentiometry – determination of activity and activity coefficient of ions.
n. pH Titration of *ortho*-phosphoric acid.
o. To determine the relative strength of two acids by conductance measurements.
p. To determine the pH of a buffer solution using a quinhydrone electrode.

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SEMESTER-IV **HOURS/WEEK: 6**
ELECTIVE COURSE-IVA (EC-IVA) **CREDITS: 5**

(A) GREEN CHEMISTRY

OBJECTIVES

1. To learn the green chemistry and their principles.
2. To learn the importance of greener reactions.
3. To understand the phase-transfer catalyst in green chemistry.

UNIT I: Introduction to Green Chemistry

Introduction to green chemistry – twelve principles of green chemistry – planning a green synthesis in a chemical laboratory – evaluating the type of reaction involved – rearrangement, addition, substitution, elimination and pericyclic reactions.

Selection of appropriate solvent – aqueous phase reaction – reactions in ionic liquids – organic synthesis in solid state – solid supported organic synthesis – selection of starting materials – use of protecting group – use of catalyst – use of microwaves and sonication.

UNIT II: Addition and Condensation Reactions

Addition reactions – Michael addition in [aqueous medium and solid state] – Diels-Alder reactions in aqueous phase.

Condensation reactions – Aldol condensation of aldehydes with nitroalkanes and nitriles – Aldol condensation in solid phase – benzoin condensation under catalytic conditions – applications.

UNIT III: Oxidation and Reduction Reactions

Oxidation reactions – Baeyer-Villiger oxidation in aqueous phase and solid state – enzymatic Baeyer-Villiger oxidation.

Reduction reactions – Clemmensen reduction – mechanism – limitations – applications

UNIT IV: Phase-Transfer Catalyst Reactions

Phase-transfer catalyst reactions – Heck reaction – Michael addition reaction – oxidation of toluene to benzoic acid – Reimer-Tiemann reaction – Baker-Venkataraman synthesis – Williamson ether synthesis – Dozen reaction.

UNIT - V: Sonication Reactions

Sonication reactions – Barbier reaction – Reformatsky reaction – Simmons-Smith reaction – Strecker synthesis – Ullmann coupling reaction – Wurtz reaction – Bouveault reaction.

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SEMESTER-IV **HOURS/WEEK: 6**
ELECTIVE COURSE-IVB (EC-IVB) **CREDITS: 5**

(B) INDUSTRIAL CHEMISTRY

OBJECTIVES

1. To know the basic ideas of an industry and industrial wastes.
2. To understand the petroleum and petrochemicals.
3. To understand the functions of portland cement.
4. To study the principles of pulp and paper.
5. To know the preparation of soaps, detergents and perfumes.

UNIT I: Basic Ideas and Industrial Wastes

Basics idea about unit operation – flow chart – chemical conversion – batch versus continuous processing – chemical process selection – design – chemical process control.

Types of industrial wastes – treatment of wastes or effluent with organic impurities – treatment of wastes or effluent with inorganic impurities – treatment of some important chemical wastes.

UNIT II: Petroleum and Petrochemicals

Introduction – saturated hydrocarbons from natural gas – uses of saturated hydrocarbons – unsaturated hydrocarbons – acetylene, ethylene, propylene, butylene – aromatic hydrocarbons – toluene and xylene.

Preparation of rectified spirit from beat – methylated spirit – preparation of absolute alcohol from rectified spirit – petrochemicals in India.

UNIT III: Manufacture of Cement

Introduction – types of cement – high alumina cement, water proof cement, slag cement, acid resisting cement, white cement, coloured cement, Pozzolana cement.

Setting of cement – properties of cement – testing of cement – uses of cement – concrete – cement industries in India.

UNIT IV: Pulp and Paper and Manufacture of Paper

Introduction – manufacture of pulp – types of pulp – sulphate or craft pulp, soda pulp, Rag pulp – beating, refining, filling, sizing and colouring.

Calendaring – uses – paper industries in India.

UNIT V: Soaps, Detergents and Perfumes

Introduction – types of soaps – hard and soft soaps – manufacture of soap (hot and continuous process only) – cleansing action of soap – detergents – surface active agents – biodegradability of surfactants, amphoteric detergents.

Introduction – production of natural perfumes – flower perfumes – jasmine, rose and lily – production of synthetic perfumes – muscone and nitro-musks.

REFERENCES

1. B. K. Sharma, Industrial Chemistry; 8th Ed., Goel Publishing House, New Delhi, 1997. (Unit–I, II, III, IV and V)
2. R. N. Shreve, and J. A. Brink Jr. Chemical Process Industries; 4th Ed., McGraw Hill, Toronto, 1977. (Unit–I, II, III, IV and V)
3. A. C. S. Brain, Production and Properties of Industrial Chemicals; Reinhold, New York, 1989. (Unit–I)

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SEMESTER-IV **HOURS/WEEK: 6**
ELECTIVE COURSE-VA (EC-VA) **CREDITS: 5**

(A) SELECTED TOPICS IN CHEMISTRY

OBJECTIVES

1. To understand the quantum chemical approach to chemical bonding.
2. To know the named reactions and their applications.
3. To understand the retro-synthetic methods.
4. To study the polymers and their types.
5. To learn the principles of nuclear chemistry.

UNIT I: Quantum Chemical Approach to Chemical Bonding and Molecular Structure

Diatomic molecules: Born-Oppenheimer approximation – MO theory (H_2 and H_2^+), VB theory (H_2 and H_2^+) – comparison.

HMO calculations – evaluation of coefficients and eigenvalues for simple molecules – electron density – bond order and free valence index.

Extended HMO theory – applications to simple systems – hybridization schemes.

UNIT II: Named Reactions and Applications in Organic Synthesis

Bamford-Stevens reaction – Barton-McCombie reaction (Barton Deoxygenation) – Baylis-Hillman reaction – Biginelli reaction – Corey-Chaykovsky reaction – Enamines and selective mono- and dialkylation via enamine reactions

Henry reaction – Hosomi-Sakurai reaction – Hunsdiecker reaction – Julia olefination and its modifications – Mitsunobu reaction – Mukaiyama-Aldol addition – Nazarov cyclization – Peterson olefination – Prevost reaction – Prins reaction – Staudinger reaction

Ugi reaction – Weinreb ketone synthesis – Wittig reaction and its modifications – Yamaguchi macrolactonization – Palladium based reactions: Fukuyama coupling – Heck reaction – Hiyama coupling – Sonogashira coupling – Stille coupling – Suzuki coupling – Tsuji-Trost Reaction.

UNIT III: Synthetic Methodology

Introduction to disconnections – synthons and synthetic equivalents – synthon approach – electron donors (nucleophiles) – electron acceptors (electrophiles)

Introduction of functional groups – umpolung reactions – one group disconnections: alcohols, olefins, ketones, acids – two group disconnections: 1,2-, 1,3-, 1,4- and 1,5-difunctional compounds – convergent syntheses.

Functional group interconversion – functional group addition – carbon-heteroatom bonds – methods for 3- and 4-membered rings - synthesis of mono- and difunctional open chain molecules – mono and bicyclic molecules with substituents.

UNIT IV: Polymer Chemistry

Introduction – structure – classification of polymers – polymerisation methods – importance of polymers.

Molecular weight of polymers – number average and weight average – determination of molecular weight by osmometry – light scattering, viscosity and sedimentation methods.

Kinetics of polymerisation reactions, polycondensation reactions, ionic and free radical polymerisation, copolymerisation – coordination polymers, conducting polymers, Ziegler-Natta catalyst.

UNIT V: Fundamental of Nuclear Chemistry

The nucleus – subatomic particles and their properties – nuclear binding energy – nuclear structure – Liquid-drop model and nuclear-shell model – n/p ratio – nuclear forces – modes of radioactive decay – alpha, beta and gamma particles – orbital electron capture – nuclear isomerism – internal conversion.

Q-Values of nuclear reaction, coloumbic barrier, nuclear cross section, threshold energy and excitation function – different types of nuclear reactions with accelerated particles.

Projectile capture and particles emission, spallation, fragmentation, nuclear fission, nuclear fusion – proportional counter, Geiger-Muller counter, scintillation counter and Cherenkov counter – linear accelerator, cyclotron and synchrotron.

REFERENCES

1. R. K. Prasad, Quantum Chemistry; 4th Ed., New Age International Publishers, New Delhi, 2009.
2. A. K. Chandra, Introductory Quantum Chemistry; 4th Ed., Tata McGraw Hill, New Delhi, 1994.
3. D. A. Mcquarrie, Quantum Chemistry; University Science Books, 2nd Ed., 2007.
4. I. N. Levine, Quantum Chemistry; 7th Ed., Prentice Hall, New Jersey, 2013.
5. L. Kurti and B. Czako, Strategic Applications of Named Reactions in Organic Synthesis; Elsevier, 2005.
6. A. Hassner and C. Stumer, Organic Synthesis Based on Named and Unnamed Reactions; Elsevier Science Ltd., UK, 1994.
7. G. Brahmachari, Organic Name Reactions: A Unified Approach; Alpha Science Intl. Ltd, UK, 2006.
8. S. Warren, Designing Organic Synthesis: The Disconnection Approach; 2nd Ed., Wiley, New York, 2008.
9. F. A. Carey and R. J. Sundberg, Advanced Organic Chemistry, Parts A and B, 5th Ed., Springer, Germany, 2007.
10. W. Carruthers and I. Coldham, Modern Methods of Organic Synthesis, 4th Ed., Cambridge University Press, Cambridge, 2004.
11. C. E. Carraher, Polymer chemistry, 6th Ed, Marcel Dekker, New York, 2003.
12. F. W. Billmeyer, Jr., A Text Book of Polymer Science, 3rd Ed., John Wiley, 1994.
13. V. R. Gowariker, N. V. Viswanathan, and J. Sreedhar, Polymer Science; 1st.Ed., New Age Publishers, New Delhi, 1986.
14. G. Friedlander, E. S. Macias, J. W. Kennedy and J. M. Miller, Nuclear and Radiochemistry; 3rd Ed., John Wiley and Sons, London, 1981.
15. S. Glasstone, Source Book on Atomic Energy, Krieger Publishing Company, New Delhi, 2014.
16. H. J. Arnikar, Essentials of Nuclear Chemistry; 4th Ed., New Age International Publishers, New Delhi, 2005.

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SEMESTER-IV **HOURS/WEEK: 6**
ELECTIVE COURSE-VB (EC-VB) **CREDITS: 5**

(B) CHEMISTRY OF NANOSCIENCE AND NANOTECHNOLOGY

OBJECTIVES

1. To know the synthetic methods of nanomaterials.
2. To understand the characterization of nanomaterials.
3. To understand carbon clusters and nanostructures.
4. To learn nanotechnology and nanodevices.

UNIT I: Synthetic Methods

Definition of nanodimensional materials – historical milestones – unique properties due to nanosize, quantum dots, classification of nanomaterials.

General methods of synthesis of nanomaterials – hydrothermal synthesis, solvothermal synthesis – microwave irradiation– sol-gel and precipitation technologies – combustion flame – chemical vapour condensation process – gas-phase condensation synthesis – reverse micelle synthesis – polymer-mediated synthesis – protein microtubule-mediated synthesis – synthesis of nanomaterials using microorganisms and other biological agents – sonochemical synthesis – hydrodynamic cavitation.

Inorganic nanomaterials – typical examples – nano TiO_2/ZnO/CdO/CdS, organic nanomaterials – examples – rotaxanes and catenanes

UNIT II: Characterisation of Nanoscale Materials

Principles of Atomic Force Microscopy (AFM) – Transmission Electron Microscopy(TEM)

Resolution and Scanning Transmission Electron Microscopy (STEM) – Scanning Tunneling Microscopy (STM) – Scanning Nearfield Optical Microscopy (SNOM).

Scanning ion conductance microscope, scanning thermal microscope, scanning probe microscopes and surface plasmon spectroscopy.

UNIT III: Reactions in Nanoparticles

Reactions in nanospace – nanoconfinement – nanocapsules

Cavitands, cucurbiturils, zeolites, M.O.Fs, porous silicon, nanocatalysis.

UNIT IV: Carbon Clusters and Nanostructures

Nature of carbon bond – new carbon structures – carbon clusters – discovery of C_{60}–alkali doped C_{60}–superconductivity in C_{60}–larger and smaller fullerenes.

Carbon nanotubes – synthesis – single walled carbon nanotubes – structure and characterization – mechanism of formation – chemically modified carbon nanotubes – doping – functionalizing nanotubes – applications of carbon nanotubes.

Nanowires –synthetic strategies – gas phase and solution phase growth – growth control – properties.

UNIT V: Nanotechnology and Nanodevices

DNA as a nanomaterial – DNA – knots and junctions, DNA – nanomechanical device designed by Seeman.

Force measurements in simple protein molecules and polymerase – DNA complexes– molecular recognition and DNA based sensor.

Protein nanoarray, nanopipettes, molecular diodes, self-assembled nanotransistors, nanoparticle mediated transfection.

REFERENCES

1. C. N. R. Rao, A. Muller and A. K. Cheetham (Eds), The Chemistry of Nanomaterials: Vol. 1 and 2; Wiley-VCH;Germany, Weinheim, 2004.
2. C. P. Poole, Jr: and F. J. Owens, Introduction to Nanotechnology; Wiley Interscience, New Jersey, 2003.
3. K. J. Klabunde (Ed), Nanoscale Materials in Chemistry; 2nd Ed., Wiley-Interscience, New York, 2009.
4. T. Pradeep, Nano: The Essentials in Understanding Nanoscience and Nanotechnology; 1st Ed., Tata McGraw Hill, New York, 2007.
5. H. Fujita (Ed.), Micromachines as Tools in Nanotechnology; Springer-Verlag, Berlin, 2003.
6. Bengt Nölting, Methods in Modern Biophysics; 3rd Ed., Springer-Verlarg, Berlin, 2009.
7. H. Gleiter, Nanostructured Materials: Basic Concepts, Microstructure and Properties, Elsevier, Chennai, 2000.
8. W. Kain and B. Schwederski, Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life; 2nd Ed., John-Wiley R Sons, New York, 2013.
9. T. Tang and P. Sheng (Eds), Nanoscience and Technology, Novel Structures and Phenomena; Taylor andFrancis, New York, 2003.
10. A. Nabok, Organic and Inorganic Nanostructures; Artech House, Boston, 2005.
11. E. A. Rietman, Molecular Engineering of Nanosystems; Springer-Verlag, New York, 2001.
12. Home page of Prof. Ned Seeman - http://seemanlab4.chem.nyu.edu/
13. Nanoletters - http://pubs.acs.org/journals/nalefd/index.html
14. Nanotation - http://www.acsnanotation.org/

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. Computer Science Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 12.06.2017

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Mathematical Foundation for Computer Science	6	4	3	25	75	100
	Core Course – II (CC)	Web Technologies	6	4	3	25	75	100
	Core Course – III (CC)	Design and Analysis of Algorithms	6	4	3	25	75	100
	Core Course – IV (CC)	Distributed Operating Systems	6	4	3	25	75	100
	Core Practical – I (CP)	Web Technologies Lab	6	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	OOAD & UML	6	5	3	25	75	100
	Core Course – VI (CC)	Distributed Technologies	6	5	3	25	75	100
	Core Practical – II (CP)	Distributed Technologies Lab	6	4	3	40	60	100
	Elective Course – I (EC)	Any one from the list	6	5	3	25	75	100
	Elective Course – II (EC)	Any one from the list	6	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII (CC)	Data Mining and Ware Housing	6	5	3	25	75	100
	Core Course – VIII (CC)	Compiler Design	6	5	3	25	75	100
	Core Practical – III (CP)	Data Mining Lab	6	4	3	40	60	100
	Elective Course – III (EC)	Any one from the list	6	5	3	25	75	100
	Elective Course – IV (EC)	Any one from the list	6	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – IX (CC)	Cloud Computing	6	5	3	25	75	100
	Core Course – X (CC)	Wireless Sensor Networks	6	5	3	25	75	100
	Core Practical - IV (CP)	Open Source Lab	6	4	3	40	60	100
	Elective Course – V (EC)	Any one from the list	6	4	3	25	75	100
	Project	Project	6	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

List of Elective Courses (For 2016 – 2017)

Elective I		Elective II	
1	Mobile Communication	1	Embedded Systems
2	Web Services	2	Artificial Intelligence
3	Human Computer Interaction	3	Pattern Recognition
Elective III		**Elective IV**	
1	Parallel Processing	1	Network Security
2	Advanced Computer Architecture	2	Computer Simulation and Modeling
3	Pervasive Computing	3	Soft Computing
Elective V			
1	Big Data Analytics		
2	MANET		
3	Digital Image Processing		

Note:

Project : 100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

Sl. No	Subject	Internal	External
1.	Theory	25 Marks	75 Marks
2.	Practical	40 Marks	60 Marks

Note:

1. Theory Internal 25 marks External 75 marks

2. Practical ” 40 marks ” 60 marks

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

Objective :

To learn the basis of the mathematical applications for developing the program.

Unit I

Propositions - evaluation - precedence rules -tautologies - reasoning using equivalence transformation - laws of equivalence - substitution rules - a natural deduction system. Deductive proofs - inference rules - proofs - sub proofs.

Unit II

Introduction - Cryptography – Ceaser Cyphor Coding - Matrix encoding - scrambled codes - Hamming metric - Hamming distance - Error detecting capability of an encoding.

Unit III

Assignment problem and its solution by Hungarian method. Project Scheduling by PERT - CPM: Phases of project scheduling - Arrow diagram - Critical path method - Probability and Cost Considerations in project scheduling - Crahing of Networks.

Unit IV

Testing of hypothesis : Tests based on normal population - Applications of chi-square, Student's-t, F-distributions - chi-square Test - goodness of fit - Test based on mean, means, variance, correlation and regression of coefficients.

Unit V

Graph - Directed and undirected graphs - Subgraphs - Chains, Circuits, Paths, Cycles - Connectivity - Relations to partial ordering - adjacency and incidence matrices - Minimal paths - Elements of transport network - Trees - Applications.

Text Books

1. "The Science of Programming", David Gries. Narosa Publishing House, New Delhi, 1993.
2. "Application Oriented Algebra", James L. Fisher, Dun Donnelly Publisher, 1977.
3. "Operation Research - An Introduction", Hamdy A.Taha, Macmillan Publishing Co., 4th Edn., 1987.
4. "Fundamentals of Mathematical Statistics", Gupta,S.C. and V.K.Kapoor, Sultan Chand & Sons, New Delhi, 8th Edn., 1983.
5. "Fundamentals of Applied Statistics", Gupta.S.C. and V.K.Kapoor, Sultan Chand & Sons, New Delhi, 2nd Edn., 1978.

References

1. "Discrete Mathematics", Seymour Lipschutz and Marc Laris Lipson, Second edition, Schuam's Outlines by Tata McGraw- Hill publishing Company Limited, New Delhi 1999.
2. "Operations Research", Kanti Swarup, P.K.Gupta and Man Mohan, Sultan Chand & Sons, New Delhi, 1994.
3. "Introductory Mathematical Statistics", Erwin Kryszig, John Wiley & Sons, New York, 1990.
4. "Probability and Statistics Engineering and Computer Science", Milton, J.S. and J.C.Arnold, McGraw Hill, New Delhi, 1986.

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CORE COURSE II

WEB TECHNOLOGIES

Objectives :

To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to developing professional software development skills.

UNIT I

Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol – The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.

UNIT II

JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking – Functions – Placing text in a browser – Dialog Boxes – Form object's methods – Built in objects – user defined objects.

UNIT III

XML: Comparison with HTML – DTD – XML elements – Content creation – Attributes –Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces – Applications – integrating XML with other applications.

UNIT IV

JSP Fundamentals: Basics – Directive basics – Page directive – The taglib directive – The include directive – JSP Standard Actions – Java Beans – Error Handling.

UNIT V

ASP: Introduction to ASP – Objects – Components – Working with HTML forms – Connecting to Microsoft SQL Server & MS–Access Database – SQL statements with connection object – Working with record sets.

Text Books

1. "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", Ivan Bayross, BPB Publication. **UNIT I & II**
2. "XML Bible", Elliotte Rusty Harold, 2nd Edition, Wrox Publication. **UNIT III**
3. "Beginning Java Server Pages", Vivek Chopra, Sing Li, Rupert Jones, Jon Eaves, John T. Bell, Wrox Publications. **UNIT IV**
4. "Practical ASP", Ivan Bayross, BPB Publication. **UNIT V**

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CORE COURSE III

DESIGN AND ANALYSIS OF ALGORITHMS

Objectives :

To study the concepts of algorithms and analysis of algorithms using divide and conquer, greedy method, dynamic programming, backtracking, and branch and bound techniques

UNIT I

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis. Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs

UNIT II

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding The Maximum And Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

UNIT III

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT IV

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNIT V

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: The Method - 0/1 Knapsack Problem.

Text Book

Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint 2009.

References

1. Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI
2. Data structures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
3. Introduction to design and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem- TMH

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CORE COURSE IV

DISTRIBUTED OPERATING SYSTEMS

Objectives :

To study the concepts of distributed computing systems and cryptography.

Unit I

Fundamentals: What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment. Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology

Unit II

Message Passing: Introduction – Desirable features – Issues in PC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication

Unit III

Distributed Shard Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory –Replacement Strategy – Thrasing –Heterogeneous DSM – Advantages Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm

Unit IV

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

Unit V

Security: Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles

Text Book :

Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003.

References:

Distributed Operating Systems 1e, Andrew S Tanenbaum, PHI.

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CORE PRACTICAL I

WEB TECHNOLOGIES LAB

Objectives :

To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to Developing professional software development skills.

1. Write a XML program for job listing in HTML.
2. Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to upper case.
3. Write a JavaScript code block, which validates a username and password.
   a) If either the name or password field is not entered display an error message.
   b) The fields are entered do not match with default values display an error message.
   c) If the fields entered match, display the welcome message.
4. Write a JavaScript code to display the current date and time in a browser.
5. Write a JSP Program for user authentication.
6. Write a JSP Program for a simple shopping cart.
7. Write a JSP Program to prepare a bio data and store it in database.
8. Write an ASP Program using Response and Request Object.
9. Write an ASP Program using AdRotator Component.
10. Write an ASP program using database connectivity for student's record.

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CORE COURSE V

OOAD & UML

Objective :

To give a detailed knowledge on Structured approach to system construction, Various object oriented methodologies, Object oriented analysis, Object oriented design and UML examples.

Unit I

Structured approach to system construction : SSADM/SADT - An overview of object oriented systems development & Life cycle

Unit II

Various object oriented methodologies – Introduction to UML

Unit III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

Unit IV

Object oriented design – Design axioms – Designing classes – Layering the software design :- data access layer, User interface layer, Control/business logic layer

Unit V

UML - Examples on :Behavioral models – Structural models – Architectural models from real world problems.

TEXT BOOK:

1. **Bahrami Ali**, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. **Booch Grady, Rumbaugh James, Jacobson Ivar**, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (Unit: -5 covered here).

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CORE COURSE VI

DISTRIBUTED TECHNOLOGIES

Objectives :

This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed operating system concepts are covered.

Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies.

Unit II

Advanced ADO, NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO, NET in Distributed Applications.

Unit III

Advanced ASP, NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development.

Unit IV

Advanced features of ASP.NET – Security in ASP, NET – State Management in ASP, NET – Mobile Application development in ASP, NET – Critical usage of these features in Website development.

Unit V

Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through n ASP, NET application.

Text Book

1. Walther, ASP, NET 3.5, SAMS Publication, 2005.

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CORE PRACTICAL II

DISTRIBUTED TECHNOLOGIES LAB

Objectives :

To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to developing professional software development skills

1. Create a table and insert a few records using Disconnected Access.
2. Develop a project to update and delete few records using Disconnected Access.
3. Develop a project to view the records using GridView, DetailsView, FormView Controls.
4. Develop a project to generate a crystal report from an existing database.
5. Design a web page that makes uses of Ad Rotator Control.
6. Design a web page involving Multi View or Wizard Control.
7. Make use of Image Control involving two hot spots in a web page.
8. Design a simple web site that makes use of Master Pages.
9. Establish the security features in a simple web site with five pages.
10. Use state management concepts in a mobile web application.
11. Develop a web service that has an ASP.NET client.
12. Develop a web service to fetch a data from a table and send it across to the client.

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CORE COURSE VII

DATA MINING AND WARE HOUSING

Objective :

On successful completion of the course the students should have: Understood data mining techniques- Concepts and design of data warehousing**.**

UNIT I

Introduction – What is Data mining – Data Warehouses – Data Mining Functionalities – Basic Data mining tasks – Data Mining Issues – Social Implications of Data Mining– Applications and Trends in Data Mining.

UNIT II

Data Preprocessing : Why preprocess the Data ? –Data Cleaning - Data Integration and Transformation – Data Reduction – Data cube Aggregation – Attribute Subset Selection Classification: Introduction – statistical based algorithms – Bayesian Classification. Distance based algorithms – decision tree based algorithms – ID3.

UNIT III

Clustering: Introduction - Hierarchical algorithms – Partitional algorithms – Minimum spanning tree – K-Means Clustering - Nearest Neighbour algorithm. Association Rules: What is an association rule? – Methods to discover an association rule–APRIORI algorithm – Partitioning algorithm .

UNIT IV

Data Warehousing: An introduction – characteristics of a data warehouse – Data marts – other aspects of data mart .Online analytical processing: OLTP & OLAP systems.

UNIT V

Developing a data warehouse : Why and how to build a data warehouse – Data warehouse architectural strategies and organizational issues – Design consideration – Data content – meta data – distribution of data – tools for data warehousing – Performance considerations

TEXT BOOKS

1. Jiawei Han and Miceline Kamber , “Data Mining Concepts and Techniques “ , Morgan Kaulmann Publishers, 2006. (Unit I – Chapter 1 -1.2, 1.4 , Chapter 11-11.1) (Unit II – Chapter 2 - 2.1,2.3, 2.4, 2.5.1,2.5.2)
2. Margaret H Dunham , “Data mining Introductory & Advanced Topics”, Pearson Education , 2003.(Unit I – Chapter 1 -1.1 , 1.3, 1.5) , (UNIT II – Chapter 4 – 4.1, 4.2, 4.3, 4.4) (UNIT III – Chapter 5 – 5.1,5.4, 5.5.1, 5.5.3,5.5.4, Chapter 6 – 6.1,6.3.
3. C.S.R.Prabhu, “Data Warehousing concepts, techniques, products & applications”, PHI, Second Edition.) (UNIT IV & V)

REFERENCES:

1. Pieter Adriaans, Dolf Zantinge, “Data Mining” Pearson Education, 1998.
2. Arun K Pujari, “Data Mining Techniques”,Universities Press(India) Pvt, 2003.
3. S.Rajashekharan, G A Vijaylakshmi Bhai,”Neural Networks,Fuzzy Logic,and Genetic Algorithms synthesis and Application”, PHI
4. Margaret H.Dunham,” Data Mining Introductory and Advanced topics”,Pearson Eductaionn 2003.

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CORE COURSE VIII

COMPILER DESIGN

OBJECTIVES :

On successful completion of the subject the students should have Understood the different phases of compiler and needs of the compiler.

UNIT I

Introduction to compilers – Analysis of source program – Phase of compiler – Cousins of compilers – Grouping of phases – Simple one pass compiler: overview – Syntax definition Lexical analysis: removal of white space and comments – Constants – Recognizing identifiers and keywords – Lexical analysis – Role of a lexical analyzer – Input buffering –Specification of tokens – Recognition tokens.

UNIT II

Symbol tables: Symbol table entries – List data structures for symbol table – - Hash tables – Representation of scope information – Syntax Analysis: Role of parser – Context free grammar – Writing a grammar – Top down parsing – Simple bottom up parsing – Shift reducing parsing.

UNIT III

Syntax directed definition: Construction of syntax trees – Bottom up evaluation of S-Attributed definition – L-Attributed definitions – Top down translation - Type checking: Type systems – Specifications of simple type checker.

UNIT IV

Run-time environment: Source language issues – Storage organizations – Storage allocation strategies - Intermediate code generation: Intermediate languages – Declarations – Assignment statements.

UNIT V

Code generation: Issue in design of code generator – The target machine – Runtime storage management – Basic clocks and flow graphs - Code optimization: Introduction – Principle source of code optimization – Optimization of basic blocks

Text Books:

1. AHO, ULLMAN, "**COMPILERS, PRINCIPLES AND TECHNIQUES AND TOOLS",** PEARSON EDUCATION – 2001 6TH EDITION.

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CORE PRACTICAL - III

DATA MINING LAB

Objective : To get hands on experience in developing applications using data mining tool.

Practical	Practical List
Exercise 1	Preprocessing a. Datatype Conversion b. Data Transformation
Exercise 2	Filters- **Practical** a. Replace Missing Values b. Add Expression
.	Feature Selection Select Attributes- **Practical** a. Filter b. Wrapper c. Dimensionality Reduction
Exercise 4	Supervised Technique Classifier - Function - **Practical** a. Multilayer Perceptron Tree - **Practical**J48
Exercise 5	Classifier- Bayes –**Practical** a. Naive Bayes Rule- **Practical** b. ZeroR
Exercise 6	Unsupervised Techniques Clustering- Theory Partitioned – Algorithm – Practical Hierarchical Algorithm – Practical Semi Supervised Algorithm – Practical
Exercise 7	Association Rule Mining A-Priori –Algorithm –Practical Predictive A-Priori –Practical
Exercise 8	Experimenter Dataset – Test – Practical Algorithm based –Test –Practical
Exercise 9	Knowledge Flow Feature Selection – Practical Clustering –Practical
Exercise 10	Knowledge Flow Classification – Practical

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CORE COURSE IX

CLOUD COMPUTING

Objective:

To provide understanding on concepts & technologies associated with Cloud Computing.

UNIT I FOUNDATIONS : Introduction to Cloud Computing :

Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and types of Clouds – Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks – Migrating into a Cloud: - Introduction – Broad Approaches – The Seven step model – Enriching the 'Integration as a Services' Paradigm for the Cloud Era: - Introduction – The Evolution of SaaS – The Challenges of SaaS Paradigm – Approaching the SaaS Integration Enigma – New Integration Scenarios – The Integration Methodologies – SaaS Integration Services – The Enterprise Cloud Computing Paradigm: - Introduction – Background – Issues – Transition Challenges – The Cloud Supply Chain.

UNIT II INFRASTRUCTURE AS A SERVICE : Virtual Machine Provisioning and Migration Services:

Introduction – Background – Manageability – Migration Services – Management of Virtual Machines for Cloud Infrastructures: - Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – Enhancing Cloud Computing Environments Using a Cluster as a Service: - Introduction – Related Work – RVWS Design – The Logical Design – Secure Distributed Data Storage in Cloud Computing: - Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security – Challenges.

UNIT III PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) Aneka Integration of Private and Public Clouds :

Introduction– Technologies and Tools – Aneka Cloud Platform - Aneka Resource Provisioning Service – Hybrid Cloud Implementation – CometCloud: An Autonomic Cloud Engine: - Introduction – CometCloud – Architecture – Autonomic Behavior of CometCloud – Overview of CometCloud-based Applications – Implementation and Evaluation

UNIT IV PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) TSystems Cloud-based Solutions for Business Applications:

Introduction – Enterprise Demand of Cloud Computing – Dynamic ICT Service – Importance of Quality and Security in Clouds – Dynamic Data CentreProducing Business-ready; Dynamic ICT Services – The MapReduce Programming Model and Implementations: - Introduction – MapReduce Programming Model – MapReduce implementations for the Cloud.

UNIT V MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing

Introduction – A typical Usecase – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – Service Providers Perspective of SLA Management in Cloud Computing: - Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA – SLA Management in Cloud –Automated Policy-based Management – Performance Prediction for HPC on Clouds: - Introduction – Background – Grid and Cloud – Performance related issues of HPC in the Cloud.

Text Book:

Rajkumar Buyya, James Broberg, Andrzej Goscinsky, "Cloud Computing Principles and Paradigms", Wiley India Pvt. Ltd., 2011.

Reference Books:

1. Barrie Sosinsky, "Cloud Computing Bible", 1st Edition, Wiley India Pvt. Ltd., New Delhi, 2011.
2. Michael Miller, "Cloud Computing", 1st Edition, Pearson Education Inc., New Delhi, 2008.

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CORE COURSE X

WIRELESS SENSOR NETWORKS

Objective:

On Successful completion of the course the students should have understanding wireless sensor nodes, networks and tools.

UNIT I OVERVIEW OF WIRELESS SENSOR NETWORKS:

Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.

UNIT II ARCHITECTURES :

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT III NETWORKING SENSORS :

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols-Energy-Efficient Routing, Geographic Routing.

UNIT IV INFRASTRUCTURE ESTABLISHMENT:

Topology Control, Clustering, Time synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS:

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

TEXT BOOKS

1. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks" , John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks-Technology, Protocols, And Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

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CORE PRACTICAL IV

OPEN SOURCE LAB

Objectives:

To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to developing professional software development skills.

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a mysql table.
4. Write a PHP program interface to create a database and to insert a table into it.
   i). Write a PHP program using classes to create a table.
   ii). Write a PHP program to upload a file to the server.

5. Write a PHP program to create a directory, and to read contents from the directory.
6. Write a shell program to find the details of an user session.
7. Write a shell program to change the extension of a given file.
8. Create a mysql table and execute queries to read, add, remove and modify a record from that table.

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Project Work

Objective:

The student can get the knowledge to prepare the document , to implement tools for the specific problem and learn the industrial need programs for their placement .

PROJECT WORK

SL	Area of Work	Maximum marks
1.	PROJECT WORK: (i) Plan of the Project	20
	(ii) Execution of the plan / Collection of data /Organization of materials/ Fabrication Experimental study / Hypothesis, Testing etc., and Presentation of the report.	45
	(iii) Individual Initiative	15
2.	VIVA VOCE EXAMINATION	20
	TOTAL	100

Note : PASSING MINIMUM – 50 MARKS

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ELECTIVE COURSE I

1.1 MOBILE COMMUNICATION

Objective :

On successful completion of this subject, the students should have understood Wireless networks WAP architecture

Unit I

Introduction: Applications-Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Telecommunications System: Telecommunication System– GSM – Architecture – Protocols – Hand over - Security – UMTS and IMT 2000 – UMTS System Architecture-UTRAN-Core Network-Handover- Satellite System

Unit III

Wireless LAN : IEEE S02.11 –System Architecture- Protocol Architecture-Medium Access Control Layer-MAC Frame-MAC Management—Roaming-Bluetooth:Architecture-Link Manager Protocol- Security -and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless ApplicationProtocol (WAP) – Architecture – XML – WML Script – Applications

Text Books

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

References

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

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ELECTIVE COURSE I

1.2 WEB SERVICES

OBJECTIVES:

On successful completion of this subject student should have: understood how to build real world application using web services

Unit I

Introduction-What are web services-SOAP-WSDL-UDDI Basic web services standards, technologies and concepts: XML fundamentals: Documents-Namespaces-schema-processing XML-Simple API for XML(SAX)-Document object model(DOM)

Unit II

SOAP and WSDL: The SOAP model-SOAP messages-SOAP encoding WSDL: Structure-The types element-Managing WSDL descriptions-Using SOAP and WSDL Service implementation and Invoking web services.

Unit III

UDDI: Introduction- UDDI specification - UDDI and lifecycle management. Conversation: Overview-web services conversation language-WSCL interface components.

Workflow: Business process management-workflows and workflow management. Quality of Service: What is QoS- Why is QoS important for web services- QoS metrics for web services-QoS enabled web services. Mobile and Wireless mobile services- challenges with mobile.

Unit IV XML and HTML:

The limits of HTML-The scope of HTML-Structure-Structure and Content-Structure and Synthesis-Structure and Presentation-Representing Structure. **The XML Language**: Markup languages-Defining Markup Languages in XML.

Unit V Linking in XML:

Links(Information, Resources, and Hot Spots)-Link Management-Working with names-Choosing the linking methodology. **XML Style**: The publishing Process-At which stage do I structure my data?-Where do I process from one stage to the next?-When do I Convert?-Publishing data-Choosing a Client-side processing Application-Choosing a Server-side processing application

Text Book:

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services: An Architects Guide", Prentice Hall, Nov 2003
   Unit I : Chapter 1 (Pg. 1 to 8), Chapter 2 (Pg.19 to 64)
   Unit II : Chapter 3 (Pg. 71 to 86 , 100 – 119)
   Unit III: Chapter 4 (Pg. 121 to 122, Pg. 129 , Pg. 137 to 139), Chapter 5 (Pg. 147-166)
   Chapter 6 (Pg. 177-183), Chapter 9 (Pg. 345– 350, Pg. 364-368) Chapter 10 (Pg. 377-387)
2. Rick Darnell "HTML 4 Unleashed" Techmedia Publication, Second Edition,
   Unit IV: Chapter 27 (Pg. 564-591), Chapter 28 (Pg. 606-626)
   Unit V: Chapter 29 (Pg. 636-649,660-661) Chapter 30 (Pg. 664-670,672-674)

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ELECTIVE COURSE I

1.3 HUMAN COMPUTER INTERACTION

Objective:

To impart knowledge related to the various concepts, methods of Human Computer Interaction techniques with design basics, design rules and evaluation techniques

Unit I The Interaction

Introduction – Models of interaction – Frameworks and HCI Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interactions. Paradigms : Introduction – Paradigms for interaction.

Unit II Interaction, Design basics

Introduction – What is design? – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping. HCL in the Software Process : Introduction – The software lifecycle – Usability engineering – interactive design and prototyping – Design rationate.

Unit III Design Rules

Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns. Implementation Support : Introduction – Elements of windowing systems – Programming the application Using toolkits – User interface management systems.

Unit IV Evaluation Techniques

What is evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method. Universal Design : Introduction – Universal design principles – Multi-modal interaction – Designing for diversity – Summary.

Unit V User Support

Introduction Requirements of user support – Approaches to; user support – Adaptive help systems designing user support systems.

Text Book :

1. Human - Computer Interaction, Third Edition, “Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale”, Pearson Education, 2004.

Reference Book :

1. Human – Computer Interaction in the New Millennium, “John C. Carroll”, Pearson Education” 2002.

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ELECTIVE COURSE II

2.1: EMBEDDED SYSTEMS

Objectives:

To provide fundamental concept of Embedded systems and real time operating systems.

UNIT I

Introduction to Embedded systems – processor in the system – software embedded into a system – structural units in a processor – processor, memory selection, Memory devices - Allocation of memory to program segments and blocks and memory map of a system.

UNIT II

Device drivers – Interrupt servicing mechanisms – context and periods for context switching - Programming concepts and Embedded programming in C and C++: Software programming in ALP and in high level language 'C' – 'C' program elements: Header source files and preprocessor directives – Macros and functions: Data types – data structures – modifiers – statements – loops and pointers – Embedded programming in C++ and Java.

UNIT III

Program modeling concepts in single and multiprocessor systems – software – development process: modeling process for software analysis – programming model for event controlled or response time constrained real time program- modeling of multiprocessor systems. Multiple processes – sharing data by multiple tasks and routines – inter process communications.

UNIT IV

Real time operating systems: OS services – IO sub systems – Real time and embedded operating systems – Interrupt routines in RTOS environment – RTOS task scheduling models, Interrupt latency and response times of the task as performance metrics – performance metrics in scheduling models.

UNIT V

Hardware Software code design: Embedded system project management – Embedded system design and Co-design Issues – Design Cycle – uses of target system – use of software tools for development – use of scopes and logic analysers for system hardware tests – issues in embedded system design.

Text Books:

1. Embedded systems – Architecture, Programming and Design By Raj Kamal – TMH, 2007.

REFERENCE:

1. Mohamed Ali Maszidi & Janice Gillispie Maszidi, "The 8051 Microcontroller and Embedded System", Pearson Publishers

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ELECTIVE COURSE II

2.2 ARTIFICIAL INTELLIGENCE

Objective:

On Successful completion of the course the students should have: understood the AI & Expert Systems.- Learnt the Heuristic techniques and reasoning

UNIT I

Introduction: AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems

UNIT II

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First - Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

UNIT III

Using Predicate logic: Representing simple facts in logic - Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

UNIT IV

Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT V

Game playing – The minimax search procedure – Expert System - Perception and Action

TEXT BOOKS

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.
   Unit1: Chapter 1(1.1,1.3.1.5), Chapter 2(2.1,2.2)
   Unit2: Chapter 3(3.1,3.2,3.3,3.6), Chapter 4(4.1,4.2,4.3,4.4).
   Unit3: Chapter 5(5.1,5.2,5.3,5.4).
   Unit4: Chapter 6.
   Unit5: Chapter 12(12.1,12.2),Chapter 20 and Chapter 21.

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ELECTIVE COURSE II

2.3 PATTERN RECOGNITION

Objective:

1. To understand Fuzzy Pattern Classifiers and Perception.
2. To explore different classification models.
3. To study about feature extraction and structural pattern recognition.
4. To know about Supervised and unsupervised Learning.

UNIT I PATTERN CLASSIFIER

Overview of Pattern recognition – Discriminant functions – Supervised learning – Parametric estimation – Maximum Likelihood Estimation – Bayesian parameter Estimation – Problems with Bayes approach– Pattern classification by distance functions – Minimum distance pattern classifier.

UNIT II CLUSTERING :

Clustering for unsupervised learning and classification – Clustering concept – C Means algorithm – Hierarchical clustering – Graph theoretic approach to pattern Clustering – Validity of Clusters.

UINT III FEATURE EXTRACTION AND STRUCTURAL PATTERN RECOGNITION 9 KL

Transforms – Feature selection through functional approximation – Binary selection -Elements of formal grammars - Syntactic description - Stochastic grammars - Structural representation.

UNIT IV HIDDEN MARKOV MODELS AND SUPPORT VECTOR MACHINE 9

State Machines – Hidden Markov Models – Training-classification-support vector machine-Feature selection.

UNIT V RECENT ADVANCES 9

Fuzzy logic – Fuzzy Pattern Classifiers – Pattern Classification using Genetic Algorithms – Case Study Using Fuzzy Pattern Classifiers and Perception.

REFERENCES:

1. M. Narasimha Murthy and V. Susheela Devi, “Pattern Recognition”, Springer 2011.
2. S.Theodoridis and K.Koutroumbas, “Pattern Recognition”, 4th Ed., Academic Press, 2009.
3. Robert J.Schalkoff, “Pattern Recognition Statistical, Structural and Neural Approaches”, John Wiley & Sons Inc., New York, 1992.
4. C.M.Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.
5. R.O.Duda, P.E.Hart and D.G.Stork, “Pattern Classification”, John Wiley, 2001
6. Andrew Webb, “Stastical Pattern Recognition”, Arnold publishers, London, 1999.

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ELECTIVE COURSE III

3.1 PARALLEL PROCESSING

Objective:

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

UNIT I

Introduction to Parallel Processing – Evolution of Computer Systems – Parallelism in Uniprocessor Systems – Parallel Computer Structures – Architectural Classification Schemes– Parallel Processing Applications.

UNIT II

Memory and Input-Output Subsystems – #Hierarchical Memory Structure# – Virtual Memory System – Memory Allocation and Management – Cache Memories and Management – Input-Output Subsystems.

UNIT III

Principles of Pipelining and Vector Processing – Pipelining : An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipelined Processors – Vector Processing Requirements.

UNIT IV

Vectorization and Optimization methods – Parallel Languages for Vector Processing – Design of Vectorizing Compiler – Optimization of Vector Functions – SIMD Array Processors – SIMD Interconnection Networks

UNIT V

Multiprocessors Architecture and Programming – Functional Structures – Interconnection Networks - Parallel Memory Organizations – Multiprocessor Operating Systems – Language Features to Exploit Parallelism – Multiprocessor Scheduling Strategies.

Text Book:

Kai Hwang and Faye A. Briggs,Computer Architecture and Parallel Processing,McGraw Hill International Edition, 1985. [Chapters : 1, 2, 3, 4.5.1 – 4.5.3, 5.1, 5.2, 5.4, 6.3, 7.1, 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.3.3, 7.4, 7.5.1, 8.3]

UNIT I Chapter 1 Section 1.1 – 1.5
UNIT II Chapter 2 Sections 2.1 – 2.5
UNIT III Chapter 3 Sections 3.1 – 3.4
UNIT IV Chapter 4 Sections 4.5 , Chapter 5 Sections 5.1 ,5.2 , 5.4
UNIT V Chapter 7 7.1 – 7.4, 7.5-7.5.1, Chapter 8 Sections 8.3

Books for Reference:

1. Richard Kain, Advanced Computer Architecture, PHI, 1999.
2. V. Rajaraman and C. Siva Ram Murthy, Parallel Computers, Architecture and Programming, PHI, 2000.

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ELECTIVE COURSE III

3.2 ADVANCED COMPUTER ARCHITECTURE

Objectives:

To study the advanced computer Architecture, theories of parallel computing, network properties and applications of cost effective computer systems to meet the above requirements.

UNIT I

Parallel computer models :- The state of computing - Multiprocessors and multicomputers – Multivector and SIMD computers.

UNIT II

Program and Network properties:- Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

UNIT III

Processors and memory hierarchy :- Advanced processor Technology – Super scalar and vector processors – Linear Pipeline Processors – Nonlinear pipeline Processors.

UNIT IV

Multiprocessors and Multicomputers:- Multiprocessor System nterconnects – Message Passing Mechanisms – SIMD Computer Organizations – The Connection Machine CM 5 – Fine-Grain Multicomputers.

UNIT V

Software for Parallel Programming:- Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Text Book

1. Kai Hwang, “Advanced Computer Architecture “McGraw-Hill International Edn., Singapore , 1993. Chapters 1.1-1.3, 2, 4.1, 4.2, 6.2, 7.1, 7.4, 8 4, 8.5, 10.1, 10.2, 10.3

Reference Books:

1. Kai Hwang and Faye A.Briggs, “Computer Architecture and Parallel Processing”, McGraw- Hill International Editions, Singapore , 1985.
2. Michael J.Quinn, “Parallel Computing, Theory and Practice”, McGraw-Hill International Edn., Singapore , 1994.

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ELECTIVE COURSE III

3.3. PERVASIVE COMPUTING

Objective: :

On successful completion of the course the students should have: Understand the concept of web applications and WAP fundamentals. Learn the PDA.

Unit I

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

Unit II

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

Unit III

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

Unit IV

WAP and Beyond: Components of the WAP architecture – WAP infrastructure – WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

Unit V

PDA: Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

Text Book:

Pervasive Computing, Technology and Architecture of Mobile Internet Applications, JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006.

Reference Book:

Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

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ELECTIVE COURSE IV

4.1 NETWORK SECURITY

Objective:

To impart knowledge related to the various concepts, methods of Network Security using cryptography basics, program security, database security, and security in networks.

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book:

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003 **ISBN:** 8178089025

References:

1. Johannes A. Buchaman, Introduction to cryptography, Springer-Verlag 2000.
2. AtulKahate, Cryptography and Network Security, Tata McGraw Hill. 2007

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ELECTIVE COURSE IV

4.2 COMPUTER SIMULATION AND MODELING

Objective :

To impart knowledge in real time modeling process and the simulation of any system using the real time mode

Unit I :

Introduction to Simulation: When Simulation is the Appropriate Tool- When Simulation is not Appropriate- Advantages and Disadvantages of Simulation- Areas of Application- Systems and System Environment- Components of a System- Discrete and Continuous Systems- Model of aSystem- Types of Models- Discrete-Event System Simulation –Steps in a simulation study.Simulation Examples: Simulation of Queuing Systems, Simulation of Inventory Systems.

Unit II :

Simulation Software: History of Simulation Software- Selection of Simulation Software- Simulation in JAVA, Simulation in GPSS, Simulation in SSF- Simulation software – Experimentation and Statistical and analysis tools .

Unit III :

Statistical Models in Simulation: Review of Terminology and Concepts- Useful Statistical Models- Discrete Distributions- Continuous Distributions- Poisson process. Queuing models- Characteristics of queuing systems.

Unit IV :

Random-Number Generation: Properties of Random Numbers-Generation of Pseudo- Random Numbers-Techniques for Generating Random Numbers-Linear congruential Method- Random number streams -Tests for random numbers-Frequency tests - Test for Autocorrelation.Random-Variate Generation: Inverse Transform Technique-Exponential Distribution-Uniform Distribution- Weibull Distribution.

Unit V :

Input Modeling: Data Collection - Identifying the Distribution with Data- parameter estimation- goodness of fit tests. Verification and Validation of Simulation Models: Model Building, Verification, and Validation-Verification of Simulation Models-Calibration and Validation of Models.

Text Book:

1. Jerry Banks, John S. Carson, II Barry L. Nelson., *Discrete-Event System Simulation*, FourthEdition, PHI Edition, 2009.
   Unit:I :Chapter 1 Sections (1.1-1.11), Chapter 2 Sections (2.1, 2.2)
   Unit:II :Chapter 4 Sections (4.1, 4.2, 4.4-4.7)
   Unit:III :Chapter 5 Sections (5.1-5.5), Chapter 6 Sections (6.1)
   Unit:IV :Chapter 7 Sections (7.1, 7.2, 7.3.1, 7.3.3, 7.4), Chapter 8 Sections (8.1.1-8.1.3)
   Unit:V :Chapter 9 Sections (9.1-9.4), Chapter 10 Sections (10.1-10.3)

Book for Reference:

E.Winsberg, Science in the age of computer simulation, Chicago: University Press, 2010.

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ELECTIVE COURSE IV

4.3 SOFT COMPUTING

Objective:

To impart knowledge in Fuzzy Set Theory, Optimization, Neural Networks, Nero Fuzzy Modeling and Application Of Computational Intelligence

Unit I FUZZY SET THEORY :

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

Unit II OPTIMIZATION :

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

Unit III NEURAL NETWORKS:

Supervised Learning Neural Networks – Perceptrons – AdalineBackpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

Unit IV NEURO FUZZY MODELING:

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

Unit V APPLICATION OF COMPUTATIONAL INTELLIGENCE:

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J.S.R. Jang, C.T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, 2004.

REFERENCE BOOK

1. Timothy J. Ross, "Fuzzy Logic with Engineering Application, "McGraw Hill, 1977.
2. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and Machine Learning", Addision Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, "Grid Computing - A Practical Guide to technology and Applications", Charles River media, 2003.

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ELECTIVE COURSE V

5.1 BIG DATA ANALYTICS

Objective:

To impart knowledge in Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals

Unit I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

Unit II

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

Unit III

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

Unit IV

Hadoop foundation for analytics: History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

Unit V

HadoopMapReduce and YARN framework: Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats

Text Book

Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016

Reference Books

1. 1.“Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. 2.“Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013
3. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
4. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

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ELECTIVE COURSE V

5.2 MANET

Objective:

This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed operating system concepts are covered

UNIT I INTRODUCTION :

Introduction to adhoc networks – definition, characteristics features, applications. Charectristics of Wireless channel, Adhoc Mobility Models:- Indoor and out door models. Ad hoc Wireless Networks – What is an Ad Hoc Network? Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet.

UNIT II AD HOC ROUTING PROTOCOLS :

Introduction – Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols – Table–Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source–Initiated On–Demand Approaches – Ad hoc On–Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) –Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) –Location–Aided Routing (LAR) – Power–Aware Routing (PAR) – Zone Routing Protocol (ZRP).

UNIT III MULTICASTROUTING IN ADHOC NETWORKS :

Introduction – Issues in Designing a Multicast Routing Protocol – Operation of Multicast Routing Protocols – An Architecture Reference Model for Multicast Routing Protocols –Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing – Comparisons of Multicast Routing Protocols

UNIT IV END-END DELIVERY AND SECURITY :

Transport layer : Issues in desiging- Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.

UNIT V CROSS LAYER DESIGN AND INTEGRATION OF ADHOC FOR 4G

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary prespective. Intergration of adhoc with Mobile IP networks.

TEXT BOOKS

1. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd eition, Pearson Education. 2007.
2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000

REFERENCES

1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobilead hoc networking, Wiley-IEEE press, 2004.
2. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.
3. T. Camp, J. Boleng, and V. Davies "A Survey of Mobility Models for Ad Hoc Network"
4. C. K. Toh, "Ad Hoc Mobile Wireless Networks Protocols and Systems", Prentice Hall, PTR, 2001.
5. Charles E.Perkins,"Ad Hoc Networking", Addison Wesley, 2000

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ELECTIVE COURSE V

5.3 DIGITAL IMAGE PROCESSING

Objective:

To study the various concepts, methods and algorithms of digital image processing with image transformation, image enhancement, image restoration, image compression techniques

Unit I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS :

Light, Luminance,Brightness and Contrast, Eye, The Monochrome Vision Model, ImageProcessing Problems and Applications, Vision Camera, Digital ProcessingSystem, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd MaxQuantizer, Dither, Color Images, Linear Systems And Shift Invariance, FourierTransform, ZTransform, Matrix Theory Results, Block Matrices and KroneckerProducts.

Unit II IMAGE TRANSFORMS :

2-D orthogonal and Unitary transforms, 1-D and 2-DDFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, Singularvalue Decomposition transforms.

Unit III IMAGE ENHANCEMENT :

Point operations - contrast stretching, clipping andthresholding density slicing, Histogram equalization, modification andspecification, spatial operations - spatial averaging, low pass, high pass, bandpass filtering, direction smoothing, medium filtering, generalized cepstrum andhomomorphic filtering, edge enhancement using 2-D IIR and FIR filters, colorimage enhancement.

Unit IV IMAGE RESTORATION :

Image observation models, sources of degradation,inverse and Wiener filtering, geometric mean filter, non linear filters, smoothingsplines and interpolation, constrained least squares restoration.

Unit V IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS:

Image data rates, pixel coding, predictive techniques transformcoding and vector DPCM, Block truncation coding, wavelet transform coding ofimages, color image coding. Random transform, back projection operator,inverse random transform, back projection algorithm, fan beam and algebraicrestoration techniques.

Book for study :

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 1995.
2. Sid Ahmed M.A., “Image Processing”, McGraw Hill Inc, 1995.
3. Gonzalaz R. and Wintz P., “Digital Image Processing”, Addison Wesley, 2nd Ed, 1987.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. ELECTRONICS Course Structure under CBCS
(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 31.08.2018

Sem	Course	Title	Inst. Hours/ Week	Credit	Exam Hours	Marks Internal	Marks External	Total
I	Core Course–I (CC)	Design of Analog circuits	6	4	3	25	75	100
	Core Course–II (CC)	Design of Digital Circuits	6	4	3	25	75	100
	Core Course–III (CC)	Signals and Systems	5	4	3	25	75	100
	Core Course–IV(CC)	VLSI Design and VHDL Programming	5	4	3	25	75	100
	Core Practical – I (CP)	Electronics I(P)	8	4	4	40	60	100
	Total		**30**	**20**				**500**
II	Core Course–V (CC)	Microcontroller 8051 and IDE	6	5	3	25	75	100
	Core Course–VI (CC)	Electromagnetic Theory	6	5	3	25	75	100
	Core Practical – II (CP)	Electronics II (P)	8	4	4	40	60	100
	Elective Course–I (EC)	Optoelectronics/Medical Electronics	5	5	3	25	75	100
	Elective Course–II (EC)	Digital communication/ Embedded Linux With RTOS	5	5	3	25	75	100
	Total		**30**	**24**				**500**
III	Core Course–VII (CC)	Microcontroller PIC and MPLab	6	5	3	25	75	100
	Core Course–VIII (CC)	Digital Signal Processor	6	5	3	25	75	100
	Core Practical – III (CP)	Electronics III (P)	8	4	4	40	60	100
	Elective Course–III (EC)	Microcontroller ATMEGA and IDE/Wireless Communication	5	5	3	25	75	100
	Elective Course–IV (EC)	Mobile Communication/ CAD and PCB Design	5	5	3	25	75	100
	Total		**30**	**24**				**500**
IV	Core Course–IX (CC)	ASIC and FPGA Design	5	5	3	25	75	100
	Core Course–X (CC)	Programmable Digital Signal Processor	5	5	3	25	75	100
	Core Practical – IV (CP)	Electronics IV (P)	8	4	4	40	60	100
	Elective Course–V (EC)	Memsand Nano Electronics/ Programmable Logic Controller and SCADA	5	4	3	25	75	100
	Project		7	4	3	25	75	100
	Total		**30**	**22**				**500**
	Grand Total		**120**	**90**				**2000**

Core Paper	-	10
Core Practical	-	4
Elective	-	5
Project	-	1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

DESIGN OF ANALOG CIRCUITS

OBJECTIVE

To learn the designing concepts of Analog circuits.

UNIT I TRANSISTORS

Introduction to semiconductors-Transistor construction-Transistor operation common base configuration-Common emitter configuration-Common collector configuration-Comparison of configuration-Voltage divider bias-Eber's Moll model of transistor-H parameters: meaning of H parameters-Analysis formulas-CE analysis-Miller effect capacitance-High frequency response BJT amplifier.

UNIT II JFET AND MOSFET JFET:

Structure-Biasing-Drain curve-Transconductance curve-MOSFET: depletion type MOSFET-Biasing depletion type-Applications of depletion type-Enhancement type MOSFET-Biasing enhancement type-Applications of enhancement-VMOS.

UNIT III OPERATIONAL AMPLIFIERS

Introduction-Differential Amplifier-Single-input Balancedoutput and Single-input Unbalanced-output Differential amplifier-Block diagram of Op-Amp-The ideal Op-amp-Equivalent Circuit-Ideal voltage transfer curve-Offset voltage-Offset current-CMRR-Slew rate-Open loop op-amp configuration-Voltage series feedback amplifier-Voltage shunt feedback amplifier-Frequency response-Compensation Network-High frequency opamp equivalent circuit-Open loop voltage gain and closed loop frequency response.

UNIT IV OPERATIONAL AMPLIFIER AND ITS APPLICATIONS

Summing, scaling and averaging amplifier-Instrumentation Amplifier-Integrator-Differentiator-Filters-First order low-pass and high-pass Butterworth filter-Band pass filter-Band reject filter-All pass filter-Oscillator-Principle-Square wave, triangular wave generator-Comparator-Zero crossing detector-Schmitt trigger-Sample and hold circuit-V to I with floating & grounded load-Low voltage ac voltmeter.

UNIT V OPTO ELECTRONIC AND POWER DEVICES

Photo Diode-Photo transistor-Solar cells-LED-LCD–Laser-Semiconductor Lasers- PNPN Diode-SCR-IGBT-555 Timer and applications-Astable-Monostable-Bistablemultivibratos.

TEXT BOOKS:

1. Robert Boylstead and Louis Nashelstky, "Electronics Devices and Circuit Theory", 8th Edition, Prentice Hall India.
2. Ramak an tA.Gayakwad , "Op-Amps and Liner Integrated Circuits', Third Edition. Prentice Hall India.
3. AngsumanSarkar, Chandan Kumar Sarkar, Solid State Microelectronic and Optoelectronic Devices, Universities Press (India) Pvt Ltd, 2012

REFERENCE BOOK:

1. Malvino A.P, "Principles of Electronics", 5th Edition, Tata McGrawHill Publishing Company Limited, New Delhi.

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CORE COURSE II

DESIGN OF DIGITAL CIRCUITS

OBJECTIVE

To learn about the designing principle of digital circuits.

UNITI LOGIC FUNCTIONS AND COMBINATIONAL LOGIC DESIGN

Logic map-K-maps-Four variables-SOP - Prime implicant determination Tabular Method: Binary adders: Full adder, Ripple carry adder, Carry lock ahead adder, Binary Subtractor, Multiplexers: Multiplexers as general purpose logic circuit, Decoders and Encoders: De multiplexers, n to 2n line decoder, Tree decoder, Decoder as general purpose logic circuits &code conversion, Read only memory-Other LSI programmable logic.

UNIT II SEQUENTIAL CIRCUIT COMPONENTS

Introduction to sequential circuits-Latches and Flip flops: SR Latch, Timing problems and clocked SR Latches, JK Latch, Master slave Latch, Delay flip flop, T flip flop, Flip flop Excitation Requirements-Registers: Serial load shift registers, Parallel load shift register, Parallel to serial conversion, Universal registers.

UNIT III SYNCHRONOUS SEQUENTIAL MACHINES & DESIGN

Basic concepts - State assignments - General design procedure - State equivalence and machine minimization - Machines with finite spans - Synchronous counters-Algorithmic state machines - Asynchronous inputs.

UNIT IV FAULT DIAGNOSIS, TESTING AND A SIMPLE COMPUTER DESIGN

Introduction - Fault detection and location - Fault detection table-Compact testing techniques-Signature analysis - The scan path testing technique - Designing for testability - Building blocks - Register transfer language - Macro and Micro operations - Design of control unit - Programming computer.

UNIT V LABVIEW FOR DIGITAL CIRCUITS

Getting started with Lab VIEW virtual instruments: Building a virtual instrument-Launching Lab VIEW-Opening a new VI from a template-Adding a control to front panel-Changing a signal type Wiring objects on block diagram-Running a VI-Acquiring data and communicating with instruments.

TEXT BOOKS:

1. Norman Balabaniam, Bradly Carlson, “DIGITAL LOGIC DESIGN PRINCIPLES”, John Wiley & sons, Inc. New York.
2. Brian Holds worth, Clive woods, “DIGITAL LOGIC DESIGN”, Fourth edition, Published by Elsevier.
3. JaydeepChakravorthy, Digital Electronics and Logic Design, Universities Press (India) Pvt Ltd, 2012

REFERENCE BOOK:

1. Donald P Leach, Albert Paul Malvino, GoutamSaha, “DIGITAL PRINCIPLES AND APPLICATIONS”, Tata McGraw-Hill Publishing Company Limited, New Delhi.

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CORE COURSE III

SIGNALS AND SYSTEMS

OBJECTIVE

Toacquirethebasicsof Signals,SystemsandTransformations.

UNITI INTRODUCTIONTOSIGNAL ANDSYSTEM

Signals:Definition-Classificationofsignals–Basicoperations onsignals–Types ofsignals.Systems:Definition-Classificationof systems-Properties ofsystems-Propertiesofcontinuous-time lineartime-invariant(LTI)system-Properties ofdiscrete-LTI system.

UNITII LAPLACETRANSFORM

Definition-Representationof signalsusingLaplacetransform–Region ofConvergence(ROC)- PropertiesofLaplacetransform- Initial valueand final valuetheorem- Inverseof the Laplace transform-AnalysisofpassivenetworksusingLaplacetransform-Solutionof differentialequations using Laplacetransform - RelationshipsbetweenLaplacetransform(LT)andcontinuous-time Fouriertransform(CTFT).

UNITIII FOURIERSERIES

Continuous-timeFourierseries(CTFS):Definition-Dirichletcondition-Fourierseriesrepresentationofcontinuous-timeperiodic signal -Trigonometric Fourierseries -Problems-Exponential Fourierseries- Problems-Propertiesof CTFS-Discrete-timeFourier series(DTFS):Definition-Fourierseriesrepresentationofdiscrete- time periodicsignal - CalculationofDTFScoefficient-Properties ofDTFS.

UNITIV FOURIERTRANSFORM

Continuous-time FourierTransform(CTFT):Definition-Dirichletcondition-CTFT representationof periodic signal-PropertiesofCTFT- Problems.DiscreteTime FourierTransform (DTFT): Definition- DTFT representationofaperiodicsignal - PropertiesofDTFT- Problems.

UNITV Z-TRANSFORMS

Z-Transforms(Doubleand Single sided)-ROCconditions -Properties-Initial andfinalvaluetheorems-Relationshipbetween theZ-transformand Discrete-timeFouriertransform-Relationship betweentheZ-planeandS-plane-MethodsofinverseZ-transforms-Powerseries method(long-division)-Partial-fractionmethod -Residualmethod.

TEXT BOOK

1. PoornachandraS.,"Signalsand System",Vijay NicoleimprintsPvt.Ltd.,2004.

REFERENCE BOOKS

1. Alan V.Opphenehim,Alan S.Willskyand HamidnawabS., "Signalsand Systems",2nd Edition,PHI,2004.
2. RameshBabuP,AnandaNatarajanR.,"SignalsandSystem",3rd Edition,Scitech publicationprivatelimited,2007.

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CORE COURSE IV

VLSI DESIGN AND VHDL PROGRAMMING

OBJECTIVE

The students will get exposure of VLSI Design VHDL Programming in Application field

UNIT I TRANSISTOR THEORY

nMOS Enhancement Transistor-nMOS Enhancement Transistor-Threshold Voltage: Threshold voltage equations-Body effect-MOS Device Design equation: Basic Dc equations-Second order effects-MOS Models-NMOS Inverter-Differential Inverter-Tristate Inverter –BiCMOS Inverter.

UNIT II DATA AND CONTROL FLOW IN SYSTEMATIC STRUCTURES

Two Phase Clocks-The Shift Register-Combinational Logic-Programmable Logic array-Finite state Machine

UNIT III SYSTEM STRUCTURE

OM Project - System overview-overall structure of the data path- Arithmetic Logic Unit- Registers-Buses-Parallel Shifter-Register array.

UNITIV VHDL PROGRAMMING

VHDL-History-Capabilities-Hardware Abstraction-basic Terminology-Entity Declaration-Architecture body-Configuration Declaration-Package Declaration- Basic Language elements: Identifiers-Data Objects-Data types, Operators: Behavioral Modeling: Entity Declaration-Architecture Body-Process statement-Wait statement-If-Case-Null-Loop-Exit-Next-Multiple Process-Postponed Processes

UNIT V DATA FLOW MODELING

Concurrent Signal Assignment statement-concurrent verses sequential signal assignment –Multiple drivers-Block Statement-Concurrent Assertion statement-Value of a signal.

TEXT BOOKS:

1. Douglas A. Pucknell,Kamran EshraghianBasic VLSI Design,3rdEdtion, Prentice hall of India pvt Ltd. New Delhi.
2. DouglasL.Perry, VHDL programming by example, 4Th edition Tata McGrawhill New Delhi.
3. Stephen Brown and ZvonkoVranesic, “Fundamentals of Digital Logic Design with VHDL”, Tata McGraw-Hill, 2007.

REFERENCE BOOK:

1. Wayne Wolf, “Modern VLSI design”, 4th edition, PHI, 2009

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CORE PRACTICAL I

ELECTRONICS I (P)

(Analog and Digital Circuits Lab)

Any 12 Experiments

1. Construct and study of power supply with Single and Dual - High Current regulator & Short circuit protection.
2. Construct and study of Non-inverting, Inverting amplifier using op-amp.
3. Construct and study the Integrator, Differentiator, Unit gain amplifier using op-amp.
4. Construct and study the operation of an Instrumentation Amplifier
5. Construction and study of V to I, I to V converter using op-amp.
6. Construct and study of Clipper and Clamper using op-Amp.
7. Construct and study of Comparator and Zero crossing detector using op-amp.
8. Construct and study of Window detector, Peak detector Precision rectifier.
9. FET amplifier design.
10. Construct and study of One Shot multivibrator, Square generator and VCO using IC 555.
11. Construct and study of FSK modulator & demodulator.
12. Construct and study the Power control rectifier using SCR, TRIAC and UJT.
13. Study of sensor (Thermal, optical and mechanical).
14. Design of power amplifier (Class B and C).
15. K-map design for a three variable Boolean expression.
16. Design of counters based on state machine.
17. Study of Adder, subtractor and IC based BCD adder and subtractor.
18. Study of Encoder and Decoder.
19. Study of Multiplexer and Demultiplexer
20. Study of Buffer, Latch, Transceiver.
21. Study of Shift register (SISO, SIPO, PISO & PIPO) and shift register IC.
22. Study of Parity Generators and Checkers

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CORE COURSE V

MICROCONTROLLER 8051 and IDE

OBJECTIVE

To learn about microcontroller 8051 along with a IDE
To learn about embedded C and to develop embedded application tools

UNIT I MICROCONTROLLER 8051 ARCHITECTURE

Microprocessor and Microcontroller-8051 Microcontroller hardware: 8051 Oscillator and clock-Program counter and data pointer-A & B CPU register-Flags & PSW-Internal memory-Internal RAM-Stack and stack pointer-Special function registers-Internal ROM-Input/ Output pin, ports and circuits-External memory.

UNIT II 8051 PERIPHERAL

Counter & Timer: Timer/Counter interrupts-Timing-Timer modes of operation-Counting-Serial data input/output: Serial data interrupt-Data transmission-Data reception-Serial data transmission modes Interrupts: Timer flag interrupt-Serial port interrupt-External interrupt-Reset-Interrupt control-Interrupt priority-Interrupt destination-Software generated interrupts

UNIT III ARITHMETIC AND LOGICAL OPERATIONS

Introduction-Addressing modes-Instruction set-Byte level logical operations-Bit level logical operations-Rotate and swap operations-Simple programs. Arithmetic Operations: Introduction-Flags-Increment and decrementing-Addition-Subtraction-Multiplication and Division-Simple programs. External data move-Code memory read only data move-Push & pop-Opcodes-Data exchanges-Simple programs. Jump and call instruction: Introduction-Jump and call program range-Jumps-Calls and subroutine-Interrupt and returns-More detail on interrupts-Simple programs.

UNITIV PROGRAMMING IN EMBEDDED C

Introduction, Date types in embedded C - arithmetic and logical operators - Control statements and loops in embedded C - Functions and Arrays in embedded C. Programming of input/ output ports - Programming of Timer & counters - writing interrupt service routines in Embedded C - Programming of UART and PCA Timer in embedded C.

UNIT V PROGRAM DEVELOPMENT TOOL CHAIN USING µVISION3

Integrated Development Environment (IDE)- Editor - Assembler - Compiler - Linker - Simulator and Debugger - Assembly and 'C' program development and debugging process.

TEXT BOOKS:

1. Muhammad Ali Mazidi, Janice GillispieMazidi and Rolin D. McKinlay, "The 8051Microcontroller and Embedded Systems using Assembly and C", Pearson, Second edition, 2008.
2. Michael J Pont, "Embedded C", Addison-Wesley Professional, 2002.
3. https://www.keil.com/product/brochures/uv4.pdf

REFERENCE BOOK:

1. Kenneth J. Ayala, "The 8051 Microcontroller: Architecture, Programming, and Applications", 3rd Edition, West Publishing Company, 1997.

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CORE COURSE VI

ELECTROMAGNETIC THEORY

OBJECTIVE

To familiarize the student about the concepts of electric, magnetic and electromagnetic fields and provide knowledge of antennas, Waveguides and Microwaves.

UNIT I ELECTRIC AND MAGNETIC FIELDS IN MATERIALS

Poisson's and Laplace's equation – Electric Polarization-Nature of dielectric materials- Definition of Capacitance – Electrostatic energy and energy density – Boundary conditions for electric fields – Electric current – Current density – point form of ohm's law – continuity equation for current. Definition of Inductance – Inductance of loops and solenoids – Definition of mutual inductance – Energy density in magnetic fields – Nature of magnetic materials – Magnetization and permeability.

UNIT II TIME VARYING ELECTRIC AND MAGNETIC FIELDS

Faraday's law – Maxwell's Second Equation in integral form from Faraday's Law – Equation expressed in point form – Displacement current – Ampere's circuital law in integral form – Modified form of Ampere's circuital law as Maxwell's first equation in integral form – Equation expressed in point form – Maxwell's four equations in integral form and differential form - Poynting Vector and the flow of power – Power flow in a co-axial cable – Instantaneous Average and Complex Poynting Vector.

UNIT III ELECTROMAGNETIC WAVES AND WAVE GUIDES

Derivation of Wave Equation – Uniform Plane Waves – Maxwell's equation in Phasor form – Wave equation in Phasor form – Plane waves in free space and in a homogenous material – Wave equation for a conducting medium – Skin effect. Wave Guides: Rectangular guides – TM waves in rectangular guides – TE waves in rectangular wave guides – Impossibility of TEM wave in wave guides.

UNIT IV TRANSMISSION LINES AND ANTENNAS

Transmission lines: Basic principles - fundamentals of transmission lines – characteristic impedance – smith chart and its applications. VHF, UHF, SHF antennas: Folded dipole antenna-Yagiuda antenna – Biconical antenna – Corner reflector antenna – Helical antenna – Horn antenna – Frequency independant antennas – Microwave antennas – Lens antennas.

UNIT V MICROWAVES

Microwave Generation- Multicavity Klystron-Reflex Klystron- principle and operation of Magnetron -Travelling Wave Tubes (TWT) -Microwave Transistors- -GaAsFET-Gunn Diode- PIN diode for detection of micro waves.

TEXT BOOKS:

1. W. H.Hayt& J A Buck, "Engineering Electromagnetics" TATA McGraw-Hill, 2007
2. E.C. Jordan & K.G. Balmain, "Electromagnetic Waves and Radiating Systems" PHI, 2006.
3. K.D.Prasad, "Antenna And Wave Propagation", SathyaPrahashan.
4. Y.Mallikarjuna Reddy," Electromagnetic Waves & Transmission Lines", University Press (India) Pvt. Ltd., 2016

REFERENCE BOOKS:

1. NarayanaRao, N, "Elements of Engineering Electromagnetics" Pearson Education, 2006.
2. Edward C.Jordan, Keith G. Balmain, "Electromagnetic Waves And Radiating Systems", PHI
3. N D Deshpande, D A Deshpande, P A Rangole, "Communication Electronics" , Tata McGraw- Hill.
4. Y.Mallikarjuna Reddy," Electromagnetic Feilds", University Press (India) Pvt. Ltd., 2013

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CORE PRACTICAL II

ELECTRONICS II (P)

(VHDL Programming Lab)

Any 16 Experiments

1. Half adder and Full adder
2. Half subtractor and Full subtractor
3. Encoder [8:3]
4. Decoder [3:8]
5. Multiplexer [8:1]
6. De-multiplexer [1:8]
7. Combinational circuit implementation for given expersion
8. D and T flip-flop
9. RS flip-flop
10. JK flip-flop
11. 4 bit UP/DOWN Counters
12. 4-bit Shift register
13. Ring counter
14. Implementation of ALU
15. Design of PLA
16. Design of PAL
17. Water Level Controller
18. DC Motor Interface
19. Seven-segment display interface
20. Solid State Relay Interface
21. Time Delay Programme
22. Digital Clock

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ELECTIVE COURSE I (A)

OPTOELECTRONICS

OBJECTIVE

To understand the concepts and application of optoelectronics

UNITI ELEMENTS OF LIGHT AND SOLID STATE PHYSICS

Wave nature of light, Polarization - Interference - Diffraction - Light Source - Review of Solid State Physics - Review of Semiconductor Physics and Semiconductor Junction Device.

UNITII DISPLAY DEVICES AND LASERS

Introduction - Photo Luminescence - Cathode Luminescence - Electro Luminescence - Injection Luminescence - Injection Luminescence - LED - Plasma Display - Liquid CrystalDisplays - Numeric Displays - Laser Emission - Absorption - Radiation - PopulationInversion - Optical Feedback - Threshold condition - Laser Modes - Classes of Lasers - Mode Locking - laser applications.

UNIT III OPTICAL DETECTION DEVICES

Photo detector - Thermal detector - Photo Devices - Photo Conductors - Photo diodes - Detector Performance.

UNIT IV OPTOELECTRONIC MODULATOR

Introduction - Analog and Digital Modulation - Electro-optic modulators - Magneto OpticDevices - Acousticoptic devices - Optical - Switching and Logic Devices.

UNITV OPTOELECTRONIC INTEGRATED CIRCUITS

Introduction - hybrid and Monolithic Integration - Application of Opto Electronic IntegratedCircuits - Integrated transmitters and Receivers - Guided wave devices.

TEXT BOOKS:

1. Pallab Bhattacharya “Semiconductor Opto Electronic Devices”, Prentice Hall of IndiaPvt., Ltd., New Delhi, 2006.
2. Jasprit Singh, “Opto Electronics-As Introduction to materials and devices”,McGraw-Hill International Edition, 1998
3. AngsumanSarkar, Chandan Kumar Sarkar, Solid State Microelectronic and Optoelectronic Devices, Universities Press (India) Pvt Ltd, 2012

REFERENCE BOOKS:

1. S C Gupta, Opto Electronic Devices and Systems, Prentice Hal of India,2005.
2. J. Wilson and J.Haukes, “Opto Electronics-An Introduction”, Prentice Hall, 1995.

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ELECTIVE COURSE I (B)

MEDICAL ELECTRONICS

OBJECTIVE

To understand the concepts and application of electronic Instrumentation in the Medical field

UNITI HUMAN PHYSIOLOGICAL SYSTEM

Cells and their structure –Nature of Cancer Cells-Transport of Ions through cell Membrane –Resting and action potentials-Bio-electric Potentials-Nerve Tissues and Organs-Different Systems of Human body

UNIT II BIOPOTENTIAL ELECTRODES AND TRANSDUCERS

Design of Medical Instrument-Components of the biomedical Instrument system-Electrodes-Transducers: Active &Passive

UNITIII BIO POTENTIAL RECORDERS

ECG- EEG-EMG-ERG-EOG Recorders wIT - h high accuracy-Pacemaker-Heart Lung Machine-Kidney Machine.

UNITIV SPECIALIZED MEDICAL EQUIPMENT &BIO TELEMETRY

Electron Microscopes –X-Ray Tube-X-Ray Machine –Angiography-Elements of Bio-Telemetry system-Design of Bio-Telemetry System

UNITV ADVANCEINBIO-MEDICALINSTRUMENTATION

Computes in Medicine-Lasers in medicine-Endoscope-Computer Thermography-Magnetic resonance Imaging

TEXT BOOK

1. Dr.M. Arumugam, Biomedical Instrumentation, 2nd Edition, Anuradha Publications.

REFERENCE BOOK:

1. KhandpurHandbook of Bio-Medical Instrumentation

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ELECTIVE COURSE II (A)

DIGITAL COMMUNICATION

OBJECTIVE

To understand the different technologies of Digital Communication

UNITI PULSE MODULATION SYSTEMS

Sampling theorem: low pass signals, band pass signals –PAM-channel bandwidth for a PAM signal-Natural sampling –Flat top sampling-PCM-Electrical representation of binary digits-The PCM system-Companding-Multiplexing PCM signal –Differential PCM-Delta modulation

UNITII DIGITAL COMMUNICATION SYSTEM

Elements of digital communication system, the sampling theorem, aliasing error, PAM, PPM &PWM signals generation and detection Pulse code modulation, uniform and non-uniform quantization, SNR, companding characteristics, Intersymbolinterference, Nyquist criteria of zero ISI, eye pattern

UNITIII DIGITAL MODULATION TECHNIQUES

Coherent binary modulation techniques, PSK, FSK, QPSK, MSK differential pulse codemodulation, predictor, delta modulation, adaptive delta modulation, slope overload and granular noise, Mary signaling

UNITIV INFORMATION CODING

Measure of information, entropy, mutual information, Shannon's coding theorem, channelcapacity, capacity of Gaussian channel, source coding, Huffman code, channel coding, block codes,syndrome decoding, convolutional coding, code tree, spread spectrum communication: PN sequences, direct sequence and frequency hopping spread spectrum systems

UNITV MULTIPLE ACCESS TECHNIQUES

FDMA and TDMA, TDMA synchronization and timing, code division multiple access, Applicability of CDMA to commercial system, Earth's path propagation effects; satellite services for communication-Weather forecasting, remote sensing, direct to home (DTH) TV

TEXT BOOKS

1. Digital communications: Bernard Sklar (Pearson Education, Asia Publ)
2. Kennedy and George Davis, "Electronic Communication Systems",4th Edition, 1999.
3. Simon Hawkins, John Wiley, "Communication systems", 4th Edition,2001

REFERENCEBOOK

1. J. G. Proakis, "Digital Communication", 4th edition, TataMcGraw-Hill.

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ELECTIVE COURSE II (B)

EMBEDDED LINUX WITH RTOS

OBJECTIVE

To impart knowledge about Embedded Linux Support Package, Storage, Drivers and Real Time Operating System

UNITI INTRODUCTION TO EMBEDDED LINUX

Embedded Linux - Introduction - Advantages- Embedded Linux Distributions - Architecture - Linux kernel architecture - User space - Linux startup sequence - GNU cross platform Tool chain.

UNITII BOARD SUPPORT PACKAGE AND EMBEDDED STORAGE

Inclusion of BSP in kernel build procedure - The bootloader Interface - Memory Map - Interrupt Management - PCI Subsystem - Timers - UART - Power Management - Embedded Storage - Flash Map - Memory Technology Device (MTD) -MTD Architecture - MTD Driver for NOR Flash - The Flash Mapping drivers - MTD Block and character devices - Mtdutils package - Embedded File Systems - Optimizing storage space - Tuning kernel memory.

UNIT III EMBEDDED DRIVERS AND APPLICATION PORTING

Linux serial driver - Ethernet driver - I2C subsystem - USB gadgets-Watchdog timer - Kernel Modules - application porting roadmap - Programming with Pthreads - Operating System Porting Layer - Kernel API Driver - Case studies - RT Linux.

UNITIV INTRODUCTION TO REAL-TIME OPERATING SYSTEM

Tasks and Task States-Task and Data - Semaphores and Shared Data-More Operating System Services: Message Queues, Mailboxes, and Pipes-Timer Functions-Events-Memory Management-Interrupt Routines in an RTOS Environment

UNITV BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM

Overview-Principles-An Example-Encapsulating Semaphores and Queues-Hard Real-Time Scheduling Considerations-Saving Memory Space-Saving Power-Embedded Software Development Tools: Host and Target Machines-Linker/Locators for Embedded Software-Getting Embedded Software into the Target System

TEXT BOOKS:

1. P. Raghavan, Amol Lad, SriramNeelakandan, 'Embedded Linux System Design and Development', Auerbach Publications, 2005.
2. David E. Simon "An Embedded Software Primer" Pearson Publications, 1999.

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CORE COURSE VII

MICROCONTROLLER PICAND MPLAB

OBJECTIVE

To impart knowledge about the PIC microcontroller and MPLAB

UNIT I MICROCHIP PIC

PIC Microcontroller- Programming the PIC-PIC Programmers- Development Boards-Prototyping the PIC Circuit-PIC Architecture-Baseline PIC Family-PIC 10 Devices - PIC 12 Devices- PIC 14 Devices-Midrange PIC Family-PIC 16 Devices- high-performance PIC Family- PIC 18 Devices.

UNITII MID-RANGE PIC ARCHITECTURE

Processor Architecture and design-Mid-range Core features-Mid-range CPU and Instruction Set-EEPROM Data Storage-Data Memory Organization-Mid-range I/O and Peripheral Modules.

UNITIII PIC PROGRAMMING: TOOLS AND TECHNIQUES

Microchip's MPLAB-Integrated Development Environment-Simulators and Debuggers-Programmers-Engineering PIC Software-Pseudo Instructions.

UNITIV PROGRAMMING ESSENTIALS: I/P AND O/P

PIC 16F84A Programming Template-Introducing the 16F84A-Simple Circuits and Programs –Programming the Seven-Segment LED Interrupts: Interrupts on the 16F84A-Interrupt Sources-Interrupt Handlers-Interrupt Program-Sample Programs.

UNITV PERIPHERAL INTERFACING AND PROGRAMMING

LCD Programming-PIC Protocol-based Serial Program-EEPROM Devices and Interfacing-Real-Time Clocks.

TEXT BOOKS:

1. "Microcontroller Programming The Microchip PIC" by Julio Sanchez and Maria P. Canton Published by CRCPress(Taylor & Francis Group)
2. WWW. Microchip.com
3. Microchip MPLAB IDE for PIC Microcontroller

REFERENCE BOOK:

1. Design With PIC Microcontroller by JOHN B. PEATMAN Pearson Publications

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CORE COURSE VIII

DIGITAL SIGNAL PROCESSOR

OBJECTIVE

To understand DSP with their structure and application

UNITI THEORY OF DISCRETE TIME SYSTEMS.

Introduction- sequences-representation of arbitrary sequences- linear time invariant systems- Causality and stability-difference equation-frequency response-frequency response of the first order systems –frequency response of the second order systems.

UNITII FINITE DURATION IMPULSE RESPONSE FILTERS.

Digital Filters: Magnitude response and phase response of digital filters. FIR filters : Design techniques-Window techniques-rectangular window Function-Hamming window function- Hamming window function - Hanning window function-Blackman window function-Bartlet window function-Kaiser window-Design using Kaiser window function Basic structures: Basic realization block diagram and the signal flow graph Direct forms, Cascade form and linear phase form realization.

UNITIII INFINITE DURATION IMPULSE RESPONSE FILTERS.

IIR filters: Introduction-I.I.R. filler design by approximation of derivatives, Impulse invariantmethod, Bilinear transformation - Butter worth filters –ChesbyShaw filters-frequency transformation(analog and digital) Basic structures : Direct forms, Cascade form and linear phase form realization.

UNITIV EFFECTS OF FINITE WORD LENGTH IN DIGITAL FILTERS

Introduction-rounding and truncation errors - Quantization Effects in Analog to digital conversion of signals-out put noise Power from a digital system-Coefficient quantization effects in Direct form realization of I I R and FIR filters-Limit cycle oscillations-product quantization-scaling-quantization Errors in the computation of DFT .

UNIT V SPECTRAL ANALYSIS

Statistical techniques: Introduction-Energy density spectrum– Estimation of auto Correlation and power spectrum of random signals –DFT in spectral estimation–Power–spectral estimation–non –parametric methods. Bartlet Welch, Blackman and turkey methods-Quality of power spectrum estimators-parametric methods-Basics of AR, MA and ARMA models - Power spectrum estimation by AR, MA and ARMA models FFT technique : Introduction to radix 2 FFTs-some properties of radix 2-Decimation in time FFT-data shuffling and bit refusal-ecimation in frequency algorithm.

TEXT BOOKS:

1. L.R.Raliner and B.Gold Theory and application of Digital signal processing Signal processing Prentice Hall of India, New Delhi–2003
2. Digital Signal processing Tata McGraw Hill publishing Company, New Delhi-2004

REFERENCE BOOKS:

1. Allan V.Oppenheim and Ronald W Schafer Digital Signal Processing : Prenlice Hall of India-NewDelhi 2000
2. Johny-R.Johnson, Introduction to Digital signal processing –PHI, Publication, New Delhi, year -1994
3. K.S.Srinivasan, Digital signal processing. Anuradha agencies 2003 Kumbakonam

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CORE PRACTICAL III

ELECTRONICS III (P)

(8051 MICROCONTROLLER Microwave LAB)

Any 16 Experiments

1. Addition / subtraction
2. 2 . Multiplication / division
3. Block data transfer.
4. Smallest and largest of N numbers.
5. Arrange in ascending / descending order.
6. Sum of N 8 bit numbers.
7. 1's and 2's compliment of an array (8 / 16 bit).
8. UP/DOWN counter using 7 segment displays.
9. Traffic light control interface.
10. Wave form generation.
11. ADC interface.
12. DAC interface.
13. Stepper motor interface.
14. Solid State Relay Interface
15. Time Delay Programme
16. Digital Clock
17. Rolling and blinking of a message
18. LCD interface
19. DC motor interface
20. Temperature controller
21. Microwave experiments-Klystron oscillator
22. Microwave experiments-Gunn diode oscillator

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ELECTIVE COURSE III (A)

MICROCONTROLLER ATMEGA AND IDE

OBJECTIVE

To impart knowledge about ATMEGA microcontroller and programming through Arduino.

UNITI Introduction To 8-bit Microcontroller

Microcontrollers and Embedded processors, Overview of AVR family, AVR Microcontroller architecture, Register, AVR status register, ROM space and other hardware modules, ATmega32 pin configuration & function of each pin.

UNITII AVR Assembly Language Programming

Addressing modes of AVR, Data transfer Arithmetic, Logic and Compare, Rotate and Shift, Branch and Call instructions. AVR data types and assembler directives, AVR assembly language programs, AVR I/O Port Programming, Time delay loop, BCD, ASCII conversion Program, Look-up table, Bit addressability, MACROs.

UNITIII AVR Programming in C

Data types, I/O programming, logic operations, Intel HEX file, Timer programming in assembly and C, Interrupt programming in assembly and C, Serial Port programming in assembly and C.

UNITIV Peripheral Interfacing

LCD and Keyboard Interfacing, ADC, DAC and sensor interfacing, Relay, Opto-isolator and Stepper Motor Interfacing, Input capture and Wave Generator, PWM programming and DC motor control, SPI protocol and Display interfacing.

UNITV Arduino

Exploring the Arduino ecosystem - Arduino functionality - Atmel microcontroller - Programming Interfaces - General I/O and ADCs - Power Supplies - Arduino Boards - Creating Program: Downloading and Installing the Arduino IDE - Running the IDE and Connecting to the Arduino - Breaking down a program.

Text Books:

1. Muhammad Ali Mazidi, SarmadNaimi and SepehrNaimi,The AVR Microcontroller and Embedded Systems Using Assembly and C, Pearson Education, 2011
2. DhananjayGadre, Programming and Customizing the AVR Microcontroller, McGraw Hill Education, 2000

Reference Books

1. AVR ATmega32 data sheet
2. Jeremy Blum, Exploring Arduino, John Wiley & Sons Inc., 2013

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ELECTIVE COURSE III (B)

WIRELESS COMMUNICATION

OBJECTIVE

To learn the concepts of wireless communication

UNIT I SERVICES AND TECHNICAL CHALLENGES

Types of Services-Requirements for the services-Multipath propagation, Spectrum Limitations-Noise and Interference limited systems-Principles of Cellular networks-Multiple Access Schemes.

UNIT II WIRELESS PROPAGATION CHANNELS

Propagation Mechanisms (Qualitative treatment) - Propagation effects with mobile radio - Channel Classification - Link calculations - Narrowband and Wideband models.

UNIT III WIRELESS TRANSCEIVERS

Structure of a wireless communication link - Modulation and demodulation - QuadraturePhase Shift Keying - Differential Quadrature Phase Shift Keying - Offset - QuadraturePhase Shift Keying - Binary Frequency Shift Keying - Minimum Shift Keying - GaussianMinimum Shift Keying - Power spectrum and Error performance in FADING channels.

UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS

Principle of Diversity - Macrodiversity - Microdiversity - Signal Combining Techniques - Transmit diversity - Equalisers - Linear and Decision Feedback equalisers - Review ofChannel coding and Speech coding techniques.

UNIT V ADVANCED TRANSCEIVER SCHEMES

Spread Spectrum Systems - Cellular Code Division Multiple Access Systems - Principle - Power control - Effects of multipath propagation on Code Division Multiple Access - Orthogonal Frequency Division Multiplexing - Principle - Cyclic Prefix - Transceiverimplementation - Second Generation(GSM, IS–95) and Third Generation WirelessNetworks and Standards

TEXT BOOKS:

1. Andreas.F. Molisch, “Wireless Communications”, John Wiley - India, 2006.
2. Simon Haykin& Michael Moher, “Modern Wireless Communications”, Pearson Education, 2007.

REFERENCE BOOKS:

1. Rappaport. T.S. “Wireless communications”, Pearson Education, 2003.
2. Gordon L. Stuber, “Principles of Mobile Communication”, Springer International Ltd.,2001.
3. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2007.

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ELECTIVE COURSE IV (A)

MOBILE COMMUNICATION

OBJECTIVE

To understand the cellular concept and mobile communication
To learn fundamentals of mobile software

UNIT I CELLULAR CONCEPTS AND EQUALIZATION

Cellular telephone system - frequency reuse- channel assignment and land off strategies- elements of cellular radio system design- switching and traffic- data links and microwaves- system evaluation- interference and system capacity- Improving coverage capacity; Fundamentals of equalization- space polarization.

UNIT II MOBILE NETWORK LAYER

Mobile IP: goals- assumptions and requirements-Entities andterminology-IP packet delivery-Agent discovery-Registration –tunneling and encapsulation-Optimizations-Reverse tunneling –IPv6-IP micro-mobility support-Dynamic host configuration protocol.

UNIT III MOBILE TRANSPORT LAYER

Traditional TCP: congestion control-Slow start-Fasttransmit/fast recovery-Implications on mobility-Classical TCP improvements: indirect TCP-Snooping TCP-Mobile TCP-Fast transmit/fast recovery-Transmission/time-out freezing-selective transmission-Transaction-oriented TCP-TCP over 2.5/3G wireless networks - Performance enhancing proxies.

UNIT IV WIRELESS APPLICATION PROTOCOL (VERSION 1.X)

Architecture-Wireless datagram protocol-Wirelesstransport layer security-Wireless transaction protocol-Wireless session protocol-Wireless application environment-Wireless markup language-WML Script-Wireless telephony application –Push architecture-Push/pull services-i-mode-syncML-WAP 2.0.

UNIT V SYMBIAN OS FUNDAMENTALS

System structure - Hardware resource - Software basics-Processes- threads and Switches - Executable programs-Power management - The Kernel and E32 - Devices drivers-Timer –memory - files - Event handling-Perspectives even handling - Active objects - Multitasking and Preemption - Servers - API covered- Fundamental Types - Naming convention - Function-API- Templates - Casting - Classes- Design patterns Class diagrams and UML.

TEXT BOOKS:

1. William C. Y. Lee Mobile Cellular Telecommunication: MGH Inc., 1995
2. Jochen Schiller Mobile communication : Jochen Schiller 2nd edition, Pearson Education, 2004

REFERENCE BOOK:

1. W. C. Y. Lee, “Mobile Communication Engineering”, 2nd edition, McGraw- Hill, 1998

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ELECTIVE COURSE IV (B)

CAD AND PCB DESIGN

OBJECTIVE

To impart knowledge about the CAD and PCB basics and designing

UNITI INTRODUCTION TO COMPUTER AIDED DESIGN

Computer as design medium - Hardware/Software requirements - Representation of images - Scan conversion of primitive objects - text in graphics - Transformation - Viewing and modeling transformation in 2D and 3D - Matrix representation. Segmentation, Geometric modeling, data base management for CAD.

UNIT II COMPUTER SIMULATION OF ELECTRONIC NETWORKS

Mathematical review - Solution of simultaneous linear equations - exploiting the sparsity in matrices - DC analysis of linear networks - review of Nodal and loop analysis - DC analysis of non - linear networks - Transient analysis of linear and non - linear circuits.

UNIT III SEMICONDUCTOR DEVICE MODEL

Low frequency models for semiconductor devices - models for PN - junction diodes, AC Ebers Moll model, AC and DC transport model for BJT, Noise Modeling - Introduction to SPICE models.

UNIT IV LOGIC SIMULATION

Introduction to Hardware Description, Testing for design and manufacturing- Oscillations and other problems - fault simulation - Mixed - mode simulation: Relaxation method for transient analysis - waveform relaxation.

UNITV COMPUTER AIDED PCB DESIGN

Computer aided setup - Input Packages, setup - Libraries, Schematics Capture, Interface techniques Layout and component placement - general consideration - manual assisted and automatic placement- Conductor routing - routing problem - surface organization - Documentation.

TEXT BOOKS:

1. S. Krishnamoorthy and S Rajeev ,Computer Aided Design-Software and analytical tool NarosaPublishing House
2. R. RaghuramComputer Simulation of Electronic Circuits Wiley Eastern
3. Gerald L Ginsberg, Printed Circuit Design –McGraw Hills
4.M.M. Shah, Design of Electronic Circuits and CAD, Wiley Eastern Books

REFERENCE BOOK:

1. R.S.Khandur, Printed circuit Board Fabrication, Assembly and testing

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CORE CORESE IX

ASIC AND FPGA DESIGN

OBJECTIVES

To study the design flow of different types of ASIC, learn the architecture of different types of FPGA and gain knowledge about partitioning, floor planning, placement and routing, SoC.

UNITI INTRODUCTION TO ASICS

Types of ASICs: Full-Custom ASICs; Standard-Cell Based ASICs – Gate-Array Based ASICs – Channeled Gate Array – Channel-less Gate Array – Structured Gate Array – Field-Programmable Gate Arrays – Design Flow – Programmable ASICs: Anti-fuse – Static RAM - EPROM and EEPROM Technology – Programmable Logic Devices: PLA, PAL, CPLD, Field-Programmable Gate Arrays

UNITII ASIC PHYSICAL DESIGN

System partition – Partitioning – Partitioning methods – Interconnect delay models and Measurement of delay – Floor planning - Placement – Routing: Global routing – Detailed routing – Special routing – Circuit extraction – DRC

UNITIII LOGIC SYNTHESIS, SIMULATION AND TESTING

Synthesis: Combinational logic synthesis – FSM synthesis, **Simulation:** Types of simulation **Testing of logic circuits** Fault models – Complexity of a test set – Path sensitizing – Circuits with tree structure – Random test – Testing of Sequential circuits: Design for testability – Built-in self test

UNITIV FPGA

Field Programmable gate arrays- Logic blocks, routing architecture, Design flow technology - mapping for FPGAs, Xilinx XC4000 - ALTERA's FLEX 8000 and 10000, ACTEL's ACT-1,2,3 – Altera MAX 5000 and 7000.

UNITV SoC DESIGN

Design Methodologies – Processes and Flows - Embedded software development for SOC – Techniques for SOC Testing – Configurable SOC – Hardware / Software codesign Case
studies: Digital camera, Bluetooth radio / modem, SDRAM and USB.

Text Books:

1. M.J.S. Smith, "Application specific Integrated Circuits", Addition-Wesley, 2000.
2. S. Trimberger, "Field Programmable Gate Array Technology", Kluwer Academic Publishers, 1994.
3. FarzadNekoogar and FaranakNekoogar, "From ASICs to SOCs: A Practical Approach", Prentice Hall PTR, 2003.
4. R. Rajsuman, "System-on-a-Chip: Design and Test", Artech House Publishers, 2000

Reference Books:

1. Stephen Brown and Jonathan Rose "Architecture of FPGAs and CPLDs
2. Andrew Moore "FPGA FOR DUMMIES' Altera Special Edition

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CORE CORSE X

PROGRAMMABLE DIGITAL SIGNAL PROCESSOR

OBJECTIVE

To impart knowledge about Digital signal processor programming

UNIT I INTORODUCTION TO DIGITAL SIGNAL PROCESING

Introduction-Digital signal-processing system-sampling process- Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT)- Linear time-invariant systems- Digital filters- Decimation and interpolation- Analysis and Design tool for DSP Systems MATLAB- DSP using MATLAB.

UNITII COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS

Number formats for signals and coefficients in DSP systems- Dynamic Range and Precision- Sources of error in DSP implementations- A/D Conversion errors- DSP Computational errors- D/A Conversion Errors- Compensating filter.

UNIT III ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES

Basic Architectural features- DSP Computational Building Blocks- Bus Architecture and Memory- Data Addressing Capabilities-Address Generation UNIT - Programmability and Program Execution- Speed Issues- Features for External interfacing.

UNITIV EXECUTION CONTROL AND PIPELINING

Hardware looping- Interrupts- Stacks- Relative Branch support- Pipelining and Performance- Pipeline Depth- Interlocking- Branching effects- Interrupt effects- Pipeline Programming models.

UNITV PROGRAMMABLE DIGITAL SIGNAL PROCESSORS

Commercial Digital signal-processing Devices- Data Addressing modes of TMS320C54XX DSPs- Data Addressing modes of TMS320C54XX Processors- Memory space of TMS320C54XX Processors- Program Control- TMS320C54XX instructions and Programming- On-Chip Peripherals- Interrupts of TMS320C54XX processors- Pipeline Operation of TMS320C54XX Processors.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan- Digital Signal Processing Thomson Publications, 2004.
2. Lapsley et al. DSP Processor Fundamentals, Architectures & Features –S. Chand & Co, 2000.

REFERENCE BOOKS:

1. B. VenkataRamani and M. Bhaskar, Digital Signal Processors, Architecture, Programming and Applications –TMH, 2004.
2. Jonatham Stein, Digital Signal Processing John Wiley, 2005

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CORE PRACTICAL IV

ELECTRONICS IV (P)

(PIC & AVR MICROCONTROLLER, DSP and FPGA LAB)

Any 16 Experiments

1. Arithmetic and Logical operations using ALP
2. Square wave generation
3. Interfacing LCD
4. Interfacing Stepper motor
5. Interfacing Key Board
6. Interfacing Relay
7. Angle control of Stepper motor
8. Speed control of DC motor
9. Serial Communication using RS232
10. RTC interfacing using I2C protocol
11. USB Communication
12. Study of ports in AVR microcontroller with DIP switch
13. Study of LED pattern generation using AVR microcontroller
14. Study of Matrix display using AVR microcontroller
15. Interfacing PWM in AVR microcontroller to control the speed of a DC motor.
16. Study of in-built ADC in AVR microcontroller.
17. Sampling and aliasing in PDSP kit
18. Implementation of FIR filter in PDSP kit.
19. Decoder circuit implementation in FPGA
20. Four bit counter implementation in FPGA
21. PLC based Light control circuit
22. PLC based Motor control circuit

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ELECTIVE COURSE V (A)

MEMS AND NANO ELECTRONICS

OBJECTIVE

To develop expertise in the MEMS field through studying in depth advanced micro/Nano fabrication and its application.

UNIT I MEMS INTRODUCTION

MEMS or MST - Micromachining - Materials for MEMS-Silicon compatible- Silicon, silicon dioxide and nitride - thin metal films and polymers, othermaterials - Glass and fused quartz, silicon carbide and diamond-shapememory alloys - Important material properties and physical effects.

UNIT II MICRO AND NANO FABRICATION

Processes for micromachining Processes for Micromachining - Basic ProcessTools - Epitaxy - Oxidation - Sputter Deposition - Evaporation - Chemical-Vapor Deposition - Spin-On Methods - Lithography - Etching-SupercriticalDrying - Self-Assembled Monolayer - SU-8 Photosensitive Epoxy

UNIT III MEM STRUCTURES AND SYSTEMS IN RF APPLICATIONS

Signal integrity in RF MEMS-Micro machined passive components- Micro electromechanical Resonators, Microelectromechanical switches.

UNIT IV NANO LITHOGRAPHY AND NANO MATERIALS

Introduction to Nano lithography-Cross cutting technologies- EmergingNano lithography-Carbon Nano tubes- Application of Nano tubes: for storageapplication ,for field emission , for sensor application ,and for electronicapplication - Introduction to Quantum dots-Introduction to Nano composites.

UNIT V QUANTUM COMPUTATION AND MAGNETORESISTIVEMATERIALS AND DEVICES

Nano structures for quantum computation-Quantum computation algorithms-Requirements for physical realizations of quantum computers-Introductionto magnetic materials and devices - Acronyms for AMR, GMR, TMR, BMRand CMR semiconductor spintronics.

TEXT BOOKS:

1. NadimMaluf, KirtWilliams ,"Introduction to Microelectromechanical systems engineering" 2004, Second edition, Artech house, Boston.
2. Massimiliano Di ventra, StephaneEvory and James R. Hefline,Jr."Introduction to Nanoscale science and technology",KluwerAcademic Publishers, 2004

REFERENCE BOOK:

1. Anupama B. Kaul, "Microelectronics to Nanoelectronics: Materials,Devices&Manufacturability" CRC press, 2013.

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ELECTIVE COURSE V (B)

PROGRAMMABLE LOGIC CONTROLLER AND SCADA

OBJECTIVE

To learn the concept and application of Programmable Logic Controller and SCADA

UNIT I PLC INTRODUCTION

Parts of PLC; Principles of operation; Modifying the operation; PLC size and application- PLC Hardware Components: The I/O section; Discrete I/O section; Analog I/O section - Special I/O modules The CPU; Programming devices

UNITII BASICS OF PLC PROGRAMMING

Processor memory organization - PLC Programming Languages - Relay type instructions- Instruction addressing - Programming Examine IF closed and Examine IF open instructions - Electromagnetic control relay - Motor starters - Manually operated switches - Mechanically operated switches - Proximity sensor: Inductive and capacitive Proximity sensor; Output control devices; Converting relay schematics into PLC ladder programs

UNITIII PLC INSTRUCTIONS

Timer Instructions: ON-Delay timer instructions; OFF-Delay timer instructions - Counter Instructions: UP Counter - Down Counter - Allen-Bradley SLC-500 PLC Instructions: Program control instructions -Data manipulation instructions - Math instructions

UNITIV APPLICATIONS OF PLC

Simple sequence control concepts - Priority determination design - Automatic packing mechanism - Automatic control of warehouse door - Automatic lubricating oil supplier - Conveyor belt motor control - Bottle label detection - Car park control - Ball sorter mechanism - Temperature control

UNITV SCADA

Convergence of Evolving Technologies - Basics of SCADA Signal Processing - Defining the Scope of SCADA Software - Use of Generalized Terminology - Typical SCADA System Architecture - Sample Application: WTP SCADA System - Life Cycle of a SCADA Project - System Graphic Displays - Process Graphic Displays - Historical Reports and Trend Displays - Special Operating Procedures

TEXT BOOKS:

1. Frank D. Petruzella, “Programmable Logic Controllers”, Tata McGraw Hill, Third edition, 2010.
2. http://www.pacontrol.com/download/OMRON-PLC-Programming.pdf
3. Stuart G. McCrad, “Designing SCADA Application Software: A Practical Approach”, Elsevier, First edition, 2013.

REFERENCE BOOK:

1.A. W. Bolton, “Programmable Logic Controllers”, Elsevier, Fifth edition Reprint, 2011.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Environmental Science Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 17.10.2018

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Principles of Ecology and Environmental Science	6	4	3	25	75	100
	Core Course – II (CC)	Environmental Chemistry and Toxicology	6	4	3	25	75	100
	Core Course – III (CC)	Environmental Microbiology and Biotechnology	5	4	3	25	75	100
	Core Course – IV (CC)	Climate Change and Current Issues	5	4	3	25	75	100
	Core Practical – I (CP)	Environmental Chemistry, Microbiology and Biotechnology (P)	8	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Environmental Pollution Studies	6	5	3	25	75	100
	Core Course – VI (CC)	Environmental Geology, Geography and Remote Sensing	6	5	3	25	75	100
	Core Practical – II (CP)	Environmental Geology and Geography and Remote Sensing (P)	8	4	3	40	60	100
	Elective Course – I (EC)	Biodiversity and Conservation	5	5	3	25	75	100
	Elective Course – II (EC)	Environmental Ethics, Law and Policy	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII (CC)	Waste Management and Remediation	6	5	3	25	75	100
	Core Course – VIII (CC)	Energy and Green Technology	6	5	3	25	75	100
	Core Practical – III (CP)	Energy and Remediation (P)	8	4	3	40	60	100
	Elective Course – III (EC)	Natural Resource Management	5	5	3	25	75	100
	Elective Course – IV (EC)	Statistical and Computer Applications in Environmental Studies	5	5	3	25	75	100
	Total		**30**	**24**				**500**
IV	Core Course – IX (CC)	Environmental Analytical Methods	5	5	3	25	75	100
	Core Course – X (CC)	Environmental Impact Assessment and Environmental Audit	5	5	3	25	75	100
	Core Practical - IV (CP)	Environmental Analytical Methods (P)	8	4	3	40	60	100
	Elective Course – V (EC)	Industrial Pollution and Safety Management	5	4	3	25	75	100
	Project		7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Note:

Project	- 100 Marks
Dissertation	- 80 Marks
Viva Voice	- 20 Marks

Core Papers	- 10
Core Practical	- 4
Elective Papers	- 5
Project	- 1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

PRINCIPLES OF ECOLOGY AND ENVIRONMENTAL SCIENCE

OBJECTIVES

1. To study the ecological factors, structure and function of ecosystem.
2. To study about biodiversity and natural resources in the Biosphere.
3. To understand the causes, effects and control measures of pollution.

UNIT I

Definition, principle, branches and scope of ecology. Ecological factor: Abiotic –Physical and chemical factors: Soil, air, water, temperature, pH, humidity, radiation, wind, pressure, precipitation. Biotic – Limiting factors – Species interaction: Commensalism, amensalism, mutualism, competition, parasitism, prey-predator relationship. Basic components of an ecosystem – structure and functional aspects of an ECO System, Tropic structure – Ecological Niche – Ecological dominance –stability diversity rule.

UNIT II

Population: definition, characteristics, population density, natality, mortality, age distribution, growth patterns, population fluctuation, population equilibrium, biotic potentials, population dispersion and regulation of population. Ecological age pyramid. Ecological succession types, process, climax and significance of succession. Food chain –types of food chain with examples, food web, energy flow, ecological pyramid of biomass.

UNIT III

Definition, concept, structure and function of an ecosystem: producers, consumer and decomposers. Primary and secondary productivity. Ecosystem types: Terrestrial – forest, mountain, deserts and grassland. Aquatic – Freshwater (lentic and lotic) and marine (Estuary, mangroves, corals, deep sea).

UNIT IV

Definition, concept and types of biodiversity. Introduction to taxonomy. Biogeographical classification in India. Values of biodiversity. Status of biodiversity – Global, national and local status. Hot-spots of biodiversity. Endangered and threatened species. Strategies for biodiversity conservation – Insitu and Exsitu conservation, Cryopreservation, Gene banks, Gene pool and species conservation. National parks and sanctuaries. Common flora and fauna in India. Bioprospecting.

UNIT V

Definition, principle and scope of Environmental science. Earth, man and Environment interactions. Geographical classification and zones. Significance of Atmosphere, lithosphere and Hydrosphere. Biosphere – global distribution of plant biomes, spatial distribution of animals – zoogeographic realms. Environmental pollution: definition types (Air, water and soil). Biogeochemical Cycles – Availability and rate of cycling of nutrients – gaseous and Sedimentay cycle.

REFERENCES

1. Aguirre, A. Alonso. "Biodiversity and human health." EcoHealth 6.1, (2009): 153-156
2. Asthana, DK and Meera Asthana, (2014). A Textbook of Environmental Studies. S. Chand Publication, New Delhi
3. Begon M, Townsend CR & Harper JL, (2006). Ecology: from individuals to ecosystems
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CORE COURSE II

ENVIRONMENTAL CHEMISTRY AND TOXICOLOGY

OBJECTIVES

1. To understand the sources, distribution, transport, chemodynamics and fate of chemicals/pollutants in the ecosystems.
2. To acquire broad knowledge of Environmental Chemistry including development of methods for ultra-trace analysis of pollutants in air, water, soil and biological matrices.
3. To describe important chemical reactions in the lithosphere, hydrosphere and atmosphere, including smog formation, ozone chemistry, acid rain chemistry, etc.

UNIT I : Fundamentals of environmental chemistry

Stoichiometry, Gibb's energy, chemical potential, chemical equilibria, acid-base reactions, solubility product, solubility of gases in water, the carbonate system, unsaturated and saturated hydrocarbons, radionuclides.

UNIT II : Chemical composition of air

classification of elements, chemical speciation. Particles, ions and radicals in the atmosphere. Chemical processes for formation of inorganic and organic particulate matter. Thermochemical and photochemical reactions in the atmosphere. Oxygen and ozone chemistry. Chemistry of air pollutants. photochemical smog and acid rain.

UNIT III : Water chemistry

Physico-Chemical parameters of water, concept of DO, BOD, COD, sedimentation, coagulation, filtration, Redox potential, hydrological cycle, sampling techniques.

UNIT IV : Soil chemistry

Structure of lithosphere, nature of soil - physical properties of soil - soil water - soil air - soil temperature - mechanical composition- structure and texture. Chemical properties of soil: Minerals of soil - colloids in soil; ion exchange reactions in soil. Soil fertility and evaluation - organic matter in soil and their transformation - soil pH.

UNIT V : Environmental toxicology and toxicogenomics

Introduction to toxicology, toxicity evaluation methods-LD_{50}, LC_{50}, etc. Toxic chemicals in the environment -Teratogens, mutagens and carcinogens. Pollutant uptake, biotransformation, accumulation, detoxification and elimination by organisms. Toxicant effects – molecular effects and biomarkers, sublethal, acute and chronic effects. Impact of toxic chemicals on enzymes and hormones - Biochemical effects of arsenic, lead, mercury,

pesticides, PCBs, flame retardants, Environmental toxicology of nanoparticles/materials.

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CORE COURSE III

ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY

OBJECTIVES

1. To provide the students with an opportunity to learn about the fundamentals of microbes and environment interactions.
2. To make the students to understand the biotechnological aspects of microbes in biodegradation and environmental remediation.

UNIT I : Introduction to microbiology and biotechnology

Structure and reproduction of microbes in general - Bacteria, Fungi, Virus, and Actinomycetes - Sterilization and microbial culture methods - Preparation of culture media - isolation and identification of microorganisms by biochemical and molecular methods - Microbial growth kinetics - Molecular methods - Nucleic acids isolation - Restriction enzymes - PCR.

UNIT II : Aquatic microbiology

Microbiology of water - Bacteriological analysis in Water - Water pollution - Eutrophication - Waterborne diseases - Sewage microbiology - Sewage treatment - Activated sludge process.

UNIT III : Soil microbiology

Soil Microbial Community - Microbial interactions - Biogeochemical cycles - Carbon cycle - Nitrogen cycle - Biological Nitrogen fixation, ammonification, nitrification and denitrification - Phosphorus cycle - Sulphur cycle - Role of bacteria and fungi in soil fertility.

UNIT IV : Environmental application of microorganisms

Biological wastewater treatment - Effluent treatment - Anaerobic digestion and biogas production - Biodegradation, Biotransformation, Mineralization, Bioremediation of Environmental Pollutants - organic pollutants and heavy metals remediation - Bio-mining.

UNIT V : Biotechnological products of microbes

Biodegradation and Bioconversion lignocellulose to fuels - Microbial Fuels Bioethanol, Biobutanol production, Biohydrogen production - Biodeterioration - Bio-fertilizers - Bio-pesticides, Microbial enzyme - cellulases, hemicellulases - ligninases, laccases, amylases, xylanase.

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2. http://www.environmentalscience.org/environmental-microbiology-gis
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4. http://enhs.umn.edu/current/5103/gm/harmful.html
5. http://igmoris.nic.in/
6. www.wastewatertreatment.co.in/index.php
7. www.microbialfuelcell.org
8. www.pollutionissues.com/A-Bo/Bioremediation.html
9. www.bioreactors.net
10. http://www.cpeo.org/techtree/ttdescript/biorec.htm
11. http://www.personal.psu.edu/jel5/biofilms/
12. www.rdp.cme.msu.edu

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CORE COURSE IV

CLIMATE CHANGE AND CURRENT ISSUES

OBJECTIVESS

1. To understand the structure and composition of the Earth.
2. To describe the climatology pattern, changes and its effect on earth.
3. To discuss the climate change impact and its mitigation.

UNIT I

Overview of the structure and composition of the atmosphere; earth and sun relations - rotation, revolution and seasons. Atmosphere, Hydrosphere, Lithosphere, Biosphere and their linkage, Earth's geological history and development and evolution of the atmosphere; Gaina Hypothesis. Element of climate, climate controls. Species and temporal patterns of climate parameters.

UNIT II

Meteorology fundamental – Energy, radiation, temperature and heat; pressure, pressure belts, wind and atmospheric circulation; atmospheric moisture humidity, condensation, formation of precipitation, dew, fog and clouds; atmospheric stability, adiabatic process; scales of meteorology; application of micro-meteorology to vegetated surfaces, urban areas; atmospheric stability diagrams, turbulences, diffusion. Wind roses, Topographic effects, Pollutant climatology

UNIT III

Atmosphere and climate. Basic atmosphere properties, climate controls. Climate classifications and variability. Atmospheric climate - global scale, regional scale, locals scale. Oceans: General circulation patterns. Air-Sea interaction. Tropical systems– equatorial trough, ITCZ, jet streams, vortices; Indian monsoon.

UNIT IV

Global Energy balance: Source, transfer, distribution. Energy balance of the atmosphere. Wind, stability and turbulence; El Niño, southern oscillations cyclones. Natural climate changes: Records of climate change (glacial cycles, ocean sediments, corals, tree rings). Climatic considerations in industrial locations and city planning. Oceans and variation in climate.

UNIT V

Human impact on climate-causes and consequences of Global warming – Global and regional trends in greenhouse gas emissions –Sea level rise; role of oceans and forests as carbon sinks, Ozone hole. Impacts of climate changes- Effects on organisms including humans; effects on disease;

Extinction risk for temperature –sensitive species; UV effects climate change and policy: Montreal protocol; Kyoto Protocol; carbon trading. Physiography, spatial and temporal patterns of climatic parameters - temperature, rainfall and its variability in India with special reference to NE monsoon, general circulation.

REFERENCES

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3. http://www.unc.edu/~jjwest/ClimateCourse-Syllabus_2015.pdf
5. www.hmmtreasury.gov.uk/independent_reviews/stern_review_economics_climate _ change/ stern review_report.cfm.
6. www.aip.org/history/climate.
7. www.realclimate.org.
8. www.globalchange.gov/engage/process-products/sap-summary

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CORE PRACTICAL I

ENVIRONMENTAL CHEMISTRY, MICROBIOLOGY AND BIOTECHNOLOGY (P)

OBJECTIVES

1. To provide practical knowledge on basic environmental chemistry.
2. To develop experimental skills of the students in handling microbes.
3. To develop experimental skills of the students in production of microbial products for environmental applications.

PRACTICAL

1. Determination acidity, alkalinity, pH and conductivity.
2. Estimation of total solids (TS), total dissolved solids (TDS) and total suspended solids (TSS)
3. Preparation of culture media and isolation of microorganims from soils, mine contaminated area bacterial growth kinetics.
4. Isolation of bacterial DNA and gel electrophoresis.
5. PCR amplification of 16S rRNA gene, sequencing and identification of Bacteria.
6. Enumeration bacteria from water and wastewater - total coliform and total fecal coliform.
7. Estimation of Ammonium and Phosphorus content of wastewater.
8. Biodegradation of environmental pollutant by bacteria – phenol degradation.
9. Microbiological treatment of industrial (dye or paper) effluent and determination of COD.
10. Production fungal biocontrol agent for pathogen control.
11. Production and quantification of enzyme activity.

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CORE COURSE V

ENVIRONMENTAL POLLUTION STUDIES

OBJECTIVES

1. Define pollution and describe the sources, types and effects of major pollution.
2. Appreciate why access to sewage treatment and clean water are important to people in developing countries.
3. Examine the topic of pollution, its possible solutions, and the government agencies that are responsible to deal with environmental issues.
4. Enable students to understand environmental problems, looking at causal linkages between pollution sources, exposure pathways and impacts to environmental quality and human health.

UNIT I : Air Pollution

Structure of the atmosphere, Types of air pollutants, primary and secondary particulate and gaseous contaminants, their sources and impact on vegetation, animals and human beings. Photochemical smog, Bhopal gas disaster. Acid rain formation its effects on environment. Community air pollution survey. Meteorological factors in air pollution survey. Meteorological factors in air pollution, wind, Atmospheric stability, plume behaviour. Air pollution monitoring, principles of sampling and analysis of particulate and gaseous contaminants.

UNIT II : Water Pollution

Sources and types of water pollution. Classification of water pollutants - Oxygen demanding wastes, pathogens, plant nutrients, synthetic organic compounds, inorganic chemicals and mineral substances. Thermal pollution - sources and effects, an episode of thermal pollution. Sewage - nature of sewage.

UNIT III : Land Pollution

Sources, types and nature of solid wastes, effects of solid wastes, solid industrial wastes, defecation and its effects, fertilizer pollution, types of fertilizers, field run off-effects. Pesticides pollution, history, types - effects of biocides, Other forms of environmental degradation, monoculture and its impacts, Dam water development projects and its impacts.

UNIT IV : Radioactive Pollution, Noise pollution and Marine pollution

Radiation - types and units-sources natural and man-made. Effects of radioactive pollution, atomic explosions and episode. Noise pollution: Sources, types, characteristics of sound, noise, intensity annoyance, impacts of noise pollution. Marine pollution: Sources of marine pollution and control. Criteria employed for disposal of pollutants in marine system. Impact of marine pollution. Oil pollution - sources and effects, an episode of oil pollution. - coastal management

UNIT V : Environmental Pollution and Management

Applications of Advance technologies on Pollution Management - Environmental impact assessment and monitoring – cleaner production technology, waste minimization techniques – bioremediation technology, Remote Sensing and GIS technology. Green technology, Alternative energy, waste to energy conversion technology, International Organization for standardization (ISO) - Role of NGOs, Public participation. Enforcement or implantation environmental protection acts.

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CORE COURSE VI

ENVIRONMENTAL GEOLOGY, GEOGRAPHY AND REMOTE SENSING

OBJECTIVES

1. To introduce the fundamental process and dynamics that place in various components of the Geosphere.
2. To understand the structure of the earth, its formation and composition.
3. To throw light on rock cycle inclusive weathering, soil formation and land forms.
4. To understand the basics of Sedimentology including formation chemistry and transport.
5. To develop an understanding on geochronology, tectonic and ocean crust

UNIT I : Introduction to geosphere components

Fundamentals of Atmosphere (Troposphere, Mesosphere, Stratosphere, Exosphere), Hydrosphere, Lithosphere, Pedosphere and their interaction, material balance principle, Thermodynamics princ and entropy.

UNIT II : Geology and its perspective

Earth in the solar system: origin, size, shape, mass, density, rotational and revolution parameters. Formation of core, mantle, curst, and elemental abundance in each constituent. Convection in the earth's core and production of its magnetic field. Mineral: physical properties (form, colour, lusture, strak, cleavage, fracture, hardness, specific gravity) and chemical composition. Silicate structure and their classification.

UNIT III : Rock Cycle and weathering

Types of rocks and their composition, controlling factors and products of weathering. Soil formation, soil profile and soil types. Important erosional and depositional landforms produced by running water: waterfalls, rapids, meanders, oxbow lakes, floodplains, levees, alluvial fans, stream terraces and deltas. Youth, mature and old stages of river systems. Stream patterns.

UNIT IV : Radioactivity and age of the earth

Radio isotope dating methods and geochronology, Elementary ideas of various geotectonic units namely shield, craton, platform, orogenic belt, mid-oceanic ridge, ocean island arc, deep sea trenches and their examples. Elementary ideas about seafloor spreading, plate tectonics, and continental drift.

UNIT V : Remote Sensing and GIS

Remote Sensing and GIS – Definition, Principles and Concept of Remote Sensing, Types, Components of GIS, Concept. Sensors – Satellite Remote Sensing Sensors. Data Processing – Digital Image Processing, Visual

Interpretation. GIS – GIS Softwares, Spatial Database Creation, Integration, Analysis. Application of Remote Sensing and GIS for Environmental Studies – Land Use/Land Cover Changes, Forest Management, Natural Resource Management, Pollution Mapping and Biodiversity Assessment.

REFERENCES

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10. Burrough P.H and Mc Donnelli (1998) Principles of Geographical Information System, Oxford University Press.

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CORE PRACTICAL II

ENVIRONMENTAL GEOLOGY, GEOGRAPHY AND REMOTE SENSING (P)

OBJECTIVES

1. To experimentally understand the basic structure of rocks and their mineral composition
2. To read the toposheet and identify topographical features for further environmental analysis
3. To process maps and analyze environmental data using GIS softwares
4. To visualize the satellite imageries and interpret geographical, geological and ecological features using ERDASS software.

1. Structure of geology and geophysical method
2. Identification of rock types
3. Introduction of toposheet /Basic Mapping and Creation of a database
4. Georeferencing of toposheet and Projection and transformation of Raster data (toposheet)
5. Basic of Digitization, Data editing and topology creation
6. Data analysis and output map generation
7. Study of satellite Imagery in different bands and visual interpretation
8. Identification of feature on satellite imagery
9. Georeferencing of image using Erdas Imagine
10. Demonstration of GPS (Global position system)

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ELECTIVE COURSE I

BIODIVERSITY AND CONSERVATION

OBJECTIVES

1. To maintain essential ecological processes and life supporting systems.
2. To preserve the diversity of species or the range of genetic material found in the worlds organisms.
3. To make sustainable utilization of species and ecosystems.

UNIT I : Biodiversity – Concept and Definition

Scope and Constraints of Biodiversity Science, Composition and Scales of Biodiversity: Genetic Diversity, Species/ Organismal Diversity, Ecological/ Ecosystem Diversity, Landscape/ Pattern Diversity, Agrobiodiversity, Biocultural Diversity and Urban Biodiversity.

UNIT II : Values of biodiversity

Instrumental/Utilitarian value and their categories, Direct use value; Indirect/ Non-consumptive use value, Introduction to Ecological Economics; Monetizing the value of Biodiversity; Intrinsic Value; Ethical and aesthetic values, Anthropocentrism, Biocentrism, Ecocentrism and Religions; Intellectual Value; Deep Ecology.

UNIT III : Threats to biodiversity

Habitat Destruction, Fragmentation, Transformation, Degradation and Loss: Causes, Patterns and consequences on the Biodiversity of Major Land and Aquatic Systems Invasive Species' pathways, biological impacts on terrestrial and aquatic systems. Extinction: Types of Extinctions, Processes responsible for Species Extinction, Current and Future Extinction Rates, IUCN Threatened Categories, Sixth Extinction/Biological Crisis.

UNIT IV : Introduction to conservation biology

The history and distinctions of conservation Biology, Emergence of Global Conservation (Developing and Developed Nations) strategies

In response to expanding anthropogenic demands, In response to global climate changes, Multidimensional aspects of conservation biology-*in situ*, *ex situ*, Biogeographic classification.

UNIT V : Conservation challenges in the twenty first century:

Urbanisation; Creating knowledge society, Conflict management and decision making, Management of introduced species.

Evaluation of priorities for conservation of habitats and species

Selection criteria for protection of species – species quality, IUCN Guidelines for Red List categories and criteria (version 7.0), Red List of Indian Flora and Fauna, Selection criteria for protection of habitats – hotspots, Conservation indices.

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1. Groom MJ, Meffe GR and CR Carroll, (2006). Principles of Conservation Biology. Sinauer Associates, Inc., USA
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4. Hambler C and SM Cannly, (2013). Conservation. Cambridge University Press.
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ELECTIVE COURSE – II (EC)

ENVIRONMENTAL ETHICS, LAW AND POLICY

OBJECTIVES

1. To learn the basic concepts of constitutional frame work of India with emphasis to Environmental protection
2. To understand the pollution control laws in India with respect air, water soil, wildlife and biodiversity
3. To develop and understanding about the powers of Government and Judiciary in Environmental Protection

UNIT I

Environment and Constitution of India – Environmental Legislature Machinery – Constitutional Status of Environment – Duty to Protect Environment – Role of Public Interest Litigation in Environmental Protection – Constitutional Justification – Ethics - Concepts - Ethical theories - consequential theory - deontological theory - virtue ethics - situation ethics - feminist ethics.

UNIT II

Laws on Water Pollution Control – Powers of Central and State Pollution Control Boards – Prevention and Control of Water Pollution – Judicial Restraint Order – Closure or Stoppage of Water and Electricity Supply – Citizen Suit Provision – Power of Central Government to Supersede the Central Board – Power of State Government to Supersede the State Board.

UNIT III

Laws on Air Pollution Control – Powers and Functions of Boards – Air Pollution Control Areas –Prohibition of Emissions of Air Pollutants – Judicial Restraint Order – Citizen Suit Provision – Offenses and Penalties.

UNIT IV

Legal Protection of Forests and Wild Life – The Forest Act 1927 – Constitutional Status – The Forest (Conservation) Act 1980 Application of Act to Union Territories – Hunting of Wild Animals – Sanctuaries or National Parks – Prohibition of Trade or Commerce in Wild Animals, Animal Articles – Offences and Penalties. Biodiversity Act and Rules.

UNIT V

Environment (Protection) Act 1986 – Powers of Central Government – Legal Regulation of Hazardous Substances – Hazardous Wastes (Management and Handling) Rules 1989 – The Natural Environment Tribunal Act 1995 – Legal Measures to Control Noise Pollution. EIA 1994 and 2006.

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4. Singh RB and Mishra (1996) Environmental law in India – Issues and Responses Concept Publishing, New, Delhi
5. Tiwar AK (2006) Environmental law in India, Deep & Deep Publishing, New, Delhi

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CORE COURSE VII

WASTE MANAGEMENT AND REMEDIATION

OBJECTIVES

1. To provide information about various types wastes and waste characteristics.
2. To introduce about the waste management practices - collection and treatment of various types of wastes.
3. To impart knowledge on waste remediation and recycling processes.

UNIT I : Introduction to waste and pollution

Wastes - Introduction, sources, collection, characteristics, composition, types of wastes – Global scenario of wastes - wastes generation per capita - Wastes collection, storage, segregation – disposal methods - sanitary land fillings.

UNIT II : Municipal Solid wastes management

MSW – Sources, types, collection, transportation and disposal – Waste segregation, resource recovery, recovery of recyclable and non-recyclable wastes – reuse and recycling of MSW – Disposal – Incineration, pyrolysis, composing, aerobic and anaerobic digestion. Biomedical wastes – source, types, disposal principles.

UNIT III : Hazardous Waste Management

Introduction, characteristics, sources – Types of hazardous wastes (industrial, hospital, domestic) – Handling of hazardous solid wastes – segregation and recovery – Disposal of hazardous wastes – Radioactive hazardous wastes – source, types, control, management and remediation.

UNIT IV : Plastic and E-wastes

Plastic wastes - Sources, Facts and figures of plastic wastes in national and international level, environmental effects and control measures – E-wastes – sources, types, recovery, reuse – E-wastes pollutant chemicals - E-wastes Environmental impacts.

Unit V : Remediation of Pollutants

Bioremediation - Description – Biostimulation, Gaseous nutrient stimulation organic liquid stimulation – Bio-augmentation – Limitations and Concerns – Biofertilizer technology – Bio composting techniques.

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4. www.satavic.org/vermicomposting.htm
5. http://web.mit.edu/urbanupgrading/urbanenvironment/sectors/solid-wastelandfills.html
6. www.cement.org/waste/wt_apps_radioactive.asp
7. www.ipma.co.in/recycle.asp
8. www.algae.info
9. http://www.epa.vic.gov.au/business-and-industry/lower-your-impact/~/media/Files/bus/EREP/docs/EREP-waste-management-seminar.pdf
10. http://www.tn.gov.in/dtp/publications/SWM/SWM_161to184.pdf
11. http://energy.gov/em/services/waste-management
12. https://www.unesco-ihe.org/online-course-solid-waste-management
13. http://www.bostonelectronicwaste.com/go-green/what-is-ewaste
14. http://www.ces.iisc.ernet.in/energy/paper/ewaste/ewaste.html
15. http://ec.europa.eu/environment/waste/plastic_waste.htm

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CORE COURSE VIII

ENERGY AND GREEN TECHNOLOGY

OBJECTIVES

1. To study the energy and its effects.
2. To understand the concepts of green technology composite on environment.
3. To study ecological economics and green energy management.

UNIT I

Types of energy: oil, natural gas, coal, solar, wind, their merits and demerits, (effect of price controls, cost benefit) and environmental perspectives - Renewable and non-renewable energy - The McCkelvey classification of energy resources. Commercial and non-commercial energy economic issues

UNIT II

New Energy Materials: Carbon nano-tubes (CNTs) and multiwall carbon nanotubes (MWCNTs) methods of production, properties and its utility in energy devices. Recent advances in new energy materials, concepts of Green Composites: Low Energy Approaches to Water Management. Management of Solid Wastes and Sewage. Urban Environment and Green Buildings.

UNIT III

Approaches from ecological economics; indicators of sustainability; ecosystem services and their sustainable use; bio-diversity; Indian perspective; alternate theories. environmental reporting and ISO 14001; climate change business and ISO 14064; green financing; financial initiative by UNEP; green techniques and methods, green energy management.

UNIT IV

Criteria for choosing appropriate green energy technologies, life cycle cost; the emerging trends –process/product innovation; Eco/green technologies for addressing the problems of water, energy, health, agriculture and biodiversity- WEHAB (eco-restoration/ phyto-remediation, ecological sanitation, renewable energy technologies, industrial ecology, agro ecology and other appropriate green technologies); design for sustainability (4Ds).

UNIT V

The inseparable linkages of life supporting systems, biodiversity and ecosystem services and their implications for sustainable development; future energy Systems- clean/green energy technologies; International agreements/conventions on energy and sustainability - United Nations Framework Convention on Climate Change (UNFCCC).

REFERENCES

1. Climate Responsive Architecture, (2001). TataMcGraw Hill
2. Loulou Richard, Waaub Jean-Philippe, Zaccour Georges, (2005), Energy and Environment Set: Mathematics of Decision Making, XVIII, 282 p. ISBN: 978-0-387-25351-0
3. EH Thorndike, (2000). Energy and the Challenge of Sustainability, World Energy assessment, UNDP, N York, 8 [4] Energy & Environment: A Primer for Scientists and Engineers, Addison-Wesley Publishing Company.
4. Ristinen, Robert A Kraushaar, Jack JA Kraushaar, Jack P Ristinen, Robert A, (2006). Energy and the Environment, 2nd Edition, John Wiley, ISBN:9780471172482; Publisher: Wiley, Location: New York
5. Markus TA and Morris EN, (1980). Buildings Climate and Energy. Pitman, London, Arvind Kishan et al (Ed)
6. Michael F, (2009). Ashby Materials and the Environment, Elsevier
7. Nick Hanely, Jason F Shogren and Ben White, (2001). "Introduction to Environmental Economics", Oxford University Press.Chapter 14
8. Osman Attmann, (2010). Green Architecture Advanced Technologies and Materials. McGraw Hill
9. Parry C Field, (2001). Natural Resource Economics, Mcraw Hill. Chapters 10 & 11
10. Wilson, R. & Jones, W. J., Energy, Ecology and the Environment, Academic Press Inc.

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CORE PRACTICAL – III

ENERGY AND REMEDIATION (P)

OBJECTIVES

1. To provide the practical knowledge on green energy and its benefits.
2. To develop the experimental skills of the students in utilizing wastes for better management.

1. New energy materials
2. Microbial fuel cells
3. Solar battery
4. Solar cooker
5. Solar lantern/light
6. Waste segregation survey for better management at local level
7. E-wastes survey at institution level
8. Waste to wealth through vermicomposting
9. Biofertilizers
10. Biocomposting techniques
11. Phytoremediation
12. Microbial remediation

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ELECTIVE COURSE III

NATURAL RESOURCE MANAGEMENT

OBJECTIVES

This course will provide the students with the knowledge of natural resources, their types and their availability. The students will understand the environmental impact of overuse of these resources. The students will learn the importance of management of these resources and how to manage them.

UNIT I

Introduction to Natural Resource (Renewable & Non –renewable Resources) Bases: Concept of resource, classification of natural resources. Factors influencing resource availability, distribution and uses. Interrelationships among different types of natural resources. Concern on Productivity issues. Ecological, social and economic dimension of resource management.

UNIT II

Forest resources: forest vegetation, status and distribution, major forest types and their characteristics. Timber extraction, mining, dams and their effects on forest and tribal people, deforestation and forest management. Developing and developed world strategies for forestry. Land resources: Dry land, land use classification, land -degradation, man induced landslides, soil erosion and desertification. Landscape impact analysis, wetland ecology and management. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Water ecology and management. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

UNIT III

Marine resources: Production, status, dependence on fish resource, unsustainable harvesting, issues and challenges for resource supply, new prospects. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Resource Management Paradigms. Resource conflicts: Resource extraction, access and control system. Approaches in Resource Management: Ecological approach; economic approach; Poverty and implications in Resource Management in developing countries .

UNIT IV

Management of Common International Resources: Ocean, climate, International fisheries and management commissions; Biological classification of India: Endangered and endemic species of India: Antarctica:

the evolution of an international resource management regime. Environmental Scenario in India, National Forest policy act in 1998.

UNIT V

Case Studies: Resource management in mountain ecosystem, Dry-land ecosystem, Management of marine and coastal resources, shifting cultivation, Mangrove ecosystem and their management

REFERENCES

1. Agarwal KC, (2001). Environmental Biology, Nidhi Publication Ltd. Bikaner
2. Chapin FS, Kofinas GP, Folke C, (2009). Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World. Springer; 1 edition. ISBN-10: 038773032X. ISBN-13: 978-0387730325
3. Mann KH, (2000). Coastal Ecology & Management, Ecology of Coastal Waters with Implications for Management (2nd Edition).Chap. 2-5, pp.18-78 & Chap. 16, pp.280-303
4. Cunningham WP, Cooper TH, Gorhani E & Hepworth MT, (2001). Environmental Encyclopedia, Jaico Publishing House
5. Daniel R Lynch, (2009). Sustainable Natural Resource Management. ISBN: 9780521899727
6. Suresh, K. Dhameja, (2004-2005). Environmental Science and Engineering
7. Francois Ramade, (1984). Ecology of Natural Resources. John Wiley & Sons Ltd.
8. Vitousek PM, (1994). Global Change and Natural Resource Management, Beyond global warming: Ecology and global change. Ecology 75, 1861-1876
9. Heywood VH & Watson RT (1995). Global Biodiversity Assessment. Cambridge Univ. Press.
10. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
11. Odum EP, (1971). Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
12. Townsend C, Harper J, and Michael Begon. Essentials of Ecology, Blackwell Science

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ELECTIVE COURSE IV

STATISTICAL AND COMPUTER APPLICATIONS IN ENVIRONMENTAL STUDIES

OBJECTIVES

1. To study the basics of statistics and information technology,
2. To understand the statistical and computer application in Environmental Studies.
3. To learn applications of computer, hard ware and software.

UNIT I

Introduction to Statistics: scope, limitations of statistics, statistical method and experimental method. Collection of data, sampling, classification and tabulation of data. Diagrammatic & graphic presentation of data. Information technology: Information Types, needs, data processing, computer network and Internet. Computer application in Environmental Studies.

UNIT II

Descriptive statistics – Introduction, measure of central location, mean, mode, median, measure of shapes. Properties of mean, measure of spread, variance and standard deviation, co-efficient of variation. Sampling theories and Hypothesis testing, techniques and experimental designs. Testing hypothesis: Significance level and X2 test, t and F test.

UNIT III

Correlation, regression and ANOVA: Analysis of variance: One way and two way ANOVA, MONOVA, Regressions: Defining the fit, Correlation, polynomial regression, multiple regression, P-Value.

UNIT IV

Introduction: History of Computer; character and organization – types and generation of computer. Hard ware and Software: Types of memory; primary (RAM, ROM, PROM, EPROM, EEPROM) and secondary (Floppy, hard disc, eband DVD), video terminal, OMR, OCR, Printers and scanners Operating system- Introduction; DOS: UNIX, Linux, M.S. Office.

UNIT V

Environmental Statistics & Computer Application - Tabulation of data. Graphical presentation of data; line graph, bar chart, cumulative bar chart, percentage bar, chart, pie chart and three dimensional graphs. Frequency analysis; Univariate and bivariate frequency tables. Calculation of mean, median and mode. Calculation of modal frequency; grouping table and analysis table. Testing and hypothesis; application of't' test. ANOVA:

application and problems. Calculation of correlation and regression. Data sheet and data management. Simple statistical work using Excel spread sheet.

REFERENCES

1. Bryan FJ, Manly, (2008). Statistics for Environmental Science and Management, Second Edition, ISBN 9781420061475.
2. Ford ED, (2000). Scientific methods for Ecological Research. Cambridge University Press, Cambridge
3. John Schuenemeyer, Larry Drew, (2011). Statistics for Earth and Environmental Scientists.
4. Rosner B, (1986), Fundamentals of Biostatistics, Duxbury Press, Boston
5. Snedecor W and G Cochran, (1967). Statistical Methods. Oxford and IBH Publishing Co. Calcutta
6. Zar JH, (1984). Biostatistical Analysis. Prentice-hall, Inc Englewood Cliff, New Jersey

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CORE COURSE IX

ENVIRONMENTAL ANALYTICAL METHODS

OBJECTIVES

1. To explain fundamental principles for environmental analytical methods (titration, spectrophotometry, spectroscopy, chromatography, electro-chemistry, etc.)
2. To develop both the analytical toolsets and mindset for quantitative research.
3. To develop ability to acquire suitable analytical techniques for analyzing a specific compounds in an environmental matrix.

UNIT I : Microscopy

Introduction to microscopy. Principles and applications of light, phase contrast, fluorescence, confocal, atomic force, scanning and transmission electron microscopy (SEM & TEM) -. Cytophotometry, fixation and staining.

UNIT II : Biomolecular Separation Techniques

Centrifugation - Differential and Ultracentrifugation. Chromatography - Principles and applications of gel filtration, and Column Chromatography ion-exchange, Size exclusion and affinity chromatography. Paper and Thin Layer Chromatography, High Pressure Liquid Chromatography (HPLC).

UNIT III : Bioanalytical Techniques

Titrimetry, Gravimetry, Colourimetry, Flame Photometry. Spectrophotometers – Fluorescence, Visible, UV and IR. NMR spectroscopy. AAS, ICPOES, ICPMS, Amino Acid analyzer, HPLC, GC, GC-MS, LC-MS, SELDI-TOF-MS, MALDI-TOF-MS and Bio-Sensors. Application of X-ray - fluorescence and diffraction.

UNIT IV : Molecular Techniques

Electrophoresis - PAGE, PFGE, SDS-PAGE, Agarose gel, Immunoelectrophoresis, 2D electrophoresis - Gel documentation. Principle and applications of PCR, RT-PCR, RFLP, RAPD, AFLP and DNA fingerprinting. Principle and applications of DNA sequencing - Automated DNA sequencing, Gene silencing and Knock out- Microarray technique.

UNIT V : Blotting and Tracer Techniques

Principles and techniques of Southern, Northern and Western blotting techniques and Hybridization. Principles and applications of radioactive isotopes, Autoradiography and Scintillation counter, Geiger Muller counter.

REFERENCES

1. Avinash Upadhyay, Kakoli Upadhyay and Nirmalend Nath, (2009). Biophysical Chemistry: Principles & Techniques, Himalaya Publishing House
2. Debajyoti Das, (2001). Biophysics and Biophysical Chemistry, Academic Publishers Kolkata
3. Purohit SS, (2005). Biotechnology Fundamentals & Applications, Agrobios.
4. Ashok Kumar, (2006). Biotechniques of Ecology, Discovery Publishing Pvt. Ltd, New Delhi
5. Gary Siuzdak, (2006). Mass Spectrometry for Biotechnology, Elsevier New Delhi Academic Press
6. Jon Cooper and Tony Cass, (2004). Biosensors, Oxford University Press, USA
7. Keith Wilson, John Walker, (2010). Principle & Techniques of Biochemistry & Molecular Biology, Cambridge University Press
8. Lacey AJ, (1999). Light Microscopy in Biology, Oxford University Press, USA.
9. Lipton Mary S, Paša-Tolic Ljiljana, (2009). Mass Spectrometry of Proteins & Peptides, Humana Press
10. Mukhopadhyay SN, (2001). Process Biotechnology Fundamentals, Viva Books, New Delhi
11. Ralph Rapley& John M Walker, (1998). Molecular Bio methods Handbook, Humana Press New Jersey
12. Rodney F. Boyer, (2006). Biochemistry Laboratory: Modern Theory & Techniques, Prentice Hall
13. Thomas Jue, (2009). Fundamental Concepts In Biophysics, Humana Press.
14. William Wu, Helen H Zhang , Michael J Welsh , Peter B Kaufman, (2001). Methods in Gene Biotechnology, CRC Press New York
15. Khopkar SM, (1998). Basic Concepts of Analytical Chemistry.New Age International.
16. Skoog DA, West DM, Holler FJ, and Crouch SR, (2013). Fundamentals of Analytical Chemistry (Cengage Learning)

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CORE COURSE X

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL AUDIT

OBJECTIVES

1. To understand about development projects and their impacts on Environment
2. To learn about the EIA practice in India and the legal framework in environmental clearance
3. To know about the EIA process and various steps involved in baseline studies, methods in assessment of environmental impacts and environmental management plan
4. To understand about environmental audit and the methods to carry out audit process

UNIT I : Introduction to Environment and Development

Development Projects - Impacts on Environment -Long-term Impacts - Short-term Impacts – Reversible and Irreversible Impact **-** Sustainable Development – Role of EIA in Sustainable Development – Aim of EIA - EIA inputs to project planning - Benefits of EIA

UNIT II : EIA Basics

Concept of EIA, Evolution of EIA, EIA practice in India, **EIA Notifications 1992, 1994, 1997 2009 of MoEF&CC, Coastal Regulation Zone Notifications**, Project Screening in EIA, Defining and Examining Scope, OBJECTIVESs and Alternatives in EIA Projects, Project Planning and processes, Baseline information, Impact prediction, decision making.

UNIT III

Types of EIA, Rapid ElA, Comprehensive EIA, Strategic EIA, Data Collection, Ecological Impacts, Environmental Impacts (Air, water, Land Noise), Socioeconomic and cultural Impacts, Health impacts, Prediction of Impacts; Methodologies, Cost Benefit analysis, Environmental Management Plan (EMP). Preparing and Writing of Environmental Impact Statements (EIS), Computer aided techniques, Reviewing EIA/EIS, Use of EIA in Public participation and decision making,

UNIT IV : Introduction ISO14000 and Environmental Audit

ISO 14000 Organizational Standards -Environmental Management Systems (EMS) - Environmental Auditing (EA) - Environmental Performance Evaluation (EPE) – EMS overview: Environmental Policy Development – Plan, do, check act. Environmental Audit program development and management - EMS Audit program design - type and scope of audits - Program administration

UNIT V : Audit Process

Pre-audit activities - On-site activities - Post site activities - Report and followup -Case Study Analysis - Audit Assessment. Auditor qualification, Auditing standards - Evaluating information - Internal reporting and communicating -External reporting and communicating

REFERENCES

1. AK Shrivastava, (2003). Environmental Impact Assessment, APH Publishing Corporation, New Delhi
2. SA Abbasi and DS Arya, (2004). Environmental Impact Assessment, Discovery Publishing House New Delhi
3. VS Kukarni, SN Kaul, RK Trivedi, (2002). A Hand book of Environmental Impact Assessment, Scientific Publishers, Jodhpur
4. Edited Maria Rosario, (2000). Perspectives on Strategic Environmental Assessment, Lewis Publishers, USA

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CORE PRACTICAL IV

ENVIRONMENTAL ANALYTICAL METHODS (P)

OBJECTIVES

1. Demonstrate insight into how to tackle practical analytical chemical problems
2. Demonstrate understanding of the basic theory and relevant parameters in analytical chemistry
3. Apply methods of instrumental chemical analysis to natural materials and (eco)systems
4. Demonstrate awareness of the limitations of the various methods
5. Report about experimental chemical analytical results and draw correct conclusions

PRACTICAL

1. Paper Chromatography
2. Thin-layer Chromatography
3. Gas Chromatography
4. Cell fractionation
5. Isolation of DNA from liver tissue
6. Electrophoresis
7. Isolation and estimation of chlorophyll by UV-spectrophotometry
8. Sample extraction methods: Liquid-liquid extraction (LLE), Solid phase extraction (SPE), Ultrasound assisted extraction (UAE), soxhlet extraction
9. Determination of pesticides in water samples using liquid liquid extraction

REFERENCES

1. Edited Helmut Gunzler and Alex Williams, (2001). Handbook of Analytical Techniques WILEY Germany
2. Roger N. Reeve, (2002). Introduction to Environmental Analysis. John Willey & Sons Ltd.

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ELECTIVE COURSE V

INDUSTRIAL POLLUTION AND SAFETY MANAGEMENT

OBJECTIVES

1. Examine the relationship between work activities and their effect on the environment
2. Identify the main sources of man-made pollutants and examine their typical patterns of emission and distribution
3. Consider the technical and scientific control measures available to mitigate the impact of industrial emissions and discharges into the environment
4. Understand the different types of wastes generated in an industry, their effects on living and non-living things
5. Understand environmental regulatory legislations and standards and climate changes

UNIT I : Tanneries and Distillary

Production of leather, vegetable tanning and chrome tanning processes. Sources and characteristics of wastes. Effect of tannery effluent and other wastes on receiving bodies and treatment methods of the wastes. Sugar mills and Distilleries - their manufacturing processes, sources and characteristics of their wastes. On receiving bodies, Treatment of their wastes and disposal.

UNIT II : Paper and Pulp, and textile industries

Manufacturing processes, sources and characteristics of wastes. Effect of wastes. Treatment processes of the wastes. Textile mills - manufacturing processes, sources and characteristics of wastes. Effects of the wastes on receiving bodies. Treatment of the wastes.

UNIT III : Cement and energy Industries

Manufacturing process, sources of pollution and wastes. Effect of wastes. Control technique of pollution. Oil refineries and thermal power plants-processes involved. Sources of pollution characteristics of pollutants and their effects. Pollution control techniques.

UNIT IV : Fertilizer and pharmaceutical Industries

Manufacturing processes, sources and characteristics of wastes and their effects. Treatment processes pharmaceutical plants: manufacturing processes sources and characteristics of wastes and their effects. Treatment of wastes.

Unit V : Safety Management and Industrial Acts

Industrial safety- Causes of accident, Accident reporting system, Accident prevention, Disaster planning, Safety committee. Hazards control- Elimination, Control, Isolation, Substitution, Personal protective equipment, medical first aid- management of medical emergencies.

Labour laws: factories act 1948, Mines act 1952, ESI act 1948- Health organizations: NIOH,AIIHPH, NHO,WTO.OSHA standards.

REFERENCES

1. Austin GT, Shreves, (1977). Chemical processes in industries. McGraw Hill Book Co., New York
2. Khudesia VP, (1986). Industrial pollution control. Pragati Prakasham, Meerut
3. Mahajan SP, (1986). Pollution Control in process industries. Tata McGraw Hill Co. Ltd., New Delhi
4. Rao MN and Datta, (1982). Wastewater treatment. Oxford and IBH, New Delhi.
5. Sharma, B.K. (1991). Industrial Chemistry. Krishna Prakashan Mandir,Meerut.
6. Trivedy, B.K. (1991). Pollution control in industries. Enviro media publishing Co., Karad
7. Benjamin O Alli, (2008). Fundamental principles of Occupational Health and Safety, Second Edition, International Labour Office, Geneva
8. Marci Z Balge, Gary R Krieger, (2000). Occupational Health and Safety, National Safety Council Press.3rd Edition. Itasca
9. Bill Walash and Lawrence Russel, (1974). ABC of industrial safety, Pitman Publishers, UK
10. Charles D. Reese, (2008). Occupational Health and Safety Management: A Practical Approach, CRC Press, USA
11. Herman Korean, Michael S Bises, (1996). Handbook of environmental health and safety, Principles and Practice, Lewis publishers
12. Paul A Erickson, (1996). Practical Guide to Occupational Health and Safety, Academic Press, USA
13. Sell NJ, (1992). Industrial Pollution Control: Issues and Techniques, John Wiley & Sons
14. Rieske DW and Asfahl CR, (2011). Industrial Safety and Health Management, Pearson Education.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Fashion Technology & Costume Designing

Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course - I (CC)	Technical Textiles	6	5	3	25	75	100
	Core Course - II (CC)	Apparel Production Technology	6	5	3	25	75	100
	Core Course - III (CC)	Apparel Standards and Quality Control	6	5	3	25	75	100
	Core Course - IV (CC)	Textile Wet Processing	6	5	3	25	75	100
	Core Practical - I (CP)	Textile Wet Processing (P)	6	4	3	40	60	100
		Total	**30**	**24**				**500**
II	Core Course - V (CC)	Fashion Concepts	6	5	3	25	75	100
	Core Course - VI (CC)	Pattern Making and Clothing Construction	6	4	3	25	75	100
	Core Course -VII (CC)	Apparel Merchandising	6	4	3	25	75	100
	Core Course -VIII (CC)	Entrepreneurship Development	6	5	3	25	75	100
	Elective - I	Advanced Garment Designing (P)	6	4	3	40	60	100
		Total	**30**	**22**				**500**
III	Core Practical - II (CP)	Fashion Illustration and Portfolio (P)	6	5	3	40	60	100
	Core Practical - III (CP)	Computer Application in Apparel Industry (P)	6	4	3	40	60	100
	Core Course - IX (CC)	Research Methodology & Statistics	6	5	3	25	75	100
	Elective - II	Clothing Production Management	6	4	3	25	75	100
	Elective - III	Apparel Export Management & Global Marketing	6	4	3	25	75	100
		Total	**30**	**22**				**500**
IV	Core Course - X (CC)	Knitting Garment Technology	6	5	3	25	75	100
	Core Course - XI	Textile Economics	6	4	3	25	75	100
	Project Work	Dissertation=80 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	6	5	-	-	-	100
	Elective - IV	Fashion Communication and Visual Merchandising	6	4	3	25	75	100
	Elective - V	Home Textiles	6	4	3	25	75	100
		Total	**30**	**22**				**500**
Grand Total			**120**	**90**				**2000**

Note:

Core Papers	-	11
Core Practical	-	3
Elective Papers	-	5
Project	-	1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate.

Project

Dissertation	80 Marks	[2 reviews – 20+20	=	40 marks
		Report Valuation	=	40 marks]
Viva	20 Marks			20 marks

Passing Minimum in a Subject

CIA	40%	Aggregate 50%
UE	40%	

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CORE COURSE I

TECHNICAL TEXTILES

Objectives:

1. To make known the field of technical textiles to students
2. To impart knowledge about the application of textiles for technical purposes

Unit I Technical textiles

Introduction, definition and scope of technical textiles. Technical fabric structure-Woven and non-woven.

Unit II Home textiles

Definition, Bed linens, Floor covering, Wall coverings Door and window treatments, Table and kitchen linens.

Unit III Medical and Survival textiles

Introduction. Non implantable materials, Implantable materials, Health care and hygience, textiles. Tents, helmets, gloves, sleeping bag, Survival bags and Suits.

Unit IV Textiles in transportation and Geo Textiles

Introduction, Textiles in Cars, Road vehicles, Rail ways, Aircraft and Marine applications. Essential properties of Geo Textiles, Applications of Geo Textiles, Natural fiber for soil strengthening.

Unit V Textiles in defence

Textiles for Protection, Thermal insulation materials, Camouflage concealment and deception, Flame and Heat protective textiles, Ballistic protective materials, Intelligent textiles-use of Wearable electronics

References:

1. Horrocks, A.R. and Anand, S.C., Handbook of Technical Textiles, The Textiles Institute, Wood Head Publishing Ltd., England, 2000.
2. Rigby, A.J. and Anand, S.C., Non-wovens in Medical and Healthcare Products, Technical Textiles, Int., 1996.
3. Pandy, S.N., Potential for the use of Natural Fibres in Civil Engineering, Jute Technological Research Laboratory, 2002
4. Grosick, Z.J.Walson's Advanced Textile Design-compound woven structures, Woohead Publishing, England, 2004.
5. Murphy W.S, Textile Finishing, Abhishek Publications, Chandgarh, 2000.

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CORE COURSE II

APPAREL PRODUCTION TECHNOLOGY

Objectives:

1. To understand the apparel production methods
2. To analyse the essentials of apparel industry

UNIT I Introduction to apparel production management

Definitions, Objectives and terminology, function of production department, factors of Production - duties and responsibilities of production manager, process flow in apparel production, work allotment and line supervision.

UNIT II Apparel production planning

Definition, Pre planning: Pre-production functions, Importance of Preproduction function. Lead Time, Product development - steps from prototype to production sample, Production control and product data management, capacity and material requirement planning.

UNIT III Apparel production methods

Methods of apparel production - whole garment production system, Progressive bundle system, Unit production system, Multiple flow system, Modular manufacturing systems, procedure for choosing suitable production system and their advantages and disadvantages.

Quick Response(QR), Just in Time Production system (JIT), Optimized Production Technology (OPT) and other methods followed to increase productivity in garment industry.Cut order planning – types of spreads, spreading methods, efficient marker utilization and economic cut quantities,cutting ticket, bundle control sheet.

UNIT IV Apparel Plant requirements

Introduction to garment industry- plant location, plant layout, process layout, product layout, combination layout. Determination of man power and machines for balanced production in apparel unit, material management and control.

UNIT V Work Study

Basic tools – work measurement, method study and time study based on Process Flow Chart - Flow Diagrams. Objectives of work study, method analysis, workplace layout, operation sequence, work aids and attachments, operator monitoring, cycle checks.

References:

1. Jacob Solinger, Apparel Production Handbook, Reinhold Publications, 1998.
2. Rajesh Bheda, Managing Productivity of Apparel Industry, CBI publishers and distributors, 2002.
3. Carr Harold, Latham Barbara, The Technology of Clothing Manufacture Om Book Service, 2004.
4. Gerry Cooklin, Introduction to Clothing Manufacture, Blackwell Science Ltd., 2005.
5. Churter, A.J., Introduction to Clothing Production Management, Oseney Mead, 2001.

CORE COURSE III

APPAREL STANDARDS AND QUALITY CONTROL

Objectives:

1. To study garment defects and inspection
2. To understand the apparel quality standards

UNIT I Introduction to Quality standards

Introduction to Quality standards – importance – benefits - levels & sources of quality standards - British standards & ISO standards for the apparel industry – ISO 9000 & 14000 standards & SA 8000 - Total Quality Management systems. Quality – Introduction – definition & importance –quality inspection – raw material – product – online – final inspection

UNIT II Garment defects

Garment defects: Cutting defects - Sewing defects - assembly defects – Pressing - Finishing & Packaging defects. Concepts of TQM - tools used for quality assurance - Care labels - International care labelling system – Japan –Canada -British care labelling systems.

UNIT III Quality control program

Starting a quality control program, implementation of quality system in production line – Product specification & analysis using analytical tools - Quality management through inspection & Seven quality tools.

UNIT IV Testing Standards and Specifications

Testing Standards and Specifications fibre length, maturity, yarn strength-yarn count, Bursting strength, Abrasion, Pilling, Drapemeter, Crease recovery and stiffness.

UNIT V Apparel Standards and Testing

Accessories testing -Inspecting garments using spec sheets - Inspecting garments using measuring tapes - without using measuring tapes - Button quality testing - Interlining quality testing - Packing a shirt and identifying faults. Quality costs & customer returns - Inspection procedures - AQL & apparel quality controls.

References:

1. Pradeep V Mehta, Managing Quality in Apparel Industry, NIFT publishers.2000
2. Mehta P V, An Introduction to quality control for the apparel industry, Marcel Dekker.2001
3. Slater K, Physical Testing & Quality Control, Vol 23, No.1/2/3, Textile Inst. 1993.
4. John H Skinkle, Textile Testing, Brooklyn pub. NY.2003
5. Sara J Kadolph, Quality Assurance for textiles & apparels, Fairchild pub, 1998.
6. Ruth Clock 7 Grace Kunz, Apparel Manufacture – Sewn Product Analysis, Upper Sadale River pub., NY, 2000.

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CORE COURSE IV

TEXTILE WET PROCESSING

Objectives:

1. To acquaint student with an understanding of textile wet processing
2. To acquire knowledge in the recent development in textile finishing

UNIT I Preparatory process

Grey fabric – properties of grey fabric. Basic fabric prepratery processes - Singeing, Scouring, bleaching, mercerizing, desizing.

UNIT II Dyeing Printing and Printing procedure

Classification of dyes and Stages of dyeing, Characteristics of dyes Suitable for different fibres. Direct, Vat, Sulphur, reactive, naphthol, acid and Basic and Disperse Dyes, Method of dyeing Natural Dyeing, Cotton, Silk, Wool and Synthetics with respective dyes, Dyeing of fibre blends, Natural dyeiong-Sources, extraction, Mordants-definition, need, types, Mordanting techniques, Dyeing procedure-types, Direct style-block stencil, screen, roller printing, Duplex printing, Rotary, Transfer printing. Discharge style Resist style-Batik, tie and dye, Minor printing methods- Flocking, Marbling, Blotch, Jetspray, Electrostatic, Photoprinting, Warp printing and Air brush printing, Preparation of printing paste – role of thickeners, method of application, after treatment of printed fabrics.

UNIT III Computer colour analysis

Anatomy of a colour measuring instrument - spectrometer, Special features employed in colour systems, Softwares and hardwares for systems, Objective specification of colour: tristumulus values, The CIELAB system of specification of colour, Colour difference, The pass/ fail system, Shade Sorting, Strength analysis of dyes from solution. Assessment of whiteness index, degree of yellowness, Computer Colour Matching.

UNIT IV Textile Finishes

Finishes, types, Recent trends in finishes - Calendaring, tentering, stiffening, gabbing, Decanting, Beetling, Glazing, Schreinerizing, Embossing, Moiering, Ciering, Raising, Napping, Gigging, Shearing. Water Proofing, Water repellency, Sanforizing, antimicrobial finish, anticrease, Wash and Wear, fire proofing silk Weighing, Crepe and Crinkle effect. Softening, durable press.

UNIT V Recent trends in wet processing

Study of enzymes, Role of enzymes for various textile processes-desizing, scouring, bleaching, softening, biopolishing, degumming.

Reference:

1. Shenai, V.A. Technology of Textile Processing, Chemistry for Dyes and Principles of Dyeing, A Sevak Publication, Bombay, 1993
2. Manivsakam.N. Treatment of Textile processing Effluents, Sakthi Publications, Coimbatore, 1995.
3. Gulrajani, M.L. Deepti Gupta, Natural dyes and their application to Textiles, Indian Institute of Technology, New Delhi, 1992
4. Prayag, R.S. 'Technology of Textiles printing, L.R. Prayag, Dharwad, 1995.
5. Shenai, V.A. History of Textiles Design, Sevak Publications, Mumbai, 1995.
6. Sule, A.D. - ATIRA, Computer colour analysis- Textile applications, New Age International Private Limited, New Delhi, 2002.
7. Nalankilli.G., Textile Finishing, SSM Publication, Komarapalayam.2000.

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CORE PRACTICAL I

TEXTILE WET PROCESSING (P)

1. Desizing, Scouring, Sizing, Calendaring and Mercerizing of cotton.
2. Bleaching of cotton, silk, wool and synthetic textiles with hydrogen peroxide.
3. Degumming and weighting of silk. Felting and chlorination of wool.
4. Dyeing of cotton, silk, wool and synthetic textiles with different synthetic dyes.
5. Extraction and application of natural dyes on cotton silk, wool and synthetic textile.
6. Printing of cotton and silk using different techniques

References:

1. Shenai, V.A., Technology of Textiles Processing, Chemistry of Dyes and Principles of Dyeing, A Sevak Publication, Bombay, 2002
2. Manivasakam.N. Treatment of Textiles Processing, Effluents, Sakthi Publications, Coimbatore, 1995.
3. Gulrajani,M.L., Deepti Gupta, Natural Dyes and their Application to Textiles, Indian Institute of Technology, New Delhi, 1992.
4. Prayag, R.S., Technology of Textiles Printing, L.R.Prayag, Dharwad, 1985.
5. Shenai, V.A., History of Textiles Design, Sevak Publications, Mumbai, 1995.

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CORE COURSE V

FASHION CONCEPTS

Objectives:

1. To enable the students to learn fashion concepts and terminologies
2. To facilitate the understanding of product design development

UNIT I Introduction to Fashion design

Introduction to Fashion design - Elements of Design- Principles of design – Classification of design – structural and decorative design – Sources of Fashion – Terms related to Fashion Industry – Boutique Collection.

UNIT II Fashion terminology

Fashion terminology – factors influencing fashion – origin and procedures of fashion – profile of fashion industry. Fashion cycle – trends based on climate – age groups. Classic seasons in fashion industry and calendar of events

UNIT III Fashion design needs

Design needs, extract from verbal and visual understanding – describing statistical information and solving problems through designs – description of situation by various means of communication –text – drawing- graphics- photographs.

UNIT IV Product profile design generation

Product profile design generation – intentions of design – psychological – sociological – economical influence of dress – texture- live colours – shape – form & design for clothing,evaluation of ideas against specifications. Generating a range of design solutions using sketches, diagrams with existing materials. Product design presentation using combination of texts, graphics & computer generated images. Conducting tests and trails for decision making with respect to material production, analysis and reasons for selection / rejection of chosen design proposal for the product development.

UNIT V Colour and fashion illustration

Colour, dimension of color, hue, value, intensity, colour schemes, its importance and application. Fashion Illustration - 4 ½ heads -8 -head figure and 10 head figure -How to draw *lay* figures -front back and side view of mens, women's and kids-proportions of measuring 8 -head figure and 10 head figure.

References:

1. Castelino, M. Fashion Kaledioscope, Rup & Co., 1994.
2. John Wiley, "Theory of Fashion Design" John *Wiley* and sons. Inc, New York, 1990
3. Stecker P, " The Fashion Design manual" Macmillan, Australia, 1997
4. Sharon Lee Tate, Inside Fashion Design, Harper & Row Pub, NY.1998
5. Leslie Devis Burns & Nancy O Bryants, Business of Fashion, Oregon State Univ. publishers

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CORE COURSE VI

PATTERN MAKING AND CLOTHING CONSTRUCTION

Objectives:

1. To train the students in pattern making
2. To introduce the students to pattern grading and alteration

UNIT I Introduction to Pattern Making

Introduction to Pattern Making – Workroom Terms and Definitions – Fabric Terms, Land Marks – Balance Line Terms – Seams – Notches- Grain lines. Industrial Form Measurement Chart – Personal / Model Measurement Chart. Measuring Techniques for Industrial Form and Human Figures. Organisation and Fitting

UNIT II Methods of pattern making

Methods of pattern making – Drafting – Draping and flat pattern making. Principles of Pattern Making ,Drafting the Basic Patterns – The Basic Bodice Block – The Skirt – The Sleeve Draft.

UNIT III Draping techniques

Draping the Basic Patterns – The Basic Drape – The Skirt Drape – Transferring the Muslin Drape to Pattern Paper. Design through draping – draping principles and methods – Basic procedures for draping in blouse and skirt area. Preparation of dress form.

UNIT IV Flat Pattern Making

Major Three types of Flat Pattern Making – Dart Manipulation by Pivotal method, Slash and Spread Method, measurement method.
Elimination of darts into Princess line, added fullness for cowls & built up Mechanisms. Pattern Alteration – Length and Width – shoulder – bust – waist and adjustment.

UNIT V Pattern grading

Introduction to grading – Pattern grading and its significance – grading to 1 size up or down – Grading to 4 size up or down – Grading techniques and methods.
Pattern for Knitted Garments – T-shirts – Track suits – Swim Suits.

References:

1. Winifred Aldrich " Metric Pattern Cutting" – Third Edition Blackwell Science.2003
2. Mary Matthews "Designing, drafting and tailoring" – Practical Clothing Construction Part I and Part II.1981.
3. Shoben Martin "Graidng" Batsford Pub, UK2002
4. Goulbern Margaitha " Introducing pattern cutting, grading and modeling.Batsford Pub, UK, 2000
5. Bane Allyne, Flat pattern design, McGraw Hill USA. 2002

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CORE COURSE VII

APPAREL MERCHANDISING

Objectives:

1. To explain the students about concepts of merchandising and its system
2. To explicate the market environment and consumer behaviour

UNIT I Merchandising concepts

Merchandising concepts: Definition of merchandising – merchandising as a business function – Behavioral Theory of the Apparel Industry – Relationship within the apparel Industry and between the environment and the industry – Evolution of merchandising in Apparel Industry – Merchandising Technology : Role – quick response business system – sources and capabilities – making quick response into accurate response.

UNIT II Market environments

Market environments – political – legal – technical – social and cultural environments, basic aspects of culture, analytical approach to culture factors- cross-cultural challenges. Apparel market and environment of marketing – micro and macro marketing environment trends- development – size and structure of Apparel and Fashion Market- apparel market – study of markets and segments. Contribution of Fashion markets to the Apparel Industry. Major fashion markets of the world – Italy-Paris- U.S.A.- Japan.

UNIT III Consumer behavior and Product development

Consumer behaviour in Apparel and Fashion Market – Fashion Buyer – Decision Making – Psychological and sociological aspects – Product Planning and development – Development of new product. Apparel and Fashion Market practices and Procedures.

UNIT IV Merchandising system

Merchandising System: Planning – developmental presentation – merchandise planning- fundamental overview of line process – traditional line planning – forecast based merchandise planning. Merchandising perspective on pricing and profits – planning and controlling merchandising budget, components of merchandising budget and its mechanics.

UNIT V Merchandise sourcing

Introduction to Sourcing – Apparel Costing & Quality Assurance for merchandising, Introduction to retail merchandising & visual merchandising

References:

1. Castelino, M. Fashion Kaleidoscope, Rup & Co., 1994
2. Mike Casey, Fashion Marketing, Blackwell Science UK 1995
3. Merchandise buying and management: Fairchild Publications1998.
4. Grace I. Kunz, Merchandising: Theory, principles and Practices. IOWA state university, fair child books2003
5. Oleon Peter, Consumer behaviors and marketing strategy, McGraw Hill Publications.2000
6. Leslie Devis Burns & Nancy O Bryants, Business of Fashion, Oregon State Univ. pub 2000
7. Fashion: From concept to consumer, Frings G.S., Prentice Hall 6th edition, 1998

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CORE COURSE VIII

ENTREPRENEURSHIP DEVELOPMENT

Objectives:

1. To provide an understanding of entrepreneurship
2. To facilitate the students to formulate project proposal to start business

UNIT I Principles of Management

Principles of Management: Process of Management: Planning -types & strategies, Organizing business - organization & types, office management, Actuating- leadership, motivation & Communication and Control- authority, power, centralization / Decentralization, delegation.

UNIT II Entrepreneurship

Entrepreneurship: Introduction - Management strategies - Starting a new venture, essentials of a successful centre. Activities of a modern business entrepreneurship. Project planning - formulation & appraisal.

UNIT III Location of enterprises

Location of enterprises - Guidelines on location – factors influencing plant location- availability of labor - raw material – transportation - market & Govt. policies.

UNIT IV Plant layout

Plant layout-building structure – lighting - ventilation & heating - material handling SISI- DIC- handloom – Textile Committee.

UNIT V Financial planning

Financial planning - Role of Government & financial institution in entrepreneur ship development. Industrial sickness & remedies - Tax planning -knowledge of exemptions & deductions.
A new project proposal to start an Apparel Industry

References:

1. Harell, For entrepreneurs only, Career pub., New Jersey, 1995
2. Vikram Sarabhai, Management for Development, Vikas pub., 1974
3. Rajagopal, Entrepreneurship and Rural markets.1998
4. Ormerod A, Textile Project Management, The Textile Institute, 1992.
5. Terry & Franklin, Principles of Management, AITBS, 2002

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ELECTIVE COURSE I

ADVANCED GARMENT DESIGNING (P)

I. Designing and constructing a garment for

a) Visually disabled / Polio
b) Pregnant Women
c) Party wear
d) Stage wear
e) Bridal wear
f) Fashion wear using recent fabrics
g) Fancy Saree blouse

II. Develop designs based on themes and construct at least three garments.

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CORE PRACTICAL II

FASHION ILLUSTRATION AND PORTFOLIO (P)

Objectives:

1. To create garment based on theme
2. To select the fabric, trims & accessories to sew garment

I. Documents to be prepared;

1. Design Research
2. Client profile.
3. Board – Theme, Colour, Fabric and Trim
4. Forecast board
5. Fashion Illustration board
6. Final presentation board
7. Garment construction - One men‘s wear/ womens wear/ kids wear

References:

1. Campbell, D et. Al: How to develop a professional Portfolio: Allyn & Bacon by Waterier, John W. 2001
2. Aspelund Karl, Design Process, Fairchild Publication, 2010.
3. Seivewright Simon, Basics Fashion Design -Research and Design, Bloomsbury Publication India, 2012.

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CORE PRACTICAL III

COMPUTER APPLICATION IN APPAREL INDUSTRY (P)

1. Introduction to Software and Hardware of apparel CAD
2. Development of croquies based on the head theories for men, women and children in various poses.
3. Texture mapping and virtual Fashion – mapping of original colour, transparent effect, designs, stripped, checks and prints.
4. Draping of Fabric on the croquies
5. Designing different types of accessories and its application on the drapes croquies.
6. Development of mood board using computer.
7. Designing garments for various occasions based on themes – male, female and children
8. Draft the pattern and grade using Spec sheets for knitted and woven garments.
9. Lay planning for knitted and woven garments
10. Digitizing the flat pattern to computer system.

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CORE COURSE IX

RESEARCH METHODOLOGY AND STATISTICS

Objectives:

1. To understand the fundamental principles and techniques of research methodology
2. To apply statistical procedure to analyze numerical data and draw inferences.

UNIT I Types of Research

Types of Research – Different types of research and its applications. Methods of collecting data – conducting enquiries to collect primary data – sources of secondary data – preparation of schedules – questionnaires – pre testing and pilot study – interview method of enquiry – editing and coding the data.

UNIT II Data representation

Classification by categories and measurements – discrete and continuous variables – tabulation scheme – preparation of tabular forms – methods of securing accuracy in tabulation. Representation of Data – Graphical representation – diagrammatic representation.

UNIT III Surveys and report writing

Sample surveys – choice of the sample – simple random samples – systematic samples – cluster samples –multistage sample and quota sample – sources of bias and methods of reducing bias. Experimentation and thesis writing – Principles and planning of experiments – presentation of data – writing reports – footnotes and bibliography citations

UNIT IV Measures of central tendency, correlation and regression

Measures of central tendency and variation – Mean – median – mode their relative advantages and disadvantages – measures of dispersion – mean deviation – standard deviation – quartile deviation – coefficient of variation – percentiles and percentile ranks. Correlation and regression – Correlation – coefficient of correlation and its interpretation - rank correlation – regression equations and predictions – association of attributes – contingency table.

UNIT V Probability and Tests of significance

Probability – rules of probability and its applications – normal – binomial- their properties – Importance of these distributions in research studies.
Test of Significance – large and small sample, 't' and 'f' tests for independence using chi-square analysis of variance and applications.

References:

1. Sidhu K.S. Methodology of Research in Education Sterling Publishers Pvt. Ltd., New Delhi 1987.
2. Best, J.M. and Kahn, J.V., Research in Education, Prentice Hall of India Ltd., NewDelhi, 1989.
3. Kothari, C.R., Research Methodology, methods and techniques, Wiley Eastern Limited, New Delhi, 1990.
4. Agarwal, Y.P., Statistical methods, Sterling Publishers Pvt. Ltd., 1990.
5. Richard, I. Wevin. et. Al., Statistics for Management, Prentice Hall of India Ltd., 1991.
6. Palanisamy.S. and Monaharan, M., Statistical Methods for Biologists, Paramount Publications, Palani, 1991.
7. Sancheti, D.C. and Kapoor, V.K., Statistics, Theory, Method and Application, Sultan Chand & Sons. New Delhi, 1993.
8. Gupta, S.P. Statistical Methods, Sultan Chand & sons, New Delhi, 1996.
9. Alice Mani, Fundamentals of Business Statistics, Supreme Publishing House, 1997

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ELECTIVE COURSE II

CLOTHING PRODUCTION MANAGEMENT

Objectives:

1. To acquaint students with clothing production planning
2. To impart quality work and method study procedures

UNIT I Production Planning

Production Planning & Balancing - Process analysis – breakdown of garment production – Production flow charts – improving process. Theoretical balancing – skills & inventory – balance & control – balancing calculations.

UNIT II Productivity measurement and improvement

Productivity measurement in International, National, Enterprise Level – Benefits of higher productivity – productivity in the individual enterprise. Technique for productivity improvement – improving productivity by reducing work content – ineffective time – management of productivity

UNIT III Work Study

Work Study – Basic procedures – pre-requisites of conducting a work study – Factors affecting working conditions – Management & supervision – role in work study – Lighting – Climate – Noise – Vibration – Conditioning

UNIT IV Method Study

Method Study – Definition & Objectives – Work Measurement – work sampling – time study – equipment – selecting & timing the job. Time study – rating & standard time.

UNIT V Movements in the work place

Methods and movements in the work place – introduction – Principles of motion economy – classification of movements – work place layout – design of figures – tools and fixtures – machine controls and display of dials. Process charts – two handled – micro motion study. Use of films in method analysis & other recording techniques. Development of improved methods and methods laboratory.

References:

1. A.J.Chuter, Introduction to Clothing Production Management, Blackwell science.
2. Harold Carr, The Clothing Factory, Clothing and footwear Institute, 1972.
3. Kilgus, R. Clothing technology; From Fibre to Fashion, Verlag Europa Lehrmittel, 1996.
4. Tarlos, E. Clothing matters; Questions of dress and identity in India, Hurst 1996.
5. Gaetan, M. Sewn product engineering and reference manual, Bobbin publications. 1977
6. Ruth E Clock, Apparel Manufacturing & sewn product analysis
7. Tyles D J, Material Management in Clothing Production, Blackwell Science Pub.

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ELECTIVE COURSE III

APPAREL EXPORT MANAGEMENT & GLOBAL MARKETING

Objectives:

1. To Analyze the steps involved in apparel export business
2. To understand the process of global marketing

UNIT I Introduction to apparel trade

International apparel trade and its significance. Role of WTO in international trade. Statistics of textiles and apparel International trade. Introduction to global marketing for apparel, factors influencing global marketing – economic, social and cultural. Limitations to global marketing and global competition.

UNIT II Apparel export business

Setting up of apparel export business and marketing, product planning for apparel export markets, pricing and costing, Export correspondence and negotiations for export business.The determinants of apparel exports – national policies, difference in culture and competitive advantage. Principles of sourcing strategy, contracts and incentives, supplier strategies. Sourcing data and reports.

UNIT III Apparel export promotion

Foreign Direct Investment - advantages to host and home countries, Exim Policy from 2008 – 2013 and various schemes for apparel export promotion – duty drawback, duty exemption and duty remission. Special Economic Zones and Free Trade Zones, assistance for marketing and brand promotion. Positioning a new brand, positioning a global brand. Global product and services and distribution strategies and promotion.

UNIT IV Finance in apparel exports

Apparel export and import financing, export promotion and apparel trade. Basic concepts and functions of foreign exchange, risk management in foreign exchange. International Payment procedures- Terminologies and Letter of Credit, regulations for imports and exports - Export Financing – Pre and Post shipment finance, EXIM Bank of India.

UNIT V Apparel import and export procedure and documentation

Export Procedure- shipping formalities - pre-shipment inspection – packing - mechanical tests - Climatic tests – International care labeling. Type of containers, freight forwarders, cargo insurance, custom clearances. Import licensing, pass book scheme and import of capital goods.
Import and Export Documentation - types - transport documents, commercial documents, and regulatory documents. Negotiation of documents and realization of export proceeds, procedure for obtaining various import and export incentives.

References:

1. Francis Cherunilam, International Trade and Export Management, HPH, 2004.
2. Govt. of India‘s, Foreign Trade Policy, 2007.
3. D.C. Kapoor, Export Management, Vikas Publications, 2009
4. Globalization: Technological, Economic and Environmental Imperatives, The Textile Institute, 1995.
5. P.K.Khurana, — Export Management, Galgotia Publishsing Company, 2003.

CORE COURSE X

KNITTING GARMENT TECHNOLOGY

Objectives :

1. To outline the structure and properties of knitted fabrics
2. To acquire knowledge on various knit structures

UNIT I Introduction to knitting

Introduction to knitted fabrics. Difference between knits and woven's, Indian knitting industry – past, present and future.

UNIT II Types of knitting

Hand knitting, terms used in knitting, weft knitting & warp knitting – introduction and comparison. Parts and functions of weft knitting and warp knitting – calculations used in knitting

UNIT III Knit structures

Wefts knit structures – single jersey or plain – rib – purl – interlock – Knit- float- tuck and stitch structures – designing of weft structures. Warp Knit Fabrics –warp knit structures – under lap – overlap – closed lap and open lap stitches.

UNIT IV Knitting machines

Latest Knitting machines, weft knitting machines: Flat bar, straight bar, circular- warp knitting machines: Raschel, Tricot-Knitted fabric defects- Drop Stitches, Barriness, Streakiness, Imperfections, Contaminations, Surface hairiness & pilling, Dyeing patches, Stains, Color fading, Shade variations, High shrinkage.

UNIT V Knitted garment manufacture

Knitted garment manufacture: marker planning, spreading, cutting, stitching, checking, quality control, pressing(or)ironing, packing, final inspection, shipping- knit wear garment designs and developments.

References:

1. David J Spencer, Knitting Technology, Pergoman Press, 1983.
2. Terry Brackenbury, Knitted Clothing Technology, Cambridge University Press, 1992.
3. Samuel Raz, Flat Knitting: The New Generation, Meisenbach, 1991.
4. John Arthur Smirfitt, An Introduction to Weft Knitting, Merrow, 1975.
5. Cegielka L, The knitting Industry: Present needs, future requirements, Textile Institute, 1988.

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CORE COURSE XI

TEXTILE ECONOMICS

Objectives:

1. To make the students to understand the growth and development in textile industry
2. To know the competency of textile industries in global business era

UNIT I Indian Textile Industry

Origin, growth and development of Indian Textile Industry - Cotton, Wool, Silk, Rayon, Man Made Textiles and Readymade garments.

UNIT II Development in Textile Industries

Technological developments in Fiber and Yarn sectors, knitting, weaving – Handloom and Power loom, non woven, garment and textile processing Industries.

UNIT III Organization and Association Related to Textile Industry

WTO, GATT, Research Associations, Financial Institutions, Technological Institutions and Mills Association. Role of government bodies and Export Promotion Council.

UNIT IV Five year plans and textile Industry

Planning strategy, Allocation and Utilization of funds, TUF and Textile policy, Organizations related to the Textile and clothing Industry - GATT, MFA, WTO and others.

Unit V Market Research and Fashion Forecasting

Growth of apparel retailing, marketing research, forecasting and its techniques, trend analysis for fashion and Colour.

References :

1. Dr. Anupam Agrawal, Pratiyogita Darpan, Indian Economy P.110, Upkar Prakashan, Agra 2008.
2. Dudeja V. D. Professional Management of Fashion Industry, Gagandeep Publications, Delhi, 2005.
3. Nirupama Pundir, Fashion Technology Today and Tomorrow, Mittal Publications, New Delhi, 2007.
4. Manmeet Sodhia and Pooja Chately, Fashion Marketing and Merchandising, Kalyani Publishers, 2003.
5. Textile Committee, Economic Survey, 2007.
6. Vasant Desai, Problems and Prospects of Small Scale Industries in India, Himalaya Publishing, 2004.
7. Economic Survey
8. Textile Reviews

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ELECTIVE COURSE IV

FASHION COMMUNICATION AND VISUAL MERCHANDISING

Objectives:

1. To acquaint students with knowledge of fashion communication.
2. To make them understand the importance of visual merchandising

UNIT I Fashion promotion

Fashion promotion and need for communication process – Media planning and production. Communication through different media – electronic media – photography – print media. Clothing culture and communication - men and women clothing – groups - role & status of clothing. Clothing culture & communication based on conservative –labor – liberal – social – democrat - customs and marital status

UNIT II Communication Practice

Scripting source – conducting interviews – event reporting fashion critics – case studies – designing catalogues and brochure – visualization of décor and ambience – fashion choreography. Individual & dress - personal communication - personal expression - image building. Psychological & sociological influence on clothing

UNIT III Window disply

The Store window – Mannequins and Display settings – exterior of the store – window display – masking – mannequins and alternatives – 3D dressing - Elements of visual Merchandising.

UNIT IV Props in fashion communication

Props, Promotion and Signage – Attention getting devices and familiar symbols – Visual Merchandising planning and colour palletes – furniture as props and signage display – sale ideas and setting display shop

UNIT V Store interior planning

Store planning and design – store interiors and display locations – fixtures and dressings – store planning systems – pointing purchase display – exhibit –trade show design, industrial display – fashion shows – trade organization and sources.

References:

1. Castelino, M. Fashion Kaleidoscope, Rup & Co., 1994
2. Kathryn Mikelvey, Fashion Source, Blackwell Science Publication, Oxford, England.2000.
3. Laura L Bliss, Study Guide Visual Mechandising and Display third edition, 1955 – Fairchild's Publication Newyork1997
4. Martin M Pegler (S V M) Visual Mechandising and Display third edition, 1955 – Fairchild's Publication Newyork.1997
5. Jetwany J N Advertising, (1999)
6. Roundy N & Maid D, Strategies for technical communication 1985, little Brown & Company., Boston

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ELECTIVE COURSE V

HOME TEXTILES

Objectives:

1. To acquire knowledge about home furnishing types and materials
2. To outline the knowledge on suitability of home furnishing linens for different end use

UNIT I Introduction to home textiles

Definition, need for home textiles, types of home textiles-woven and non-woven fabric used in home textiles, factors influencing the selection of home textiles, recent trends in home textiles.

UNIT II Wall Covering

Definition, need and maintenance of wall covering, types, uses and care. Floor Covering: Definition, need and maintenance, types, uses and care

UNIT III Living room furnishing

Introduction, choosing colour, pattern& texture for interiors, types of living room furnishing, Sofa types, Sofa covers, wall hanging, cushion & cushion covers, upholstery materials, bolster & bolster covers, care & maintenance, advantages and disadvantages.

UNIT IV Bed linens

Introduction, types of mattresses and mattress covers, types of bed linens-blankets, Pillow, Quilts and comforters, Care & cleaning of bed &bed spreads advantages and disadvantages.

UNIT V Kitchen and Table Linens

Introduction to kitchen linens, definition of kitchen linens, types of kitchen linens-hand towels, dish cloth, kitchen apron, Mixie and grinder covers, their uses and care. Introduction to table linens, definition of table linens, types of table linens, table cloth, table mats, Table napkins, Doilies, runners, protective pads, Silence cloth, Selection of towel & table line their uses and care.

REFERENCES

1. Joan. C. Branson, Margaaret lennox, Hotel, Hostel and House Keeping, Edward Arnold, 1988.
2. Henry Wilson, India: Decoration, Interiors, Design, Watson-Guptill Publications, 2001.
3. Jay Diamond and Ellen Diamond, — Fashion Apparel, Accessories, Home Furnishings,Pearson Prentice Hall, New Jersey, 2007.
4. Hamlym, Bed and Table linen, Octopus Publishing Group Ltd, Newyork 2001.
5. Emma Callery, —The Home Decorator‘s Colour Source Book‖, Apple Press Ltd, London, 2006.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.SC. FOOD SERVICE MANAGEMENT AND DIETETICS
COURSE STRUCTURE UNDER CBCS
(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 09.03.2017

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Advanced Food Science	6	4	3	25	75	100
	Core Course – II (CC)	Nutrition through Life Span	5	4	3	25	75	100
	Core Course – III (CC)	Clinical Biochemistry	5	4	3	25	75	100
	Core Course – IV (CC)	Food Service Management	5	4	3	25	75	100
	Core Practical – I (CP)	Advanced Food Science Nutrition through Life Span Clinical Biochemistry* (P)	3+3+3	4	3	40	60	100
		TOTAL	**30**	**20**				**500**
II	Core Course – V (CC)	Dietetics	6	5	3	25	75	100
	Core Course – VI (CC)	Food Microbiology and Sanitation	6	5	3	25	75	100
	Core Practical – II (CP)	Dietetics Practicals* and Dietetics Internship* # (P)	8	4	3	40	60	100
	Elective Course – I (EC)	Functional foods and Nutraceuticals	5	5	3	25	75	100
	Elective Course – II (EC)	Front Office Management and Housekeeping	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
III	Core Course – VII (CC)	Quantity Food Production and Service	6	5	3	25	75	100
	Core Course – VIII (CC)	Research Methods and Statistical Techniques	6	5	3	25	75	100
	Core Practical – III (CP)	Quantity Food Production and Service Practical* (P)	8	4	3	40	60	100
	Elective Course – III (EC)	Hospital Food Service Administration	5	5	3	25	75	100
	Elective Course – IV (EC)	Food Product Development	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – IX (CC)	Food Service Facilities	5	5	3	25	75	100
	Core Course – X (CC)	Management and Accounting in Hospitality Industry	5	5	3	25	75	100
	Core Practical - IV (CP)	Catering Internship*@ (P)	8	4	3	40	60	100
	Elective Course – V (EC)	Counselling Skills	5	4	3	25	75	100
	Project		7	4	-	-	-	100
		TOTAL	**30**	**22**				**500**
		GRAND TOTAL	**120**	**90**				**2000**

Note:

*- Practical Exams to be conducted

- Should include both internal and external components in the dietetics practical and dietary internship.

Evaluation of the dietary internship should be done by the hospital in which the student undergoes training and marks should be obtained for the external component and the case study and viva should be considered for the internal component

@- Evaluation should be done by the hotel where the students undergo catering internship for their external component and the casestudy, work sheet and viva should be included in the internal component.

Project

Note:

Project	: 100 Marks
Dissertation	: 80 Marks
Viva Voice	: 20 Marks

Core Papers	- 10
Core Practical	- 4
Elective Papers	- 5
Project	- 1

Note:

1. Theory	**Internal**	**25 marks**	**External**	**75 marks**
2. Practical	**”**	**40 marks**	**”**	**60 marks**

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate. : 100 Marks

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CORE COURSE I

ADVANCED FOOD SCIENCE

Objectives:

1. Gain knowledge on source and properties of food
2. Develop skills to judge the quality of cooked foods
3. Understand the Principles and chemistry of foods.
4. Apply the Principles while preparing and cooking.

UNIT I

a. Physiological changes- Physical properties of water and ice sorption phenomena, solutions and colligative properties, freezing and ice structure, Colloidal salts, stabilization of colloidal systems, properties of colloids, Rheology of food dispersion, foam structure formation and stabilization. Denaturation of proteins, emulsions, stabilizers, browning reaction - enzymatic and non enzymatic
b. Sugar cookery and sweeteners - Sugar cookery, sources, uses, properties, syrups, sugar alcohol, sweeteners, chemistry related to usage in food products. Structural relationship to sweetness perception, hydrolytic reaction, solubility and crystallization. Textural contribution, fermentation, non enzymatic browning. Amorphous and crystalline candies, fondant, caramel brittles and fudge

UNIT II

a. Starch Cookery- Sources, uses and chemical characteristic, factors affecting viscosity of starch pastes. Batters and doughs- types, properties. Flour and flour quality, extruded foods, breakfast cereals, wheat germ, bulgar, puffed and flaked cereals. Fermented foods cereal based products
b. Fats and oils - Sources, composition of fats and oils. Chemical changes in fat during storage and cookery. Fat substitutes and fat deterioration. Antioxidants, radiolysis, interesterification of fats. Emulsions in food preparation

UNIT III

a. Fleshy foods- Meat structure and composition, cuts of meat. Post mortem changes, methods of cooking, tenderizers, factors affecting tenderness. Classification and kinds of fish, nutritive value, selection and methods of cooking. Poultry- nutritive value, selection and methods of cooking
b. Egg cookery - Structure and composition, selection, testing for freshness of eggs. Coagulation of egg protein, foam formation, factors affecting foam formation. Egg processing, egg cooked in shell, poached egg, custard. Omelets, angel cake, sponge cake. Novel products- low cholesterol egg, double yolk eggs.

UNIT- IV

a. Milk and milk products- composition and nutritive value, physical and chemical properties. Milk protein, coagulation, factors affecting coagulation, problems in milk cookery. Cream- types, uses of butter, cheese, types and making cheese. Cultured milk, yogurt, whey, concentrated dried products, substitute
b. Legumes- .Pulses- Grams, dhal and nuts, processing, composition. Methods of cooking. Effects of processing such as cooking, decortication, germination and fermentation

UNIT V

a. Plant pigments- Fruits and vegetables, structure, pigments and acid in vegetables and fruits. Cellulose and pectic substances, browning reaction in fruits and vegetables and preventive methods. Different methods of cooking and the effect on structure, pigment and volatile substances. Ripening of fruits.
b. Acceptability testing – Quality features of food. Evaluation of foods by subjective and objectives methods, factors affecting the acceptability of foods, selection of taste panel.Difference, preference and descriptive tests, microscopic examination. Physical and chemical methods, physical characterstic colour, appearance, texture, density, volume, tenderness. Viscosity and surface tension, moisture, loss of weight

Text Books:

1. Gopalan.C., Ramasastry, S.V. And Balasubramanium. S.C. Nutritive Value of Indian Foods, National Institute Of Nutrition, Hyderabad, 2008.
2. Swaminathan .M. Advanced Textbook on Food and Nutrition, The Bangalore Printing and Publishing Co., Ltd., 2nd Ed, 2003
3. Shakuntala Manay, N. Shadaksharaswamy.M, Food Facts and Principles, 2nd Edition, New Age International, 2001.
4. Srilakshmi, B, 2002, Food Science, New Age International p) Ltd, New Delhi

Reference Books

1. Potter N.M. 'Food Science' The AVI publishing Company inc., West Port, Connecticut, U.S.S. 1973.
2. Fox A. Cameron, A.G. 1970, 'Food Science and Chemical Approach',University of London, press Ltd., 1970.
3. Griswold, R.M. 'The Experimental study of Foods' Houghton Milflin, Company, Bpstpn New York, 1962
4. Peckham, G.C., 'Foundation of Food Preparation', The Macmillan and Company, London, 1969
5. Paul P.C. and Palmer, H.H.'Food Theory and applications'. John Willey and sons, Inc., New York 1972.
6. Low, B. 'Experimental Cookery' John Willey and Sons, Inc, New York. (1965)
7. Meyer, H. Food Chemistry' Van Nonstrand, Teinhold Company, New York and London, 1969.
8. Amerine, M.A. et-al ., 'Principles of Sensory Evaluation of food" Academic press, New York, and London 1965.
9. Paul, P.C. and palmer, H.H Food Theory and Applicaions. John Wiley (1972)
10. Matz., S.A. Food Texture The AVI Publishing Co. (1962)
11. .Kranar, A. and Twing B.A. Fundamental of Quality control for the Food Industry. The AVI publishing Co., (1966)
12. Vail, G.E., Philip J.A. Rust L.O. Griswold R.M. Justin, M.M. 'Food' , Houghton Mifflin, Co., 1973.
13. Pameranz., Y., Functional Properties of Food components. Academic
14. Press Inc., Boston, 1991

Journals

1. Journal of Food Science, The Institute of Food Technologists, Illinois, USA
2. Nutrition and Food Science, Farbes Publications Ltd., Hatree House, Greenway, London
3. Journal of Food Science and Technology, Association of Food.

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CORE COURSE II

NUTRITION THROUGH LIFE SPAN

Objectives: To enable the students to

1. Understand the importance of meal planning
2. Comprehend the nutritional needs pertaining to different stages of life
3. Know the nutrition related problems in life cycle
4. Plan diet for various age groups

UNIT I

a. Basic principles of meal planning, balanced diet, RDA, food allowance for different age groups, factors affecting meal planning.
b. Nutrition during pregnancy – stages of foetal development, physiological changes, haematological changes, cardiovascular changes, respiratory changes, renal changes, gastrointestinal changes, metabolic changes, weight gain in pregnancy, factors influencing the outcome of pregnancy, complications, nutritional requirements and diet planning for a pregnant women.

UNIT II

a. Nutrition for lactating women – Physiology and psychology of lactation, hormonal control, improving lactation performance- physical contact between mother and child, psychological support, good nutrition, galactogogues, colostrum – composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for lactation failure.

UNIT III

a. Nutrition in infancy – birth weight of infants, growth and development, milestones in development (only stages), immunization schedule, nutritional requirements of the infant, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, problems in weaning, nutrition related health problems- diarrhoea, under nutrition, over nutrition/ obesity, preterm infants.
b. Nutrition in preschool age – growth and development, body composition, physical and motor development, language, cognitive development, emotional and social development, nutritional requirements, factors affecting nutritional status, food requirement, eating habits, low cost supplementary foods, nutrition related problems in childhood- under nutrition, micronutrient deficiencies, overweight and obesity, diet planning for the preschool child.

UNIT IV

a. Nutrition in school age – growth and development, changes in height and weight, changes in body composition, changes in social and psychological behaviour, nutritional and food requirement, packed lunch – factors to be considered, sample menu, feeding problems, nutritional concerns- iron deficiency anaemia, malnutrition, diet plan for the school children.

b. Nutrition in adolescence - growth and development, – Physiological changes, sexual changes, psychosocial changes, dietary changes, body composition, nutritional requirements, nutritional problems- anaemia, iodine deficiency, calcium deficiency, zinc deficiency, obesity, eating disorders- bulimia nervosa, anorexia nervosa, binge eating, malnutrition due to early marriage, food habits and diet plan.

UNIT V

a. Nutrition in adulthood – Physiological changes, reference man and reference women, activity classification, nutritional requirements of an adult man and women, body composition, nutrition and health issues- under nutrition, anaemia, iodine deficiency disorder, lifestyle related disorder, obesity, metabolic syndrome, hypertension, cardiovascular diseases, diabetes, cancer. Planning diet to suit different income levels.
b. Nutrition in elderly – definition of geriatrics, changes in body composition, physiological changes, psychological and socio- economic factors in relation to food intake, nutritional requirement, nutritional and health problems- under nutrition, obesity, osteoporosis, anaemia, diabetes, cardiovascular diseases, arthritis, constipation, Alzheimer disease, modification of diet in old age.

Text books:

1. ***Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition,*** Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2012.
2. ***Srilakshmi, B., Dietetics,*** New Age International (P) Ltd., New Delhi, 2013.
3. ***Swaminathan, M., Advanced Textbook on Food and Nutrition***, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

Reference books:

1. ***Dietary Guidelines for Indians, ICMR, National Institute of Nutrition***, Hyderabad, 2013.
2. ***Gopalan, C. Rama Sastri B.V. and Balasubramanian***, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad, 2014.
3. ***Krause, M.V. and Hunscher, M.A., Food, Nutrition and Diet Therapy***, 14th Edition, W.B. Saunders

Journals:

1. Reports of the State of World's Children, WHO and UNICEF, Oxford University.
2. Reports of National Family Health Survey, International Institute for Population Science, Mumbai.
3. World Development Reports, Investing in Health, World Development indication
4. Indian Journal of Medical Research, ICMR, New Delhi,
5. Indian Journal of Pediatrics, Valley Nicro, Mussoria, U.P.
6. Indian Journal of Nutrition and Dietetics, Avinashilingam Deemed University, Coimbatore.
7. Proceedings of the Nutrition Society of India, NSI, Hyderabad.

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CORE COURSE III

CLINICAL BIOCHEMISTRY

Objectives: To enable the students to

1. Understand the metabolism of the nutrients and the associated diseases
2. Know the organ function tests
3. Comprehend the role of hormone in health

UNIT I Disorders of carbohydrate metabolism:

Diabetes mellitus, glycohemoglobins, hypo-glycemias, galactosemia and ketone bodies. Various type of glucose tolerance tests. Glycogen storage diseases. Inborn errors of carbohydrate metabolism

UNIT II

a) **Disorders of amino acid metabolism**- Phenylalanemia, homocystinuria, tyrosinemia,MSUD, phenylketonuria, alkaptonuria, albinism and animoacidurias.

b) **Disorders of nucleic acid metabolism**- Disorders in purine/ pyrimidine metabolism.

c**) Disorders of fat metabolism**

UNIT III Evaluation of organ function tests:

Assessment and clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions. Clinical importance of bilirubin.
Enzymes of clinical importance, Enzymes of pancreatic origin and biliary tract.

UNIT IV Hormonal disturbances:

Protein hormones (anterior pituitary hormones, posterior pituitary hormones), steroid hormones, adrenocorticosteroids, and reproductive endocrinology. Disturbances in thyroid function.

Disorders of mineral metabolism: Hypercalcaemia, hypocalcaemia, normocalcaemia,
hypophosphataemia and hyperphosphataemia.

UNIT V Biochemical aspects of hematology:

Disorders of erythrocyte metabolism, hemoglobinopathies,
thalessemias thrombosis and anemias. Detoxification in the body: enzymes of detoxification, polymorphism in drug metabolizing enzymes.

Text Books

1. M.N. Chatterjea and Rana Shinde, Textbook of Medical Biochemistry, Jaypee Brothers, 2015
2. David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry 5th Ed
   WH Freeman and Company, 2008.

Reference Books

1. LSP Davidson, J MacLeod and CRW Edwards, Davidson's Principles and Practice of Medicine: A Textbook for Students and Doctors, 15th Ed Publisher: Churchill Livingstone.
2. John W. Baynes and Marek Dominiczak, Medical Biochemistry, Publisher: Mosby,2010
3. Allan Gaw, Michael Murphy, Robert Cowan, Denis O'Reilly, Michael Stewart and James
4. Shepherd, Clinical Biochemistry: An Illustrated Colour Text, 3rd Ed, Publisher: Churchill Livingstone, 2008.
5. William F. Ganong, Review of Medical Physiology, Publisher: McGraw-Hill, 2012.
6. Robert K. Murray, Daryl K. Granner, Peter A. Mayes and Victor W. Rodwell, Harper's Biochemistry, Publisher: Appelton and Lange, 2012.
7. Richard Luxton, Clinical Biochemistry, Scion Publishing Ltd.2008
8. Gerhard Meisenberg and William H. Simmons, Principles of Medical Biochemistry: Publisher: Mosby.

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CORE COURSE IV

FOOD SERVICE MANAGEMENT

Objectives: To enable students

1. Understand the organization and management of Food Service Institutions.
2. Gain knowledge about the Food Service and responsibilities of each.

UNIT I Definition and scope of food service Management :

Food Industries - Classification Review of objectives and classification of food service. Definition, Principles and scope of management

UNIT II Planning

Nature, importance, steps in: Planning, steps in: planning, steps and kinds of forecasting, assessment of needs of food service based on present and future trends.
Organizing- present and future trends. Process of organization. Principles of organization, types of organization, tools of management.

UNIT III

Staffing- Man power planning, labour sources, selection, recruitment and training, wages, salaries, incentives, promotion, demotion, transfer, dismissal. Managerial problems of Food Service Unit.

Directing and Controlling – Direction, leadership, delegation, decentralization, centralization, supervision, human relations in industry, authority and responsibility, motivation, communication, evaluation techniques

UNIT IV Food cost and Accountability

Review of maintenance of accounts daily, weekly, monthly accounts for food, labour equipment and furnishing, rent, water, fuel, light, licences, cleaning supplies, maintenance and miscellaneous. Double entry book keeping, ledger accounts, journal and balance sheet, budgetary control, non- budgetry control. Cost control, fixed, variable, average, marginal and unit cost, break even analysis- production planning control.

UNIT V Administrative Leadership

Qualifications of effective food service administrator and/ or dietitians. Responsibilities, communications, academic requirements and opportunities. Professional and trade associations. Evaluation of self and department.

Related experience

1. Visit to commercial and non commercial (welfare) food service institutions
2. Planning work sheet for different categories of personnel in Food Service Institution.
3. Preparation and use of check sheet for use by administrator and dietitians

Text Books

1. Kinton, R., Cessarani, V and Foskett, D, The Theory of Catering, Hodder and Stoughton, 2000.
2. Tripathi, P.C. Personnel Management and Industrial Relations, Sultan Chand and Sons, 2000.

Reference Books

1. Kaufman,R. Mega planning- Practical tools for Organisational Success, Sage Publications Inc, 2000.
2. Shring Y, P. Effective Food Service Management, Anmol publications Pvt Ltd,New Delhi, 2001.
3. Stephen, B, , Williams, S, R, "Bill Jardine, and Richard, J, N, Introduction to Catering,
4. Ingredients for Success, Delmar- Thomson learning, 2001.
5. Yadav, C, P. Management of Hotel and Catering Industry, Anmol publications Pvt
6. Ltd and Institute of sustainable development, Lucknow, New Delhi, 2001

JOURNALS

1. Journal of vacation marketing. Henry Steward Publications 28/30 Little Russel Street, London, W.C. IA. 2 HN
2. Indian Management - Journal of All India Management Association.All India Management Association pub. Management House, New Delhi - 3
3. Journal of the American Dietetic Association 'the American Dietetic Association, 430 North Michigan Avenue, Chicago, Illincise.

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CORE PRACTICALS I

ADVANCED FOOD SCIENCE (P)
(NON EXAMINATION)

a. Sugar cookery, stages, preparation of fondant, fudge, caramel, pulled toffee and brittles. Preparation of syrup for gulab jamoon, coconut burfi, brittle
b. Starch- microscopic examination, gelatinisation of starch, preparation of idli, dosai, appam, chappathi , paratha and poori. Starch as binding and coating agent.
b. Fats-Smoking temperature, factors affecting absorption. Deep fat fried foods, preparation of pastries and Salad dressings.
c. Meat, fish and poultry. Changes in cookery. Tenderness, different methods of cooking
d. Coagulation of egg white and egg yolk. Boiled egg, poached egg, scrambled egg, custard, cake, emulsion, mayonnaise. Egg quality testing. Egg as binding and coating agent.
e. Principles involved in the preparation of tomato soup, cooking vegetables in milk, cheese setting of curds
f. Pulse – effect of soaking (time and types of water), germination, Factors affecting the cooking quality of pulses.
g. Effect of acid and alkali. Effect of heat on pigments in vegetables and fruits
h. Evaluating the quality-acceptability of foods, subjective and objective methods

NUTRITION THROUGH LIFE CYCLE (P)
(NON EXAMINATION)

1. Planning, nutritive value calculation and preparation of meals for
   a) Pregnancy
   b) Lactation
   c) Infancy- weaning foods, low cost supplementary foods
   d) Pre-school age
   e) School age
   f) Adolescence
   g) Adult
2. Case-study- Elderly – dietary recall and food habits
3. Dissemination of nutrition knowledge for chosen target groups in a rural community in a phased manner.

CLINICAL BIOCHEMISTRY

Objective:

To enable the students to get practical experience in the Laboratory and to develop skills to undertake research work on blood and urinary analysis.

1. Determination of Blood for

   a. Glucose
   b. Haemoglobin 1. Cyanmothaemoglobin method 2. Wong's method
   c. Total Cholesterol
   d. Triglycerides
   e. High Density Lipoproteins(HDL)
   f. Serum Calcium
   g. Serum Total Protein and A/G ratio
   h. Serum Phospholipid
   i. Serum Creatinine
   j. Serum Alkaline Phosphatase
   k. Serum Glutamic Oxalate Transaminase
   l. Serum Glutamic Pyruvate Transminase
   m. Serum Bilirubin

2. Analysis of urine for

   a. Creatinine
   b. Urea
   c. Total nitrogen
   d. Calcium
   e. Phosphorus
   f. Iodine

3. Demonstration of Serum Glycosylated Heamoglobin using biochemical analyser

References:

1. Raguramulu N. Madhavan Nair K. KalyanaSundram S., A manual of laboratory techniques Silver Printers, NIN.2007
2. Charles George Lewis Wolf, A laboratory hand-book of urine analysis and physiological chemistry,W. B. Saunders & co., 1901,Harvard University, 2007
3. Nancy A. Brunzel, Fundamentals of Urine & Body Fluid Analysis, Saunders; 2 edition , 2004.
4. H. Varley, A. H. Gowenlock and M. Bell, Practical Clinical Biochemistry, Volume 1, Heinemann, London. 1980.

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CORE COURSE V

DIETETICS

Objectives:

1. Understand the role of dietitian
2. Gain knowledge about the principles of diet therapy and different therapeutic diets
3. Develop aptitude for taking up dietetics as a profession

UNIT I Dietitian, Special feeding, Diet for Nutritional Deficiencies

Role of dietitian in the hospital and community- Types of dietitian, education and personal qualifications- Professional ethics and obligations Feeding the patients – Psychology of feeding the patients, assessment of patient's needs. Routine hospital diets- regular diet, soft diet, full fluid diet, clear fluid diet Special feeding methods- Parenteral and enteral nutrition Diet for nutritional deficiency disorders- etiology, types, symptoms and dietary modifications for PEM, anaemia, Vitamin A deficiency

UNIT II Diet in fevers and Diseases of the gastro intestinal system

a. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for Febrile conditions- acute, chronic and recurrent fevers- typhoid, influenza, rheumatic fever, tuberculosis, malaria and poliomyelitis.
b. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for Gastro intestinal disorders- peptic ulcer, gastritis, diarrhea, dysentery, constipation, malabsorption syndrome, ulcerative colitis, enteritis and carcinoma
c. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for liver, gall bladder and pancreatic disorders- Fatty liver, Hepatitis, cirrhosis, cholecystitis, cholelithiasis, pancreatitis

UNIT III Diet in Metabolic disorders, CVD and Cancer

a. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for metabolic disorders- Diabetes mellitus, obesity, underweight, hypothyroidism and hyperthyroidism, gout, arthritis and osteoporosis.
b. Pathogenesis, aetiology, types, grading, symptoms, treatment and dietary modification for cancer
c. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for cardio vascular disorders- hypertension, atherosclerosis, hyperlipidemia, hypercholesterolemia,acute and chronic cardiac diseases, congestive cardiac failure

UNIT IV Diet in Renal diseases and food allergy

a. Pathogenesis, aetiology, types, symptoms, treatment and dietary modification for renal disorders acute and chronic glomerulonephritis, nephrosis, nephrosclerosis, uremia, nephrolithiasis.
b. Allergies – food allergy and intolerance – mechanism, factors influencing, symptoms, tests for allergy, nutritional care and elimination diet.

UNIT V Nutritional Care in Inborn Errors of Metabolism, Special Children and Palliative Care

a. Nutritional care for the patients with inborn errors of metabolism- prognosis, symptoms, dietary management - phenylketonuria, galactosemia
b. Nutritional care for the children with special needs – overview of the disability, food and nutritional needs and their modification-Attention deficit hyperactivity disorder, Autism, Cerebral palsy, Down's syndrome.
c. Basics of palliative care- definition, types, objectives and principles of palliative care

Text books

1. Mehan, L.K. and Arlin, M.T., Krause's Food, Nutrition and Diet Therapy, W.B. Saunders Company, Philadephia, 1992
2. Robinson, C. H., Normal and Therapeutic Nutrition, Oxford and IBH publishing Calcutta, Bombay, 1987.
3. Sue Rodwell Williams, Nutrition and Diet therapy, CRC Press,1994.

Reference Books:

1. Antia, F.E., Philip Abraham, Clinical Dietetics and Nutrition, Oxford University Press New Delhi, 1998.
2. Davidson passmore P., and Breck J.P., Human Nutrition and Dietetics, The English Language Book Society, Livingstone, 1986.
3. Krause M.V. Horsch M.A. Food Nutrition and Diet Therapy W.B. Saunders Company, Philadelphia, 1993.
4. Swaminathan M. Essentials of Food and Nutrition, Vol. I & II Ganesh and Company, Madras, 1995.
5. William's Basic Nutrition and Diet Therapy, Staci Nix, RS, C.V. Muusby Camp. Saint, Lowin, 2012.
6. Cooper Et. al, Nutrition in health and disease 4th edition, Pitman Medical Publishing Co. 1963.
7. Srilakshmi, B, Dietetics, New Age International, New Delhi, 2002
8. Shils, E.M. Olson, A.J. and Shike M.C., Modern Nutrition in Health and Diseases, Lea and Febriger Philadephia, Vol. II 1994.
9. Gopalan , C. Ramasastri, B.V. and Balasubramaniam, S.C. Nutritive value of Indian Foods National Institute of Nutrition, Hyderbad, 2010.

JOURNALS

1. Journal of American Dietetics Association
2. Indian Journal of Medical Research
3. Indian Journal of Nutrition and Dietetics
4. Nutrition Reviews
5. American Journal of Clinical Nutrtion
6. Nutrition Bulleting. The British Nutrition Foundation.15 Belgrave square, London Swix.
7. Applied Nutrition, Journal of Indian Dietetics Association Pratabchakraborthy pub. Secretary of Indian Dietic Association 27/1 Monoharpuku, Calcutta 700 029.
8. Diabetes care. Pub. by American Diabetic & American Dietetic Association, Professional section membership, 1960 Duke Street, Alexandra, V.A. 22314.
9. Food and Nutrtion Bulletin, The Editor, The United Nations University, Cambridge, Programme Officer, Massachusatts Inst. of Technology E-38-756, Cambridge Mass, 02139, USA.
10. The New England Journal of Medicine, Massachysetts Medical Society England by passmore International Redlec, Herts.
11. Journal of Royal Society of Medicine, The Royal Society of Medicine, Wimpole Street, London.
12. Clinical Nutrition, Sales Promotion, Department, Churchill Livingstone Medical Journals Robers Stevenson House 1-3, Baxter's place, Edinburgh EHI, EAF.UK.
13. The British Journal of Nutrition, Cambridge Univerasity, Press Journals Dept. 46 West 20th Street, New York, 10011-4211.
14. The Journal of Nutrition, Subscription Dept. Rockville pick, Bethesda MD 20814-3990.
15. International Journal of Sport Nutrition, Human kinetics Publishers InE, Box 5076, Champaign IL 61825-5076.
16. International Journal of Vitamin and Nutrition Research. Hogrefe and Huber publishers, Toronto, Ontario M4P2S3. Canada.
17. Nigerian Journal of Nutritional Sciences, Dr.O.B. Oloyeda, Dept. of Biochemistry University of Illorin, P.M.B.1515. Illorin, Nigeria.

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CORE COURSE VI

FOOD MICROBIOLOGY AND SANITATION

Objectives: To enable the students to

1. Understand the microorganisms related to food
2. Know the beneficial effects of the microorganisms
3. Evaluate the principles of sanitation
4. Know the laws related to food safety

UNIT I Introduction to Microbiology

Structure, Growth and Multiplication of micro-organisms

Definition and History: Microscopy, General Morphology and Types of microorganisms Bacteria, Fungi, Algae, Yeast and Virus - Bacteriophage. Growth curve, batch and continuous culture, factors affecting growth: intrinsic factors, nutrient content, pH, redox potential, antimicrobial barrier and water activity; extrinsic factors: relative humidity, temperature and gaseous atmosphere.

UNIT II Microbiology of Foods, Benefits of Microbes

Contamination, spoilage and preservation of cereal and cereal products, sugar and sugar products vegetables and fruits, milk and milk products and canned foods, meat and meat products, egg and poultry, fish. Food fermentation-types; fermented food products

UNIT III Importance of Personal hygiene of food handlers

General principles of hygiene – personal and environmental hygiene. Hygienic Practices in Handling and Serving Foods. Planning and implementation of training programme for health personnel

UNIT IV Safety Measures:

Safety in food procurement, storage, handling and preparation, control of spoilage, safety of leftover foods, disposal of food waste

Control of Infestation and Cleaning Methods Importance of pest control, various pests and their control measures, cleaning and sanitizing, need for efficient cleaning programme. Cleaning Agents, Equipments, Methods to wash rinse and sanitize Food Contact Surfaces,

UNIT V Food Laws and Quality Management, Recent Concerns in Food Safety.

International and National food laws, Essential Commodities Act (ECA). ISI, BIS, AGMARK,PGFA,FPO, Food Safety and Standards Bill 2005, FAO,WHO, Codex Alimentarius, WTO, JEFA, APDA, ISO 22000 series. HACCP- definition and principles.

Text Books

1. Pechkam, G.C. Foundations of Food Preparation, III Edition, MacMillan Publishing Co., New Jersey, 1998
2. Roday, S., Hygiene and Sanitation in Food Industry, Tata McGraw Hill Publishing Co., New Delhi, 1999.

Reference Books

1. Charley, Hand Weaver Foods – A Scientific Approach, III Edition, Prentice Hall Inc., New Jersey, 1998.
2. Fennema, O.R., Food Chemistry, III Edition, Marcel Dekker Inc., New York, 1996.

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CORE PRACTICAL II

DIETETICS PRACTICALS AND DIETETICS INTERNSHIP (P)

OBJECTIVES: To enable the students:

1. Develop skills in translating diets into practical menus.
2. Understand the concept of the quantity of food to be prescribed
3. Develop skills in diet counselling and feeding of patients.
4. Develop capacity for taking up dietetics as a profession

DIETETICS PRACTICALS

1. Practical experience in weighing and measuring food items
2. Preparation of clear and full liquid diets and soft diet
3. Planning and preparing diets for:
   a. Febrile conditions.
   b. Gastrointestinal disorders
   c. Liver and gall bladder disorders
   d. Metabolic disorders
   e. Cardio Vascular disorders
   f. Renal disorders
   g. Obesity and underweight
   h. Nutritional deficiency
   i. Special children

4. Planning and preparing paediatric diets
   (a) Lactose free diet
   (b) Juvenile diabetes
   (c) Diet for inborn errors of metabolism

5. Visit to three hospitals

DIETARY INTERNSHIP

The Practical work consists of internship in a teaching hospital for 4-6 weeks.

i. Visits to the different wards to observe patients requiring Special diets.
ii. Experience in calculating and planning any six modified diets.
iii. Supervising and handling the Food preparation and service in the dietary department of the hospital
iv. Case study- Selecting and observing patient ten patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.
v. Calculating the diet according to medical prescription
vi. Accompanying the doctor while visiting the patient.
vii. Use of the computer in diet
viii. Counselling and patient education

ix. Education of the patient.

Preparation of the report should include

i. History of the hospital
ii. Location
iii. Facilities provided
iv. Layout of the kitchen
v. Work organization
vi. Organization structure
vii. Duties of the dietitian
viii. Special dietary preparation
ix. Menus
x. Types of service
xi. Equipments
xii. Storage of food
xiii. Handling of leftovers and shortages
xiv. Sanitation and hygiene

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ELECTIVE COURSE I

FUNCTIONAL FOODS AND NUTRACEUTICALS

Objectives To enable the students to gain:

1. Knowledge on sources of Functional Foods and Nutraceuticals
2. Knowledge on the role of functional foods, nutraceuticals and dietary supplements in health and disease

UNIT I Functional Foods and Nutraceuticals

Definition and History-Functional foods, traditional foods, nutraceuticals - teleology, designer foods and pharma foods, history of functional foods, components of functional foods, stages involved in development of functional foods.

UNIT II Categorization of Nutraceuticals

Classification - Based on food source, mechanism of action and chemical nature-isoprenoid, phenolic substances, fatty acids and structural lipids, terpenoids – saponins, tocotrienols and simple terpenes, carbohydrates and amino acid based derivatives, isoflavones.

UNIT III Functional Foods and Nutraceuticals of Microbial Origin

Functional foods of Microbial origin- Human gastrointestinal tract and its microbiota, functions, probiotic microflora and functions- Lactobacillus and Bifidobacterium, concept of probiotics and prebiotics with examples, role of probiotics in health and disease, spirulina as bioactive component.

UNIT IV Functional foods and Nutraceuticals in Health and Disease

Sources and role of Functional foods and Nutraceuticals - Role of functional foods and Nutraceuticals in diseases, concept of dietary supplements, phytochemicals, phytosterols, omega 3 and 6 fatty acids, dietary fiber, role of nutraceuticals in health and disease management – diabetes mellitus, hypertension, CVD, cancer; non essential nutrients as dietary supplements, FOSHU foods.

UNIT V Regulatory Aspects of Functional Foods and Nutraceuticals

Regulatory aspects- International and national regulatory aspects of functional foods in India, ICMR guidelines for Probiotics, development of biomarkers to indicate the efficacy of functional ingredients, Research frontiers in functional foods.

Text Books

1. Bamji (2003), Textbook of Human Nutrition, 3rd edition, Oxford & IBH Publishing Co Pvt Ltd, New Delhi
2. Srilakshmi.B (2012), Nutrition Science, 4th edition, New Age Internationl Pvt Ltd.

References

1. Webb G.P (2006), Dietary Supplements and Functional Foods, Blackwell Publishing Ltd, New York.
2. Tamine. A (2005), Probiotic Dairy Products, Blackwell Publishing Ltd, United Kingdom.
3. USFDA regulations on functional foods

Journals

1. Journal of functional foods
2. Journal of free radical research

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ELECTIVE COURSE II

FRONT OFFICE MANAGEMENT AND HOUSEKEEPING

Objectives: To enable students

1. Gain knowledge on the role of front office operations in hotels
2. Acquire skills in reservation and handling of guests

UNIT I Front office and Housekeeping department:

Objectives of front office and housekeeping department Functions of front office and housekeeping department Duties and qualities of front office staffs and their etiquettes. Importance of efficient front desk and housekeeping, Evaluation of lodging establishment, Objectives and scope of hospitality industry and classification of hotels-self study

UNIT II Rooms and rates and equipment used in front office:

Room types and rates, Rate categories, rate factor, room rate code, room rate. Classification, special rates, miscellaneous rate policies, Front office equipments

UNIT III Basic reservation system:

Basic reservation procedures, Individual and group reservation, Forecasting, computerized reservation system. Check – in procedures (registration of guest) Settlement of bills. Check – out procedures

UNIT IV Cleaning guest rooms, public room and linen and bed making:

Rules, procedure and principles, daily periodic and spring cleaning, List of standard room supplies, Cleaning equipment – type, selection, purchasing, cleaning, Cleaning agents, Linen types storage and control of linen and bed making procedures. Care and maintenance of equipment. and Cleaning agents

UNIT V Front office accounting and records for control:

Different types of reports maintained. Maintaining account balance, Compiling sales and revenue, computerized billing and electronic point of sales, Importance of reports

Text Books

1. Andrew, S. Hotel Front Office – Training manual, Tata Mac Graw Hill Publishing co ltd, New Delhi, 1995

References

1. Lean, M. Guide to Hotel and catering services, 1981.
2. Bardi, J. A., Hotel Front Office Management, Van Nostrand Reinhold Publishing Co Ltd, New Delhi, 1982.
3. Schneider, M. and Tucker, G. The professional housekeeper, Van Nostrand Reinhold, New York, 1985.
4. Branson, J, C. and Lenrox, M. Hotel, Hostel and House Keeping, Edward Arnold Ltd, 1989.
5. Martin, R, J. and Jones, T, J, A. Professional Management of House keeping operations. John Wiley and Sons Inc. New York, 1992.
6. Allen, D, N. Accommodation and cleaning services, Vol II, 1992.
7. Renner, P, F. Basic Hotel Front office Procedures, 3rd edition, Van Nostrand Reinhold, New York, 1993.
8. Andrews, S. Hotel Housekeeping, Training manual. Tata Mac Graw Hill Publishing Co ltd, New Delhi, 1995

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CORE COURSE VII

QUANTITY FOOD PRODUCTION AND SERVICE

Objectives: To enable students:

1. Gain knowledge in menu planning and product standards to maintain quality
2. Learn aspects on quantity production and quality control.

UNIT I Menu planning

Definition of menu, menu classifications, techniques of writing a menu, menu presentation, menu evaluation, Study of menus for different types of quantity food outlets. Courses of menu, uses of menu cards, important cookery terms used in menus, common terms in French and English Menu. Review of mechanics of menu Planning. Menu format, purchase and storage procedures. Procurement, product selection, specification, method of purchasing, purchasing procedures, receiving, storage and inventory control.

UNIT II Production, Planning and Standardization of recipes

Production forecasting, production scheduling, standardization of recipes, portion control, cost control, menu pricing. Standardization of recipes, recipe files and adapting recipes.

Quantity Food Transportation and buying

Transportation, receipt and handling of foods. Storage of foods (dry & refrigerated) Review of food selection with reference to food buyer, methods of buying, specifications, use of processed and convenience Foods.

UNIT III Quantity food production and Quality control

Methods of production, product standards, effective utilization of leftovers, waste disposal, service management and service equipments. Food preparations - main dishes and their usual accompaniments. Soups, salads and salad dressings. Common sauces and chutneys. Dishes for special catering - Functions, festivals.

UNIT IV Food Service

Food Service techniques- Planning the menu silver, crockery, glassware, stainless steel, plastics and melamine ware.

Preparation of service- Linen - table cloths, table mats, napkins, flowers for the table, rules for laying a table, rules for waiting at a table, types of service –

formal, informal and Indian service, carving at table, food and beverage service, for special catering functions, like wedding receptions, outdoor catering.

UNIT V Service systems

Style of service- North Indian, South Indian, Chinese, Italian, Mexican cuisines – role and influence of culture, ingredients used and special equipments Traditional, Commissary, Ready prepared – cock chill, cook freeze, assembly serve.

Text Books:

1 ***Negi, J (2000). Professional Hotel Management.*** S.Chand and Company Limited, New Delhi.
2. ***Palacio, J.P., Harger, V., Shugari, G. Thesis, M (2001). West and Woods Introduction to Food Service.*** Mac Millan Pub Co., New York.

Reference Books:

1. ***Cessarani,V. Kinton,R (2002). Practical Cookery.*** seventh edition. Hodder and Stoughton publishers.
2. ***Khan, M.A (2003). Food Service Operations.*** AVI Publications Co., Connecticut.
3. ***Thangam Philip (2005). Modern Cookery.*** Orient Longmam Limited. Third edition.
4. ***Sethi, M. and Malhan, S.M (2007). Catering Management – An Integrated Approach.*** Wiley Eastern Limited, Mumbai.

Journals:

1. International Journal of Hospitality and Tourism.
2. International Journal of Hospitality Management.
3. Journal of Hospitality Marketing and Management.

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CORE COURSE VIII

RESEARCH METHODS AND STATISTICAL TECHNIQUES

Objectives: To enable the students to

1. Understand the fundamental principles and techniques of methodology concerning research and
2. Apply statistical procedure to analyze numerical data and draw inferences.

UNIT I

1. **Introduction to Research and types of research-** Definition, Objectives and characteristics of research. Types of Research- Basic , applied , Action , Evaluation, experimental , Surveys- Descriptive , diagnostic and exploratory

2. **Basic components of any research design** - Data and methods of data collection Types of data – Primary and secondary data. Data sources. Primary data collection methods- direct personal investigation, indirect oral investigations, schedules and questionnaires. Interviews and Type of Interviews. Pre-testing and Pilot study, Editing and coding of data

UNIT II

1. **Organization of data**- Classification- Geographical chronological, qualitative, quantitative, frequency distribution, discrete and continuous. Tabulation of data parts of a table, rules of tabulation, types of tables- simple and complex, preparation of blank tables

2. **Representation of data**- Diagrammatic – One dimensional diagrams- Bar diagrams – simple, multiple, subdivided, deviation. Two dimensional diagrams- pie, circles, rectangles and squares- pictogram and cartographs. Graphical, frequency graphs- Line , polygon, curve Histogram- cumulative frequency graphs-ogives

UNIT III

1. **Sampling Techniques**- Sample design- Different sampling Methods- Probability and non probability, sampling methods, simple, stratified, systematic. Cluster, multistage, purposive judgment, convenience, quota, snowball, accidental. Sampling and non sampling errors

2. **Thesis and Report writing**- Components or layout of a thesis. Introduction, review of literature, methodology, results and discussion, summary and conclusion, bibliography, footnotes and Appendix

UNIT IV

1. **Measures of central tendency and variation**- Mean, median, mode, their relative advantages and disadvantages. Measures of dispersion, mean deviation, standard deviation, coefficient of variation, percentiles and percentile ranks

2. **Correlation and regression**- Correlation, co efficient of correlation and its interpretation, rank correlation. Regression equations and predictions. Association of attributes , contingency table

UNIT V

1. **Probability and distributions**- Rules of probability and its applications. Normal, binomial, their properties, importance of these distributions in research studies

2. **Tests of Significance**- Large and small samples, 't' and F tests , tests for independence using chi square, analysis of variance and applications

Text Books

1. Kothari.G.R., Research Methodology, Methods and Techniques, Wiley Eastern Limited, New Delhi, 2004
2. Devadas.R.P.,A Handbook on methodology of Research, Sri Ramakrishna Vidyalaya, Coimbatore, 2000

Reference Books

1. Gosh.B.N., Scientific Methods and Social Research Sterling Publishers Pvt.ltd., New Delhi.
2. Kulbir Singh Sidhu, Methodology of Research in Education Sterling Publishers Pvt. Ltd., New Delhi, 2006
3. Gupta.S.P., Statistical Methods, Sultan Chand & Sons, New Delhi, 2002
4. Srivastava.A.B.L and Sharma. K.K., Elementary Statistics in Psychology and Education, Sterling Publishers Pvt.ltd.2003

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CORE PRACTICALS-III

QUANTITY FOOD PRODUCTION AND SERVICE (P)

UNIT I

Menu planning- Different types of Menu offered in Commercial and Non Commercial food service institution

UNIT II

Standardization of recipes, Portion control and Pricing. Stepping up of selected recipes

UNIT III

Preparation of different types of cuisines. Preparation of South Indian, North Indian, Western, Chinese, Thai and Continental cuisines

UNIT IV

Soups/ Salads /Sauces- Preparation of soups, salads and sauces

UNIT V

Table Setting and Beverage service- Formal, Casual, Buffet, waiter service- order taking procedure, service and clearance.

References

1. Sethi.M and Malhan.S, Catering Management- an integrated approach, New Age International Pvt Ltd,New Delhi,1993
2. Palacio, J.P., Harger, V, Shugart, Gand Thesis, M. West's and Wood's Introduction to Food Service, Mac Millan Pub. Co., New York, 1994
3. Spears. M. C. Food Service Organisation, A Managerial Systems Approach. Prentice Hall Inc., Ohio, 1995
4. Malhotra,R.K. Fundamentals of Hotel management and Operation, Anmol publishing House ,1998
5. Coltman Michael, M. Hospitality Management Accounting, John Wiley and sons, New York 1998
6. Kinton, R, Cessarani, V, Foskett, D, The Theory of Catering, Hodder and Stoughton, 2000
7. Yadav,C.P. Managemnt of hotel and catering industries, Anmol Publications Pvt Ltd, New Delhi, 2001.

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ELECTIVE COURSE-III

HOSPITAL FOOD SERVICE ADMINISTRATION

Objectives: To enable students:

1. Gain knowledge in hospital functions and administration
2. Acquire skills in maintaining medical records
3. Understand the management of resources in hospitals

UNIT I Hospital based health care and its changing scenario

Effects of globalization on health care, concepts of corporate hospitals in developing countries, infrastructure and lay out of an ideal corporate hospital, functioning of modern, hospital and changing needs of patients, hospitality in hospital care

UNIT II Patient Care Services

Patient Admission / discharge, cafeteria and dietary services, front office services, housekeeping services, blood bank, diagnostic services, lab, physiotherapy, pharmacy operation theatre, outpatient and inpatient ward –admission

UNIT III Principles of Hospital management

Managerial activities for effective hospital functioning duties and responsibilities of hospital managers**,** qualities of office managers**,** effective inter and intra departmental co-ordination**,** understanding functioning of corporate multi specialty hospital

UNIT IV Marketing and Material management

Human resource management, managerial accounting and financial management, importance of material management, principles of material management, inventory management.

UNIT V Hospitality in hospital care

Management of dietary department, diet planning for hospital diets, purchasing, storage and quantity food production, patient compliance, food production, serving to patient- tray and trolley service, plate waste management, washing and garbage disposal

References

1. Sudhir Andrews, Front Office Management and Operations, 2008, Tata Mc Graw – Hill Publishing Company Ltd.
2. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.
3. Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics,2011
4. Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.
5. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
6. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.
7. Kalkar S.A, Hospital Information Systems, 2010, Published by Asoke K.Ghosh, PHI Learning Pvt. Ltd.
8. http://eurpub.oxfordjournals.org/content.

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ELECTIVE COURSE IV

FOOD PRODUCT DEVELOPMENT

Unit I Food consumption pattern

Trends in food consumption pattern. Economical, psychological and sociological dimensions of food consumption patterns. Trends in social change as a base for new product development

Unit II Introduction to Food Processing and Product Development

Food components, types of food processing, status of food processing industry in India and scope of growth in future principles and purpose of new product development, product design and specifications.

Unit III Recipe Development

Traditional foods, weaning foods, convenience foods, RTE, RTS, extruded foods, IMF foods, speciality products, health foods, nutritional supplements, functional foods, nutraceuticals and designer foods, sports foods, foods for defense services, space foods.

Unit IV Testing, Evaluation and Packaging of Products

Standardization, portion size, portion control, quantity cooking, shelf life Evaluation-sensory and microbial testing of processed foods, nutrient analysis. Suitable packaging materials for different foods, SWOT analysis

Unit V Financial Management and Marketing of Food Products

Institutional support (Training and Finance) for entrepreneurship development. Financial Institutions (Central and State Government) banks/ funding agencies, financial accounting procedures, book keeping, market research, marketing strategies, cost calculation , advertising methods, product sales, product license, legal specifications, consumer behaviour and food acceptance

Textbooks

1. ***Sudhir Gupta (2007) Handbook of Packaging Technology***, Engineers India Research Institute, New Delhi
2. ***Khanaka, S.S., Entrepreneurial Development***, S. Chand and Company Ltd, New Delhi, 2006.

Reference Books :

1. ***Suja, R. Nair(2004) Consumer Behaviour and Marketing Research***, 1st Edition, Himalaya Publishers.
2. ***Hmacfie,(2007) Consumer led Food Product Development***, Weedhead Publishing Ltd., UK
3. ***Fuller, Gordon, W(2005) New Food Product Development***, 2nd Edition, CRC Press, Boca Raton, Florida,
4. ***Schaffner .D,J, Schroder , W.R.(2000)Food Marketing and International Perspectives,*** Web/McGraw Hill Publication

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CORE COURSE – IX

FOOD SERVICE FACILITIES

Objectives

To enable students

1. Gain knowledge in space allocation and arrangement of equipment in food service institution.
2. Develop skills in selecting and handling equipments for food preparation and service.
3. Acquire knowledge in the use of computers for catering services.

UNIT I Type of food Service :

Review of Location, architectural considerations, space allocation, design, work flow in all types of commercial and welfare food service institutions, house keeping requirements in relation to size, work and storage heights.

UNIT II Floor planning and layouts :

Planning and organizing space relationships and arrangement of equipment with assembly line concept. Detailed layout and location of functional areas in relation to capacity, receipt, purchase & storage of food, food production, food service, removal of soiled dishes, hand washing and dishwashing. Workers and their work space needs. Food safety - Sanitation of plant, garbage disposal and pest control

UNIT III Equipment *:*

Review of classification, traditional and modern equipments, Materials used for bases and finishes, accessory parts and functional design of equipment. Equipment needs for commercial and welfare food service institutions of varying capacities Care and maintanence of equipments.

UNIT IV Catering Systems:

Recent trends versus traditional, cooking- chill & cook - freeze systems. Working knowledge of mechanics of menu planning, customer preferences, portion cost and control.

UNIT V Automation in the Hospitality Industry *:*

Advantage of using computers in menu planning and accounting functions of food service institutions. Types of computer systems used for reservation systems, point of sale systems (POS) and property management systems.(PMS)

Related experience

Market survey of electrical and non electrical equipments available.

TEXT BOOKS

1. Glow, G., 'Catering Equipment and systems Design' Applied Science Publishers Ltd., London 1977.
2. Lendal H. Kotschevar and Margret E. Terrell, 'Food Service Planning, Layout and Equipment, 2nd Edition, John Willey and Sons, 1997.

REFERENCE

1. Unklebay, N.S., Unklebay, K., "Energy Management in food Service, Ellis Horwood Ltd., England, 1982.
2. Palan E.R. Sc. Steadler, J.A. 'Preparing for the food service Industry- 'An introductory approach" AVI Publishing Co., West Port, 1986.
3. Foster, D.L. - V.I.P. An introduction to Hospitality, Glencoe, Macmillan/ McGraw - Hill, International Editions, 1993.
4. Foster, D.L. - Food and Beverage Operations, Methods and cost controls Glencoe, Macmillan/ McGraw – Hill, International Editions, 1993.
5. West, B.B., Wood, L., Harger, V.F. and Schugart - Food Service in Institutions, John Wiley & Sons., N.Y., 1972.

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CORE COURSE – X

MANAGEMENT AND ACCOUNTING IN HOSPITALITY INDUSTRY

Objectives: To enable students to

1. Gain knowledge on various sources of finance
2. Know the accounting tools used by the business office.
3. Understand the main functions of the marketing and sales department.
4. Find out the factors that influence food and beverage cost and discuss const contract methods.

UNIT I Introduction to Origin of the Hospitality Industry

Industry segments- the hospitality hotel organisations - business office (Back Office) - owner industryship- and management methods- the function of ownership - the function of management.

UNIT II

Financing need for finance - kinds of finance long –term and short –term

The Business finance- Role of commercial Banks Institutional financing.

UNIT III

Finance- The importance of financial reports - the Balance sheet – preparing Reports a Balance sheet - purpose and use of an operating statement - cash flow analysis.

Financial Planning - For costing sales - Projecting expenses Departmental Budgets.

UNIT IV

Hospitality - Understanding hospitality, marketing, identify marketing activities Marketing relationship between sales and marketing - Retail and wholesale - Element of marketing tangible and intangible components of the hospitality product. Role of sales department.

Marketing communications - Media analysis - Budgeting media, Expenditures - public Relations - presses releases - Market Research and planning - Supply and Demand - Market Planning - Targeting the market - The Marketing Budget.

UNIT V

Food cost and beverage costs - cost control methods – controlling Beverage Food Production costs - controlling food service costs- Beverage Control Cost control Techniques order entry devices a delivery net work - Dispensing units - **Tracking devices** - support equipment.

Text Books

1. Sudhir Andrews, Front Office Management and Operations, 2008, Tata Mc Graw –Hill Publishing Company Ltd.
2. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.

Reference Books

1. Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics,2011
2. Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.
3. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
4. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.
5. Kalkar S.A, Hospital Information Systems, 2010, Published by Asoke K.Ghosh, PHI Learning Pvt. Ltd. http://eurpub.oxfordjournals.org/content

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CORE PRACTICAL IV

CATERING INTERNSHIP (P)

Objectives To enable students to

1. Gain knowledge of origin, equipment and food service techniques in institutions.
2. Obtain practical training in quantity catering and service

COURSE OUTLINE

1. Internship for a period of FOUR Weeks in well established catering centre, to develop professional competence.

   - Hands on training in front office, housekeeping, kitchen and restaurant.
   - Detailed observation on meal planning, food standards and service.

2. Case study of 5 quantity food outlets to be recorded with reference to staff organization, kitchen layout, purchase, preparation and service of food, processing, holding and storage, specific equipment used and convenience products, Supervising control and accounting procedures.

3. Development of check sheets for:
   - Menu
   - Employee performance
   - Kitchen safety
   - Sanitation

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ELECTIVE COURSE V

COUNSELLING SKILLS

Objectives: Prepare the students to:

1. Understand the principles and procedures of nutrition counseling and the role of the counsellor.
2. Develop an understanding in lifestyles influence on health and well-being
3. Effect of acute and chronic diseases on the emotional and psychological state and the behaviour of the individuals.

UNIT I Counselling

Definition, Expectations, goals, scope and limits. Counsellor – Characteristics of an effective counselor The Client – Characteristics, expectations

UNIT II The Counselling Process

Techniques for obtaining relevant information,Clinical Information, Medical History and General Profile, Dietary Diagnosis -Assessing food and nutrient intakes, Lifestyles, physical activity, stress, Nutritional Status, Correlating relevant information and identifying areas of need: Problem exploration and clarification, Developing new perspectives and setting goals, implementation, follow up and evaluation.

UNIT III Counselling techniques

Strategies and communication skills, Rapport building and opening techniques, Questioning, listening, reflecting, acceptance, silence, leading reassurance, non-verbal behaviour, terminating skills

UNIT IV Group Counselling,

Developing resources and aids for education and counseling, audio visual aids, computer in education, e- resource.

UNIT V Working with different groups

Hospitalised patients (adults, pediatric, elderly, handicapped), adjusting and adapting to individual needs. Outpatients (adults, pediatric, elderly and handicapped), patient's education, techniques and modes, follow up, Monitoring and Evaluation of outcome: Home visit

Text Book

1. Alam, S. (2008). Basics of Guidance and Counselling. Global Vision Publishing House, New Delhi

Reference

1. Nayak, A. K. (2007). Guidance and Counselling. A P H Publishing Corporation, New Delhi.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI-620 024.

M.Sc. Hospital Administration **Course Structure under CBCS**

(Applicable to the candidates admitted from the academic year 2016 -2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Principles of Hospital Administration & Health Economics	6	4	3	25	75	100
	Core Course – II (CC)	Epidemiology	6	4	3	25	75	100
	Core Course – III (CC)	Basic Biological Science Part- I	6	4	3	25	75	100
	Core Course – IV (CC)	Organizational Behaviour	6	4	3	25	75	100
	Core Course – V (CC)	Biostatistics	6	4	3	25	75	100
		TOTAL	**30**	**20**				**500**
II	Core Course – VI (CC)	Basic Biological Science Part-II	6	5	3	25	75	100
	Core Course – VII (CC)	Hospital Facilities Planning and Administration	6	5	3	25	75	100
	Core Course – VIII (CC)	Hospital Information System	6	4	3	25	75	100
	Elective Course – I (EC)	Materials Management	6	5	3	25	75	100
	Elective Course – II (EC)	Human Resource Management	6	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
III	Core Course – IX (CC)	Ethics, Legal Aspects of Hospital Administration	6	5	3	25	75	100
	Core Course – X (CC)	Marketing for Health Care Services	6	5	3	25	75	100
	Core Course – XI (CC)	Accounting and Financial Management	6	4	3	25	75	100
	Elective Course – III (EC)	Research Methodology	6	5	3	25	75	100
	Elective Course – IV (EC)	Quality Assurance	6	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – XII (CC)	Managerial Communication, Public Relation and Counselling	6	5	3	25	75	100
	Core Course – XIII (CC)	Management Concepts	6	5	3	25	75	100
	Core Course – XIV (CC)	Administration of Hospital Staff and Medical Records Management	6	4	3	25	75	100
	Elective Course – V (EC)	Strategic Management and Planning	6	4	3	25	75	100
	Project		6	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Note:

Project :100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers	-	14
Elective Papers	-	5
Project	-	1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

PRINCIPLES OF HOSPITAL ADMINISTRATION & HEALTH ECONOMICS

Objective:

This module will introduce students to the field of management & Health Economics. It covers the historical emergence of management as a professional field and academic enterprise and also the various economic aspects to be dealt with in the health care sector. Students will be confronted with the core competence areas of management & health economics.

UNIT I

Management-Definition - -management as a process-managerial skills-levels of management. Concepts of management-models of management- functions of management. Evolution of Management theory-Peter Drucker-Henry Fayol's 14 principles of management - Management by objectives.

UNIT II

Parts of Hospital – Role of Hospital in Health care delivery – External relationship in Hospital Management – Hospital, relation to other health care services – Role of hospital administrator

UNIT III

Nature & Scope of Economics – Demand analysis – Law of demand – Demand Curve – Supply analysis – Consumer behavior.

UNIT IV

Health market – categorization of consumption – Engel's Law of Utility Analysis – Indifference analysis

UNIT V

Value for money in Health Care – Health Policies – Government's Role in Different Socio-economic Systems. Pricing Policy.

References:

1. Harold Koontz, Heniz, Weimirich: Management
2. James A.F., Stones., R Edward: Management
3. Rustom S. Daver: Principles of Management
4. James A William: Hospital Management., Mac Milliam Education Ltd., New Delhi.
5. Mr. Edwin Marshfield : Managerial Economics, Mc Graw Hill
6. R.L. Varshni & K. maheshwary : Managerial Economics, S. Chand
7. S. Mookerjee : Economics – Fundamentals & Foundations

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CORE COURSE II

EPIDEMIOLOGY

Objective:

To apply the tools of Epidemiology for the prevention of diseases the promotion of Health & the formation of social relevance. To use epidemiological research to detect association between modifiable hereditary, social & environmental factors and specific disease prevention.

UNIT I

Epidemiology: Basic Concepts – Definition & Back Ground – Design Strategies in epidemiological research – statistical association & cause. Types of epidemiological studies – descriptive studies – case control studies - control cohort studies – intervention studies.

UNIT II

Fundamental measures of disease frequency (preveillance, cumulative incidence, incidence density) and of risk factors – disease association (risk, relative risk, attribute risk, odd's ratio)- applied measures of disease frequency.

UNIT III

Epidemiology of communicable diseases – Classification of communicable diseases – agents – vectors – disinfection – surveillance – investigation- containment – control – eradication.

UNIT IV

Epidemiological approach to diseases – Malaria, Filaria, Cholera, Chicken Pox, Mumps, HIV/AIDS, Hepatitis. Screening methods – Evaluation of screening programs.

UNIT V

Description and analysis of epidemiological data - prevention and summerizaton of data – evaluating the role of Chance – evaluating the role of Bias.

References:

1. Park K: Textbook of Preventive & Social Medicine. M/S Bhanarasidas, Jabalpur.
2. Robert L. Heatal: Principles of Epidemiology - A self teaching guide. Academic Press London.
3. Morris J.N. :Uses of epidemiology, Churchil Livingstone Londone.
4. Benean Sm A.S : Control of communicable diseace in man American PH Association NY.

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CORE COURSE III

BASIC BIOLOGICAL SCIENCE – Part-I

(Applied Anatomy, Physiology and Microbiology)

Objective:

The course enables the students to perceive the biological structure and basis of human biology and pathogens and to understand the spectrum of health and disease to evolve health promotion strategies in system management.

UNIT I

An introduction to basic Human anatomy and study of basic vital organs. Anatomy of Heart, Ear, Eye, Brain, Kidney.

UNIT II

Physiology: Introduction to Human physiology & study of various systems – Circulatory system – Central Nervous System – Autonomous Nervous System, Reproductive System, Digestive System, Respiratory System – Sensory organs and their functions – Glands.

UNIT III

Biochemistry of proteins – Fat – Amino acids – Carbohydrates metabolism – Enzymes – Vitamins – Hormones – Blood chemistry

UNIT IV

Microbiology: Introduction to Classification & General Characteristics of various micro organisms - microbiology of food born diseases and food preservation relating.

UNIT V

Introduction to Parasitology – commonly prevailing parasites – diseases – identification and treatment.

References:

Anatomy and Physiology for Nurses.
Physiology : K. Madhavan Kutty
Microbiology: Ananthanarayanan
Phraseology : Chatterjee
Entomology : Roy and Brown

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CORE COURSE IV

ORGANIZATIONAL BEHAVIOUR

Objective:

To familiarize the students with the behavioral patterns in various context in an organisation and to develop insight into ones own self and the functioning of others.

UNIT I

Organisational behavior: nature - scope - significance - importance - classification. Organisational Goal - importance - individual goals - group goals.Individual behavior: Personality - learning - attitudes - perception - motivation - job satisfaction.

UNIT II

Motivation - theories of motivation- frustration -conflict management - stress management. Job satisfaction - theories - promoting job satisfaction - problems of absenteeism and employee turn over.

UNIT III

Leadership - concepts - theories - functions - models - factors influencing leader ship role – essentials of leader – styles. Supervision - basic principles – styles of supervision - patterns of supervision – role of trust & conflicts.

UNIT IV

Decision making - process - types - influencing factors - management techniques. Division of labour – principles. Group in organisation – formal & informal groups – Group dynamics – Inter personal relationships. Team Building – importance.

UNIT V

Organisational dynamics and change - types - sources - change process - behavioral sciences approach to OD - power and politics - control - organisational effectiveness - organisational climate - organisational culture.

References:

1. Fred Luthans: Organisational behavior., McGraw Hills., New York.
2. Robuins S.P.: Organisational behavior., Eaglewood Cliffs., New Jersy, Prentice Hall lnc.
3. Koreman: Organisational Behaviour at Work - Organisational behaviour., McGraw Hill publishing Co.,
4. Stephan M. Mitchwell: Health Care Management - A text book in organisation theory
5. George F.Wieland: Improving health care management, Organisational develepment and change.

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CORE COURSE V

BIOSTATISTICS

Objective:

To assess health status and needs of the community for planning, implementation and evolution of health programs for hospital/health management.

UNIT I

Statistics - definition - meaning - branches - biostatistics - vital statistics. Application and uses of biostatistics in health management and epidemiology. Statistical data - methods of data collection - classification of data - construction of frequency distribution table - tabulations of data - general rules of tabulation - types of tabulation. Presentation of data - diagrammatic - graphic - types - line - bar - pie - scatter - pictogram - spot man - histogram - frequency polygon - frequency curve - ogive.

UNIT II

Measures of central tendency - mean (calculation for individual, discrete and continuous series - mode (for individual series). Empirical relations connecting mean, median and mode. Merits and demerits of each type. Measures of dispersion: Range and mean deviation (for individual series) - Standard deviation (Calculation for individual, discrete and continuous series. Co-efficient of variation - uses.

UNIT III

Correlation - different types of correlation - scatter diagram - correlation coefficient - rank correlation coefficient. Regression - basic concepts - linear regression - lines of regression

UNIT IV

Sampling techniques: Criteria of good sample - sampling designs - simple random sampling - stratified sampling - systematic sampling - Multi-phase & multi-stage sampling - sample size - use of sampling - errors in sampling.

UNIT V

Probability: basic concepts. Normal distribution - binomial distribution - characteristics - standardizes normal variate. Tests of significance - uses - sampling distribution - standard error - null hypothesis - levels of significant - test of large sample - normal test - test for proportion - test for small sample - simple test paired test - Unpaired test chi square test(for a 2x2 table)

References:

1. Rao NSn: Elements of Health Statistics., Tat Book Agency, Varanasi.
2. Mahajan B.K.:Metheds of Biostatitics, kothari Book Depot., AD Marg., Bombay.
3. Potti L.R.: A test book of statistics, Yamuna Publications, Thrivandram.
4. Lancaster H.O.: Introduction to Medical Statistics, Johnwiley & Sons., New York.
5. Leius A.E.: Biostastitics in Medicine Little Brown & Co. Boston.

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CORE COURSE VI

BASIC BIOLOGICAL SCIENCE – PART-II

Objective:

The course enables the students to perceive the basic principles of Pharmacology and the importance of pathology in relation to various systems of human body Pharmacology:

UNIT I

Introduction to Pharmacology – Routes of Drug Administration – Distribution and Bio Transformation

UNIT II

Study of action of drugs in the system including Central Nervous System, Autonomic Nervous System, Eye, Respiratory System, Cardiovascular System, Blood, Kidney, Gastro intestinal tract, Uterus.

UNIT III

Chemotherapy of tropical diseases, vitamins, antibiotics, anthelminthic

Pathology:

UNIT IV

Importance of study of pathology in relation to various systems of human physiology

UNIT V

Hospital Machinery & its functions - basic equipments – specialized equipments – their functions & utilization in the Hospital.

References:

Tripathi : Pharmacology, JayPee
Santhoskar : Pharmacology, Popular
Seth : Pharmacology, BICL
Panikar : Text Book of Medical Parasitology, JayPee
Braunsli : Outlines and Review of Pathology, JayPee

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CORE COURSE VII

HOSPITAL FACILITIES PLANNING AND ADMINISTRATION

Objectives:

The course enables the students to plan in advance to face the various problems related to hospital administration and to take preventive actions accordingly. This also enables the students to acquire knowledge about the concepts for provision of good facilities for patient care to ensure best possible return on investment in health facility through good planning.

UNIT I

Hospital Planning – objectives- guiding principles in planning Hospitals – facilities & services- Preliminary survey & feasibility study.

UNIT II

Selection of Location – functional plans of Hospital construction - the design team(Architect, Engineer & Hospital Administrator) – financial planning – equipment planning- Human resource planning - functional and operational planning.

UNIT III

Furnishing and equipping the Hospital – commissioning the Hospital – organization of the Hospital – organizational structure – planning & designing of Administrative departments.

UNIT IV

Planning & designing of Medical services – Out patient & emergency services – clinical laboratories - radiology dept. – Medical records dept. Central Sterilization and Supply Dept. (CSSD) – pharmacy – food service – house keeping – nursing dept. –surgical dept. - labour & development suites.

UNIT V

External interference in planning (Govt. agencies & Local bodies).
Waste Management in Hospitals – Methods – Types of wastes. Maintenance planning – Electrical – Civil – Safety & security – water supply. Application of method study – work measurement study – Time management.

References:-

1. G.D. Kunders : Hospitals-Planning, Design & Management, Tata Mc. Graw Hill
2. Convert Richard P &Mc Nulty Elizabeth: Management Engineering for Hospitals, Chicago.
3. Dee gum 11 &Arthur: Management by Objectives, Maryland, Aspen 1977.
4. Desai V A : Hospital Administration Vol 1 Madurai, 1989
5. Goel S L & Kumar R : Hospital Administration and Management Vol 2,New Delhi., Deeps
6. Hall T.L &Mejia A : Health Manpower planning-principles, Methods and issues.

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CORE COURSE VIII

HOSPITAL INFORMATION SYSTEM

Objective:

The Course is intended to provide theoretical knowledge about the modern trends in information system and to develop skill to create hospital information system by analyzing available models.

UNIT I

HIS - introduction - meaning - concepts - its application to the organization - different computer languages - (practical MS office). Information system for decision making - its relevance to hospital design - confidentiality- security - privacy of HIS.

UNIT II

Structure of HIS - formal & informal system - information networks - operational functions - information requirements - modularity concepts. Control and information - information for operational control - financial - material - other resources - information for management planning and control.

UNIT III

Approaches to the development of HIS - bottom approach - top - down approach - process/procedure/form driven methods - quantitative methods - automated procedures.

UNIT IV

HIS Design - define the problem - set objectives - information needs - information sources - development and selection of alternative gross design - document the system concepts

UNIT V

System information services: Information centers - Current Awareness Services (CAS) - Selective Dissemination of Information (SDI) - online - offline - information services - online services in medical science.

References:

1. Gorden B. Davis & Margrath H. Oslon: Management information system - Conceptual Foundation, Structure and develepment., Mc Grew Hill Book Co.
2. Robrt M Muedick & Joel E. Ross: Information system for modern management., Prentice Hall India Pvt Ltd.
3. Bakkar A.R. & Mol J.L.: Hospital information system - Effective Health Care Vol.1 Amsterdam.
4. Griesser G etl Data Protection in Health Information system - Considerations and Guidelines.
5. Bakkar A.R.:Hospital Information System Risks., Failures and Actions., Amsterdam.

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ELECTIVE I

MATERIALS MANAGEMENT

Objective:

The course is indented to provide an in-depth knowledge about the scientific methods of purchasing, storing and dispensing of materials in hospital.

UNIT I

Materials Management - concepts - importance in organisation - relation to other administrative functions - organisation of materials management department - role and functions of materials managers.

UNIT II

Stores - Concepts of stores - importance in hospital settings - types of stores in a hospital - layout - location - store routine - supply and replacement of stock – stores audit- stock verification - control of pilferage.

UNIT III

Inventory control - definition - scope - advantages - ABC - VED analysis - EOC lead time - safety stock - just in time - inventory models - scientific techniques - deterministic model - probabilistic model.

UNIT IV

Purchase - right quantity - right price - right time - right source – price (requirement planning) forecasting methods.
Methods of purchasing - ABC - VED - analysis in purchase control – vendor selection - purchase of capital equipment.

UNIT V

Information system development for Materials Management - - standardization on materials - bar codes - trends in material control – role of computers in materials management.

References:

1. Dutta A.K. Integrated Materials Management., S. Chand & Co. New Delhi, 1989.
2. Starr and Miller: Inventory Control - Theory & Practice, Prentice Hall India
3. Gopalakrishnan P. & Sandilya M.S Stores Management & Logistics.
4. England W.B. & Lenders M.R.: Purchasing & Materials Management, Tara pore Vala & Sons.
5. Lal A.B.: Inventory Models and the problems of price fluctuations, Sree publishing Book House.
6. Peek ham H.H.: Effective Materials Management., Tara pore vala D.B. & Co., Bombay.

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ELECTIVE II

HUMAN RESOURCE MANAGEMENT

Objective:

The course enables the student to get perspective on human resources. Further it familiarizes the students with various concepts, issues and practices in dealing with people in health sector organizations.

UNIT I

Definition – Concepts – scope –relation to other departments – organization of the department – functions.

UNIT II

Man power planning – job analysis – job description – recruitment – selection – methods of selection – Types of interviews – types of tests – induction.

UNIT III

Training & development – need for training – types & methods – performance appraisal – motivation – counseling.

UNIT IV

Wage & Salary administration – principles and techniques of wage fixation - Job evaluation - Merit rating methods of wage payment – incentive schemes – employee welfare – occupational safety – collective bargaining – employee participation in management.

UNIT V

Labour relations – ESI Act – Factories Act – Payment of wages act – provident fund & provisions - trade union act – promotion - transfer – discipline – disciplinary procedures –Planning for retirement.

References:

1. Chattergee NN: Management of Personals in Indian Enterprises, Alled Book Agency, Calcutta.
2. Dale S. Beach: Personal., Mac Millian Publishing Co.,
3. Finley RT: Personal Manager and his job., American Management Association, New York.
4. Mammoria C.B.:Personnel Management, Himalaya Publishers
5. Tripati P.C.:Personnel Management and Industrial Relations., Sulthan Chand & Co.,
6. J.B. Miner & M.G. Miner: Personal and industrial Relations A Managerial Approach
7. Southwick Arthur F: law of Hospital and Health Care Administration.

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CORE COURSE IX

ETHICS, LEGAL ASPECTS OF HOSPITAL ADMINISTRATION

Objective:

The course is intended to guide students to understand the various levels of Health administration and their functioning and also to have a general idea about the legal aspects related to Hospitals.

Health Care Administration:

UNIT I

Health Care Administration at the Union Level - Organization and working of the ministry of Health & Family Welfare – Indian Systems of Medicines.

UNIT II

Health Administration at the State level - Organaization of State Health Dept. – Structure & functions. District Health Care Administration – Structure & Functions.

UNIT III

National Health Planning – analysis of the Govt. Committee reports – Decision on the Five year health plan of the Govt.

Legal Frame Work:

UNIT IV

Medico-legal Problems – types – case handling procedures – police investigation – court deliberation – death certificates - Consumer Protection Act-1986 and Hospitals – Medical Negligence - Medical Malpractice.

UNIT V

Clinical Investigation Laws – Blood Transfusion Act – Medial Termination of Pregnancy Act – Drugs & Cosmetics Act – Birth & Death Registration Act – Pre-natal Diagnostic Techniques(Regulation & Prevention of Misuse) Act.

References:

1. S.L. Goel, Health Care System & Mangement, Deep &Deep Publications
2. Syed Amin Tabish, Hospital & Health Service Administration, Oxford University Press
3. Misra S.N.: Labour & Industrial Laws, Central Law Publications, Allahabad.
4. Agarwal V.K. : Consumer Protection-Law & Practice, BLH Publishers & distributers
5. Dr. Mahendra K. Joshi : Doctor & Medical Law, Ahammedabad
6. Bag R.K. : Law of Medical Negligence & Compensation, Eastern Law House, New Delhi

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CORE COURSE X

MARKETING FOR HEALTH CARE SERVICES

Objective:

The course introduce the student to the concepts of marketing and its dimensions involving service, production, promotion and its application to health care delivery systems.

UNIT I

Marketing Concept - definition - scope. Hospital Administrators and marketing - Environment - Opportunities and challenges. Market analysis: Health care needs - factors influencing patient behavior - market segmentation - chief determining variables - targeting and product positioning for heath care services.

UNIT II

Market research and information: Steps -market information - market decision support systems - demand forecasting.
Product service: Product line - product mix - product life cycle - branding - packaging - product positioning - new product opportunities - product development process - new product - failure and success.

UNIT III

Promotion: Objectives - promotion cost - promotional budgets - determining promotional mix planning - promotional campaigns.
Advertising and Publicity: types - levels of advertising - advertising expenditure - advertising decisions -publicity.

UNIT IV

Pricing - Meaning - importance - factors determining prices - objectives - pricing policy and structure - pricing procedure - new product pricing.
Market information system: Marketing channel - physical distribution - channel design

UNIT V

Marketing programme: market mix - product decisions - price decisions - location of hospital services - planning extension services.
Camp organizing and planning: community health care programmes - medical camps - awareness of camps - planning and organizing medical camps - follow - up.

References:

1. Kolter Philps: Marketing Management - Analysis, planning, Implementation and control.
2. Kolter Philps: Principles of Maketing; Prentice Hall, Eaglewood Cliffs., NJ.,1980.
3. Kolter Philps: Reading in Marketing Management., Tata MacGraw Hill, New Delhi,1980
4. Kolter Philps: Marketing for Health Care Organisations.
5. Lovelock: Services Marketing - Text, cases and reading.

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CORE COURSE XI

ACCOUNTING AND FINANCIAL MANAGEMENT

Objectives:

The topic helps the students to acquaint themselves with the basic concepts of cost and management accounting and with the basic concepts of financial planning and control and its applications in the financial decision making.

UNIT I

Accounting Concepts- conventions and definitions- branches of accounting & classification of accounting – distinguished assets – liabilities – income & expenses. Understand nature of debit & credit.

UNIT II

Documentation – form of record maintenance – journalizing the transaction – cash book – purchase book – sales book – sales return book – purchase return book – opening balance incorporation – preparation & posting – balancing of ledger accounts – trial balance – bank reconciliation statement.

UNIT III

Basics of preparation of financial accounts – profit & loss account- balance sheet –

UNIT IV

Ratio analysis - introduction – benefits – problems (only simple problems), financial management - introduction – meaning – objectives – advantages – limitations – difference between management accounting and cost accounting.

UNIT V

Cost accounting – meaning – cost classification – elements of costing – cost sheet – Budgeting – meaning – scope – problems in fixed budget – cash budget – flexible budget – production budget – sales budget – special issues in Hospital finance management.

References:

1. Khan M.Y. Jain P.K.: Financial Management, Tata Mc Graw Hills
2. Prasanna Chandra: Financial Management, Tata Mc Graw Hills Bhattacharya S.K. &
3. Dearden J.: Accounting for Management-Text & Cases, Vikas Publishing.
4. S.N. Maheswari: Financial Management, Sultan Chand Publications.M.C. Shukla &
5. T.S.Grewal : Advanced Accounts, Sultan Chand & Co.S.P. Jain &
6. K.L. Narang : Cost accounting – Principles & Practices, kalyani Publishers.

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ELECTIVE III

RESEARCH METHODOLOGY

Objectives:

The topic is intended to provide an adequate knowledge about research methods to help them in research work settings whenever survey design and secondary data analysis is involved in the health system.

UNIT I

Research methods - meaning - types - objectives - nature - scope. Scientific research - role of theory in research - research problem - concepts - formulation - identification - selection of research problems in management.

UNIT II

Hypothesis - testing of hypothesis bias. Research design in medical research - types - descriptive - experimental - exploratory. ecological - cohort - action research - case control.

UNIT III

Methods of data collection - source - methods - tools - observation - personal interviews – interview schedule. Sampling – concepts – advantages - limitations – types.

UNIT IV

Data processing and analysis - problems - types of analysis - inference - planning - evolution.

UNIT V

Research report – introduction – types – contents of report – steps in drafting reports

References

1. Sarantakos: Social Research., Macmillan Press., Australia.
2. Festinger and Katz: Social Research., Long man., London
3. Jathoda Marie et al: Research methods in Social Relations., Free Press., New York.
4. Kothari C.R.: Research methodology - Methods and techniques. Wiley Eastern Limited., Delhi.
5. Goode and Hatt: Research Methods in Social Sciences.

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ELECTIVE – IV

QUALITY ASSURANCE

Objectives :

To conform at complianc certification tha5 the quality management system.

Unit I

Quality-meaning, concept, importance-Quality terminologies-quality philosophies-Deming's 14 points, Juran & Crosby.

Unit II

Quality Planning for service organization-Customer satisfaction-cost of quality, determinants of quality in medical care-norms for medical staff-Medical Audit-Medical Audit Committee.

Unit III

Tools of evaluating quality in medical care-Aspects of medical care that need evaluation-TQM concept-ISO 9000 Series, its implication on hospitals;Qulaity control techniques-Core Competence, Bench marking.

Unit IV

Quality Assurance-major functions of Quality Assurance-patient care evaluation-Utilisation review, Continuous medical Education, Continuos Monitoring and Credentialing-Documentation Process-Communication System.

Unit V

Quality Improvement-Problem solving-Employee Participation-instruction & measurement-Quality Circle-Quality Recognition-Quality Awards.

References:-

1. James R Evans& William M Lindsay: The Management and Control of Quality, Jaico Publishing House , Bombay
2. William F .Roth Jr: A systems Approach to quality control; Jaico Publishing House Bombay
3. Tito Coti : Building Total Quality – A Guide for Management, Chapmane Hall
4. P.L. Jain : Quality Control & Total Quality Management, Tata Mc Graw Hill

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CORE COURSE XII

MANAGERIAL COMMUNICATION, PUBLIC RELATION AND COUNSELLING

Objectives:

The topic is intended to provide knowledge and skills about various communication proceedings involved in the management process and also to acquaint them the need of effective public relations & counseling.

Unit I

Communication in Management Process – meaning & importance – Formal & Informal Communication – methods – Barriers of communication

Unit II

Business communication - meaning & significance - types. Business correspondence - drafting of business letters - reports – circulars - press releases – press conferences.

Unit III

Meeting documentation - notice of the meeting - agenda - writing minutes - minute book - writing meeting reports – Writing annual reports.

Unit IV

Public relations - scope - tools - public relation as a catalyst for change. public relations - with individual - group organisation - press - government departments.Press language - news - new writing - publicity - media planning.

Unit V

Counselling – Definition – scope – importance – types – techniques of effective counselling – Self environment in an organization – Relationships – interpersonal effectiveness – dimensions of effectiveness.

References:

1. Dalmer Fisher: Communication in Organisation's., Jaico Publishing Co., Bombay.
2. Balan K.R. Prof: Corporate Public Relations., Sterling Publishers Pvt. Ltd .,N. Delhi.
3. Krishna Mohan & Meera Banerji: develeping Business Communication., McMillian Education Ltd.,
4. Raymond V Lesikar John., D Pettil Jr. & Lakshman C Arya: Business communication., All India Traveler Book Seller., New Delhi.
5. Margues & Raja : Organizational Development, Prentice Hall.
6. Edger Schein & Warren Benis : Personal & Organizationa change through Group methods, Tata Mc Graw Hill.

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CORE COURSE XIII

MANAGEMENT CONCEPTS

Objectives;

To provide improve of an organisation

UNIT I Introduction

Management – Definition, Principles, Functions and Role, Management as science, art and profession, contribution of Taylor, Henry fayol and Elton mayo in the area of management

UNIT II Planning and Decision Making

Planning: Definition importance of planning, steps in planning, types of planning, Limitation of planning, Types of plans – Objectives, Hierarchy of objectives, MBO – Process, Benefits. Problems & Limitations, Policies & Procedures – Characteristics of sound policy & procedures Decision Making process, Making effective decision.

UNIT III Organising

Organisation structure – Role, Features of good organization structure, Departmentation, bases of departmentation (Function, Product Territory, Process, Customer), Span of management, centralization & Decentralisation – Factors determining degree of decentralization

UNIT IV Directing

Motivation – definition, Importance, Motivation Theories – Maslow, Herzberg, Mcgregor's motivation theories. Job enrichment, Job enlargement, Job rotation, Job satisfaction. Leadership – Definition, Qualities of a leader, Leadership styles-power orientation, Managerial Grid, Tridimensional Grid Communication – Communication process, oral, written & Nonverbal communication, Formal & Informal communication, barriers in communication, making communication effective.

UNIT V Controlling

Definition, Importance of control, steps in controlling, essentials of effective control system, Management by exception, Benefits of management by exception.

Reference:

1. L.M.Prasad, Priciples & Techniques of Management, Sultan Chand & Sons.
2. Dinkar & Tagore, Business Management
3. Koontz Z & 'O' Donnel, Essentials of Management
4. Tripati & Reddy, Principles of Management.

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CORE COURSE – XIV

ADMINISTRATION OF HOSPITAL STAFF AND MEDICAL RECORDS MANAGEMENT

Objectives :

To provide the develop and manage the medical and health information services.

UNIT I

Ward Management: Ward, ward nursing, ward level, inventory, receipt of patients, types of beds, bed space requirements, discharge procedures, specific requirements for specialties, preventing of hospital infections.

UNIT II Risk Management & Disaster Management

Meaning of risk management, general principles of risk identification, risk management philosophy implementing risk management, legal implications, common disasters –national level, hospital level – guiding principles in managing the situations, formation of disaster management groups.

UNIT III Recent developments

Challenges for the hospital administrator, vital role of hospital administrator, telemedicine, health tourism, medical transcription, joint venture hospitals, emergence of corporate hospitals, ISO, health insurance, medical transcription, TQM.

UNIT IV Hospital Statistics:

Outpatient statistics - daily average outpatient attendance, average out patient attendance etc.Inpatient statistics – Bed occupancy rate, bed turn over rate.Hospital morbidity mortality - gross & net death rate, Institutional death rate, anesthesia death rate, post operative death rate, MMR, IMR

Unit V Medical Records

Definition – Importance with reference to patient doctor, hospital & research.Brief mention about ownership rights & privileges, policies governed, procedures with reference to numbering system, unit system, International Classification of disease & its usage. Medical audit committee – constitution, functions and limitation. Service by service discussion in Medical Audit.

Reference Books:

1. Charles shaw. Medical Audit – A Hospital handbook standards of Care & Practice
2. Syed Amin Tabish, Hospital & Health service Administration, Oxford Univeristy press
3. Francis CM. & Mario C de Souza, Hospital Administration, Jay pee Brothers, New Delhi
4. Goel SL. & Kumar R., Hospital Administration & Management, Deep & Deep Publications
5. Sankar Rao, Hospital Organization & Administration Kuxt Darr, Hospital Organization & Management

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ELECTIVE V

STRATEGIC MANAGEMENT AND PLANNING

Objective:

The course enables the student to understand the different ways to utilize firm's resources within its environment to reach its objective and to impart the knowledge and skills to identify the need for facilities, selection and effective utilization and maintenance of facilities.

UNIT I

Strategic Management – meaning – benefits – process of strategic planning & management. Levels of strategy - dimensions of strategic decisions – strategic planning in non-profit organizations - N.C. Kinsey's 7-S frame work.

UNIT II

Organization purpose or mission – corporate objectives – SWOT analysis – objectives & goals – importance – need. Identifying critical success factor - BCG Matrix – GE Business Portfolio Matrix.

UNIT III

Social aspects of strategic management – concepts –dimensions – Environmental analysis – meaning – need for environmental scanning – characteristics of environmental analysis – environmental forces – internal & external.

UNIT IV

Strategic choice – corporate portfolio analysis, industry – competitor analysis – strategic implementation – issues in implementation – resource allocation – structural implementation – organizational design & change.

UNIT V

Forecasting techniques – Delphi method – visionary forecasts – Time series analysis – moving average – exponential smoothing – strategic and operational control.

References:

1. P.K. Ghosh : Strategic Management & Planning, Sultan & Chand
2. Chari S.N : Modern Production and Operations Management,Wilsey Eastern Ltd. New Delhi.
3. Azhar Kasmi: Business Policy.Kotler Philip : Marketing's role in non-profit organizations, PHI
4. Joseph P Peters & Simone T. Sehg : Managing strategy change in Hospital – 10 success stories, PHI
5. John A. Pearce & Richard B. Robinson : Stategic Management, AITBS Publishers.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. HOTEL MANAGEMENT & CATERING SCIENCE

Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem.	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Hospitality French	6	4	3	25	75	100
	Core Course – II (CC)	Front Office Management	6	4	3	25	75	100
	Core Course – III (CC)	Food & Beverage Service Management	5	4	3	25	75	100
	Core Course – IV (CC)	Food Production Theory	5	4	3	25	75	100
	Core Practical – I (CP)	Advanced Food Production (P)	8	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Principles of Service Marketing	6	5	3	25	75	100
	Core Course – VI (CC)	Event Management	6	5	3	25	75	100
	Core Practical – II (CP)	Advanced Food & Beverage Service (P)	8	4	3	40	60	100
	Elective Course – I (EC)	Accommodation Management	5	5	3	25	75	100
	Elective Course – II (EC)	Principles of Accounting	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII (CC)	Personality and Soft Skill Development	6	5	3	25	75	100
	Core Course – VIII (CC)	Research Methodology	6	5	3	25	75	100
	Core Practical – III (CP)	Front Office & Accommodation Management (P)	8	4	3	40	60	100
	Elective Course – III (EC)	Tourism Management	5	5	3	25	75	100
	Elective Course – IV (EC)	Home Scale and Food Preservation	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – IX (CC)	Basic Baking Science	5	5	3	25	75	100
	Core Course – X (CC)	Catering Management	5	5	3	25	75	100
	Core Practical – IV (CP)	Application of IT in Hospitality Industry (P)	8	4	3	40	60	100
	Elective Course – V (EC)	Entrepreneurship Management	5	4	3	25	75	100
	Project	Dissertation	7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Core Papers	-	10
Core Practical	-	4
Elective	-	5
Project	-	1

Note:

Project	:	100 Marks
Dissertation	:	80 Marks
Viva Voice	:	20 Marks

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

HOSPITALITY FRENCH

OBJECTIVES :

The Main Objective is to equip the Students Communication with a new language of French & to execute his profession with a Additional Language to gain proficiency in his Job.

- To establish the standard of language and its proper usuage.
- To enable the student to use the language to communicate .
- The Student expresses his views in different ways by greeting & Introducing.
- To understand the usage of Language with suitable Basic Grammer.
- The Language enables the student to interact with the guest and to fulfil their wishes.

1. **Introduction to the Language** : The letters of the alphabet and their pronunciation, different accents used in written French

2. **Self-Introducing and basic grammer**

Self Introduction	Grammer	Vocabulary
Name, Address, Age, Nationality, Profession etc.	Verbs: To Be, To have, To reside, to be called (present tense)	Professions, Countries and their Nationalities.

3. **Presenting and introducing another person.**

4. **Greeting-How to reply to a greeting**

5. **Interacting with the Guest in a Hotel**

Know-How	Speech act	Grammer	Vocabulary
Savior Faire	How to welcome a customer? How to inform about the price of the rooms? How to inquire about the accommodation and the confirmation of booking? How to verify a booking and how to refuse politely?	The Articles, Negative form, 1st group verbs, (present tense), ilya (there is, there are), c'est (this is) it is and their negation	Housing, Entertainment, Likes and dislikes, numerals 1-50

6. **Interaction with the Guest in Restaurant** 5.2 At a restaurant

Kow-How	Speech act	Grammer	Vocabulary
Savoir faire	How to ask the menu card, the bill? How to take care of the customers in the restaurant? How to thank him? How to Inform the timings of the restaurant and other expressions?	Prepositions (a, en, de avec, sans)(at, in of with, without)	Names of vegetables and Fruits. French desserts and dishes.

7. **Familiarities of Days and months in French**

REFERENCE:

A Votre Service

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CORE COURSE II

FRONT OFFICE MANGEMENT

General Objective of the Course:

On completion of study of this course, the student will be able to understand concept, significance, and role of important Front office operations

Specific Objectives of the Units:

On completion of study of these units, the student will be able

Unit - I	:	to define front desk operations and procedures.
Unit - II	:	to identify the responsibilities of front office in inter-departmental communications and security functions.
Unit - III	:	to elucidate the front office management operations
Unit - IV	:	to explain the concept and elements of yield management
Unit - V	:	to enumerate the night audit functions and procedures.

UNIT I Front Office Operation

1.1 The guest cycle
1.2 Front office systems
1.3 Front office forms
1.4 The front desk
1.5 Front office equipments
1.6 Front office computer application

UNIT II Front Office Responsibilities

2.1 Front office communication
2.2 Inter departmental communications
2.3 Guest relations
2.4 Front office security functions

UNIT III Front Office Management

3.1 Management functions
3.2 Establishing Room rates
3.3 Forecasting room availability
3.4 Budgeting for operations
3.5 Evaluating front office operation

UNIT IV Yield Management

4.1 The concept of yield and management
4.2 Measuring yield
4.3 Elements of Yield management
4.4 Using yield management

UNIT V Night Audit

5.1 Functions
5.2 Operation modes
5.3 Night audit process
5.4 Verifying night audit
5.5 Automated system update

T.B - 1 : Hotel front Office Training Manual -Sudhir Andrews
T.B - 2 : Principles of Hotel Front Office Operations - Sue Baker, P. Bradley, J. Huyton
T.B – 3 : Hotel Front Office Operation and Management, Jatashanker R.Tewari, Oxford University press, 2010.

Books for Reference:

1. Basic Hotel Front Office Procedures – Peter Renner
2. Front Office Procedures – Peter Abbott & Sue Lewry

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CORE COURSE III

FOOD & BEVERAGE SERVICE MANAGEMENT

OBJECTIVES:

At the end of syllabus students should be able to demonstrate appropriate skills and shows an understanding of the following units.

Unit I : Understanding purchasing function – organization and the administration – Distribution system – Buyers relationship.

Unit II : To enable the students to understand purchase specification – optimal prizes, suppliers – payment policy – ordering and receiving storage procedure – security system.

Unit III : To enable the student to gaining the convenience / processed food products – grocery items – all diary and non-vegetarian products – alcohol and non-alcohol beverages services – furniture fixtures equipments.

Unit IV : To evaluate the cost control techniques and enable the student to understand par stock, non moving / slow moving items – costing and reconciliation of beverages / tobacco and it controls.

1. Gaining a perspective on selection and procurement

- The concept of selection and procurement
- Distribution systems
- Forces affecting the distribution systems
- An overview of purchasing function
- The organization and the administration
- Buyers relationship with purchasing other company personnel

2. Principles of selection & procurement

- The purchase specification
- The optimal amount
- The optimal prices
- The optimal suppliers
- The optimal payment policy
- Typical ordering procedure
- Typical receiving procedure
- Typical storage procedure
- Security in the purchasing system

3. Selection and procurement of the items :

- Purchase procedure
- Convenience foods
- Processed produce and other grocery items

- Dairy product/egg/meat/poultry/fish etc.,
- Alcoholic and non alcoholic beverages
- Non food expenses items
- Services
- Furniture, Fixtures and Equipments

4. Cost Control Techniques :

- Yield Management
- Food costing
- Par Stock
- ABC/XYZ analysis
- Non moving and slow moving items
- Beverage costing
- Bar Control
- Records in food cost control
- Records in beverage cost control
- Food cost reconciliation
- Beverage cost reconciliation
- Tobacco cost reconciliation

Reference :

1. Hotel Management & Costing – D. Antony Ashok Kumar.
2. Purchasing & Selection & Procurement for the Hospitality Industry - Willies Smith.

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CORE COURSE IV

FOOD PRODUCTION THEORY

Objectives –

To put an in depth knowledge to the learner on basics of cookery.
To classify the learner on the types of kitchen and the personnel
To differentiate the learner on various commodities used in catering industry
To emphasize the learner on the art of making the preparation of food.
To stress the learner on the importance of kitchen hygiene and rules regulations

UNIT I INTRODUCTION TO BASIC COOKERY

Traces of ancient cookery- origin of modern cookery practices- eating habits changing pattern of eating foods-fusion cooking – importance of food in our daily life – cultural and religious influence of food in India.

UNIT II ORGANISATION STRUCTURE IN THE KITCHEN

Different types of kitchen – classical kitchen brigade (English & French) in a star category hotels- Duties and responsibilities of executive chef and other staff
Mise-en-place in kitchen- mise- en- scene.

UNIT III COMMODITIES PERISHABLES USED IN CATERING INDUSTRY

The five food groups- cereals (wheat, rice and other millets in India and Other continents) pulses(types, sources nutritive value).(Spices of India and continents) Sweeteners-Fats and oils-Dairy products vegetable Indian-continent types. Fruit – types Herbs (continental & Indian)

UNIT IV INTRODUCTION TO FOOD PREPARATION

Methods Of Preparing The Foods(Washing, Peeling Paring, Grating, Grinding, Mashing ,Sieving, Steeping, Marinating(meat, fish , chicken etc) Sprouting (pulses and legumes), blanching, filleting of fish, Deboning and jointing (poultry, mutton, beef, pork etc.) Methods of mixing foods(stirring, emulsifying, blending etc.) Methods of cooking food (boiling, poaching, grilling, broiling, steaming, barbeque etc.)

UNIT V KITCHEN HYGIENE

Personal hygiene required for kitchen staff- safety and security required for kitchen staff – HACCP Principles- quality standards maintain in the kitchen- types of kitchen equipments- major electrical equipments used in the kitchen – sundry equipments and utensils used in the kitchen

REFERENCE BOOKS:

1. Modern Cookery for Teaching and Trade – Vol. I & II –Thangam E. Philip (Orient Longman Publications)
2. Practical Cookery – Kinton and Ceserani (ELBS Publications)
3. The Theory of Catering – Kinton and Ceserani (ELBS Publications)
4. Theory of Cookery – Krishna Arora (Frank Bros. & Co., New Delhi)
5. A Taste of India – Madhur Jeffrey.

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CORE PRACTICAL I

ADVANCED FOOD PRODUCTION (P)

Objective

Identification of different kitchen equipments tools and commodities

Demonstration &Preparations of Basic stocks and sauces, soups

Demonstration and cuts of fish, Poultry, Beef. Mutton, Pork

Preparations Indian rice preparations

Pulao-5varieties

Biryani-5varieties.

Pulao-5varieties

Indian gravies-5 varieties

Chat items-5 varieties

Breakfast items south Indian and northern Indian varieties-5 varieties

Indian snacks- 5 varieties

10 continental menu consisting the following

Horsdoeuvres-5 varieties

Soup-5 varieties

Main course-5 varieties of each of the following

(Pasta,Risotto,Pilaf,Steak of lamb beef mutton pork fish)

Vegetable preparations

Continental desserts

PATTISSIERIE

Cakes-5 varieties

Pastry-4 varieties

Yeast goods-5 varieties

Cookies And biscuits-5varieties

Cake icings-5 varieties

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CORE COURSE V

PRINCIPLES OF SERVICE MARKETING

OBJECTIVES :

1. To extinguish the principles of service in Marketing.
2. To understand the service rendered the Customers.
3. To instinct the Principles of service by executing strategies in Quality.
4. To update and know the role of Marketing in Strategic planning.
5. To create a well equipped knowledge about Customerly Service and Hospitality.
6. The Main aim of this course is to promote Service Marketing, promote Tourism and extinguish Hospitality through Service.

UNIT - I MARKETING OF SERVICE

1.1 Meaning of Definition of Marketing
1.2 Characteristics of Service
1.3 Problems in Service Marketing
1.4 Distinction between Product Marketing and Service Marketing
1.5 Classification of Service
1.6 The Service Marketing mix

UNIT - II CUSTOMER EXPECTATIONS OF SERVICE

2.1 Service Expectations
2.2 Possible Levels of Customer Expectations
2.3 Sources of Desired Service Expectations
2.4 Sources of Adequate Service Expectations
2.5 Service Customers want the Basics

UNIT - III DELIVERING AND PERFORMING SERVICE

3.1 Employees are the Service and the Brand
3.2 The Critical Role of Service Employees
3.3 Employee Satisfaction, Customer Satisfaction and Profits
3.4 The Effect of Employee Behaviours on Service Quality Dimensions
3.5 Strategies for Delivering Service Quality through people

UNIT- IV THE ROLE OF MARKETING IN STRATEGIC PLANNING

4.1 Market Oriented Strategic Plammomg
4.2 Establishing Strategic Business Units
4.3 Planning New Businesses
4.4 Internal Environmental Analysis
4.5 External Environmental Analysis

UNIT- V MARKETING FOR HOSPITALITY AND TOURISM

5.1 Importance of Marketing
5.2 Tourism Marketing

5.3 Market Needs, Wants and Demands
5.4 Marketing value, Satisfaction and Quality
5.5 Exchange Marketing, Transactions and Relationships

REFERENCE BOOKS :

1. Marketing Management-Dr.N.Premavathy
   (Marketing, Principles of Marketing, Modern Marketing)
   Sri Vishnu Publications, First Edition-2010

2. Service Marketing (Integrating Customer Focus Across the Firm)
   Valarie A.Zeithaml/Mary Jo Bitner
   Dwayne D.Gremler/Ajay Pandit
   Mc Graw Hill Education (India) Private Limited Edition-2013

3. Marketing-Dr.N.Rajan Nair,Sanjith R.Nair
   Sultan Chandol Sons-Educational Publishers
   Seventh Edition-2012 &2014 –New Delhi

4. Marketing for Hospitality and Tourism/Pearson Education Asia
   Philip Kotler John Bowen James Makens
   First Indian Reprint -2002

5. Hospitality Sales of Promotion Derek Taylor
   Series Editor –John O'Connor
   Reed Educational and Professional Publishing Ltd-2002

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CORE COURSE-VI

EVENT MANAGEMENT

OBJECTIVES :

1. To exhibit and built the leadership qualities by managing the Events
2. By planning and executing the programmed event with proper schedule and organization.
3. To equip a quiet basic knowledge about decorative and attractive execution of stage and the function of public relative action related to it.
4. To develop the quality of program organizer.
5. To ensure the sources of Finding Agencies, additional Revenue and to give suggestion for Menus.
6. The main and Basic concept of this course is to ascertain the student with all Leadership Qualities to run or manage a programme and organize it in a full fledged manner.

UNIT I IMPORTANCE OF EVENT

1.1 Introduction to meetings and Event Management
1.2 Categories and Definitions
1.3 Need of Event Management
1.4 Objectives of Event Management
1.5 Implications of Events and Creativity

UNIT II FUNCTION CELEBRATION

2.1 Event planning, arranging chief guest/Celebrities
2.2 Arranging sponsors and Brand Management
2.3 Back Stage Management
2.4 Budget Management and Contract Management
2.5 Types of Leadership for Events & Organization

UNIT III STAGE AND DECORATION PROCESS

3.1 Designing, Backdrop, Invitation Card, Publicity Material
3.2 Event decoration, Guest and Celebrities
3.3 Making press release, Marketing Communication
3.4 Media Research & Management, Photography
3.5 Video Coverage Management & Moments

UNIT IV PROGRAMME ORGANIZATION

4.1 Participation according to The Theme of the Event
4.2 Program Scripting, Public Relation
4.3 Electing a Location, Team Spirit
4.4 Social and Business Etiquette
4.5 Speaking Skills and Stage Decoration
4.6Time Management

UNIT V SOURCES OF ADDITIONAL REVENUR & MENUS

5.1 Sponsorship and public funding
5.2 Grant funding and other income for events
5.3 Finding the Venue-Venue finding checklist
5.4 The Organization and Logistical activities
5.5 Issues in determining menus and Refreshments

REFERENCES :

1. Successful Business Correspondence - Sudesh Puri Sahni Publications, Delhi -2000
2. Successful Event Management – Anton Shone & Bryn Parry, Publisher: Cengage Learning Business Press: 2 Edition (April 22,2004)
3. Management of Event Operations (Events Management) – Julia Tum, Philippa Norton, J, Nevan Wright, Publisher:Atlantic Publishing Company(FI):Pap/Cdr Edition (January 8,2007)
4. The Complete Guide to Successful Event Planning-Shannon Kilkenny, Publisher:Wiley & Sons, India (May 1992)
5. Professiional Event Coordination(The Wiley Management Series)-Julia Rutherford Silbers and Joe Goldblatt Publisher:Wiley,John &sons, Incorporated.

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CORE PRACTICAL II

ADVANCED FOOD AND BEVERAGE SERVICE (P)

Objective :

At the end of this practical syllabus to enable the student to understand hierarchy of food and beverage service department – knowledge of menu and menu compilation – mock services and practices**.**

- Hierarchy of Food and Beverage Service outlets like Restaurant, Room Service, fast foods, Banquets etc.,

- Table d'hote menu, A la Carte menu compilation and with accompaniment & cheese, Cigarette, Cigar Wines and services.

- Setting of the table according to menus, mock services to be practiced.

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ELECTIVE COURSE I

ACCOMMODATION MANGEMENT

General Objective of the Course :

On completion of study of this course, the student will be able to know the concept, significance, and role of important Front office operations

Specific Objectives of the Units :

On completion of study of these units, the student will be able

Unit - I	:	to define front desk operations and procedures.
Unit - II	:	to identify the responsibilities of front office in inter departmental communications and security functions.
Unit - III	:	to elucidate the front office management operations
Unit - IV	:	to explain the concept and elements of yield management
Unit - V	:	to enumerate the night audit functions and procedures.

UNIT I

1.1 Planning and Organizing the Housekeeping department
1.2 Managing Inventories
1.3 Controlling expenses
1.4 The Budget Process

UNIT II

2.1 Planning the operating Budget
2.2 Budgeting Expenses
2.3 Controlling Expenses
2.4 Purchasing Systems
2.5 Capital Budgets

UNIT III

3.1 Ceiling, Walls, Furniture and Fixtures
3.2 Selection Considerations
3.3 Types of Ceiling Surfaces and Wall Coverings
3.4 Types of Furniture and Fixtures
5.6 Care Considerations

UNIT IV

4.1 Housekeeping plans into Action
4.2 To present your program to Management and Staff
4.3 The Program Implementation
4.4 Contract Cleaning
4.5 Types of Services

5.7 Agreeing on Terms – To Select and use Consultants

UNIT V

5.8 Management Theory and Housekeeping Administration
5.2 Material Planning: Administration of Equipment and Supplies
5.3 Material Budget
5.4 Guest room Furniture and Fixtures
5.5 The Housekeeper's role in Environmental Control
5.6 The Concept of safeguarding Assets
5.7 Development of others – Developing Executive Housekeepers – Training and Evaluating Supervisors and Managers

Reference:

1. Managing Housekeeping Custodial Operation-Edwin B.Feldman
2. Professional Management of Housekeeping Operations (II Edn.)-Robert J.Martin &Tomas J.A.Jones.
3. House keeping Management-Margaret M.Leappa&Aleta Nitschke

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ELECTIVE COUSE II

PRINCIPLES OF ACCOUNTING

OBJECTIVES:

1. The objective of this course is to substan the fundamental concepts of basic accounting.
2. The importance of maintaining ledger for ensuring the Accounts.
3. The methods adopted and its components in maintaining Accounts.
4. To establish the student's knowledge with the principles of Accounting and making himself aware of the statistical condition and deprevation.
5. To improve the sole trade and adjustment with in the companies, a form of understanding between them.
6. The main aim is to improvise the principle of Accounting among the students and its benefits in the field of Hotel Industry.

UNIT- I

Definition of Accounting – Accounting Principles – Accounting concepts and Conventions – Nature of Accounting – Kinds of Accounts.

UNIT-II

Journal – Ledger – Trial Balance – Rectificals of Errors – Bank Reconcilliali Statement(BRs)

UNIT-III

Subsidiary Books – Purchase Book, Sales Book, Purchase Returns Book, Sales Returns Book and Cash Book – Simple Cash Book and Petty Cash Book.

UNIT-IV

Methods of Depreciate – Straight Line Method – Written Down Value Method and Annuity Method.

UNIT-V

Final Accounts of Sole Trader and Final Accounts of Companies with Simple Adjustments.

REFERENCES :

1. Advanced Accounting – M.C.Shukla,T.S Grewel& S.C.Gupta "Sultan Chand & Sons": Edition-2014
2. Advanced Accounting – S.P.Jain & K.L.Narang Kalyani Publishers-2012
3. Advanced Accounting – R.L.Gupta &Radhasamy "Sultan Chand & Sons": Edition-2013
4. Principles of Accounting – Vinayakam,Mani&Nagarajan "Sultan Chand & Co": Edition-2013
5. Principles of Accounting - R.L.Gupta &Radhasamy "Sultan Chand & Co": Edition-2014

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CORE COURSE VI

PERSONALITY AND SOFT SKILL DEVELOPMENT

Objectives :

1. To make the student aspire the importance and significance of communication.
2. To initiate the students the mechanics of Human Brain and its attributes and Functions.
3. To endure the students knowledge with Advising and Counselling
4. To enrich the students positive attitude and their exhibitions in their working Area/Place.
5. To exhibit and initiate the leadership Qualities.
6. The General aim of this course is to enrich the student personality by developing their personal attributes, Quality developing positive thinking and leadership Qualities for their future endeavours and to acquire the knowledge of basic skills.

UNIT I SELF ASSESSMENT

1.1 Life Oriented Aspects-Personal Attributes
1.2 Relation Oriented Attributes Education and Upbringing, Leadership Oriented Attributes
1.3 Performance Oriented Attributes-Business Oriented Attributes
1.4 Self Qualifying Factors-Self Image Factor
1.5 Self Confidence Factor –Self Response Factor

UNIT II MECHANICS OF FUNCTIONING MIND

2.1 The Human Brain – The Human Body – The Human Mind
2.2 Constitution of mind-Conscious part of the Mind
2.3 Representative of Personal Attributes
2.4 Mechanics of Conscious Thought Process
2.5 Mechanics of Subconscious Thought Process

UNIT III MECHANICS OF ADVISING AND COUNSELLING

3.1 Need for Advice – Role of an Advisor
3.2 Quality of an Advice-Basic for an advice – Homework
3.3 Guidance for Advisor Counselling
3.4 Guidance for Counsellor- Quality of Counselling
3.5 Time aspect- Feedback Information- Concluding Remarks

UNIT IV DEVELOPING POSITIVE ATTITUDE

4.1 Features of attitudes-Attitude behavior
4.2 Formation of attitudes- Change of Attitudes
4.3 Attitude in a Workplace- The Power of Positive Attitutde
4.4 The benefits of a positive attitude
4.5 Developing Positive Attitude

UNIT V TEAM BUILDING AND TEAMWORK

5.1 Aspects of team building –Team Goals
5.2 Skills needed for team work-Sharing
5.3 Characteristics of effective team
5.4 Role of a team leader-Leadership and Coaching
5.5 Difficulties faced in inter-group collaboration

REFERNCES :

1. English for all Communication – K.K Ramanarayanam –Year-2003 Sage Publications India Pvt Ltd
2. Communication for development in the Third World –Srinivas R.Melkote H.Leslic Steeves-Year-2005 Sage Publications India Pvt Ltd,
3. Developing Communication Skills-Krishna Mohan/Meera Banerji Macmillan India Ltd Year-2004
4. Personality Development and Carrer Management- R.M.Onkar S.Chandol Company Ltd Year-2008
5. Soft Skills-Dr.K.Alex S.Chand & Company Pvt Ltd Year-2014

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CORE COURSE VIII

RESEARCH METHODOLOGY

OBJECTIVES

The aim is to ascertain the approaches of research and its methods in different forms and fields.

1. To Secure the knowledge of research in different aspects & fields of Hotel Industry.
2. The Methodology to collect the date & its techniques
3. To update the students with the on-growing technical extension and installing data of the Research
4. To Create a Methodology among the students for Research activity, by adopting essential fundamental concepts of Research.
5. To enable the student to execute a Research project with his finding and adopting a methodology to it.

UNIT-I

Introduction to Research Methodology – Meaning – Objectives – Research Approaches, Research Problem – Formulation of the Research Problem

UNIT-II

Types of Research – Desk Research – Field Research –Quantitative Research – Market Research – Coupon Research – Qualitative Research.

UNIT-III

Data Collection Techniques- Questionnaire – Interviews – Projective Methods – Secondary Data.

UNIT-IV

Processing and Analysing of Data – Problem in Processing – Sampling Design – Sample Survey Steps involved – Difference types – Random Sample – Complex Random Sample design. Use of Computer in , Research – Computer and Computer Technology – Computer and Researcher.

UNIT –V

Interpretation and Report Writing – Structure of a Report – Chapterisation – Meaning – Technique – Significance – Layout of Research Report – Types of Report – Oral Presentation – Mechanics – Conclusion. Documentation- Food Notes – Bibliography – Index,Charts,Diagram,Maps,Tables,Illustration,Photos, Post Script,Glossary.

REFERENCE BOOKS :

1.Research Methodology – C.R.Kothari
2. Research Methodology – Dr.Kumar & Lakshmi Narayana Agarwal

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CORE PRACTICAL III

FRONT OFFICE AND ACCOMMODATION MANAGEMENT (P)

General Objective of the Course:

On completion of study of this course, the student will be able to practice the operations of Front office and housekeeping

Specific Objectives of the Units:

On completion of study of these units, the student will be able

Unit – I	:	to learn the organization of front office and housekeeping
Unit – II	:	to determine the reservation and registration formalities
Unit – III	:	to handle the functions of information section and cleaning & polishing
Unit – IV	:	to classify the cleaning of carpets and linen
Unit – V	:	to identify the types of furniture and fixtures.

UNIT I

1.1 Hierarchy of Staff of Housekeeping and Front Office
1.2 Departments of five star hotel, medium hotel to be studied in detail.
1.3 Mock practices of arrival and departure of guest
1.4 Lost and found, format of the entire front office operations to be designed and known.

UNIT II

2.1 Registration & Reservation Procedures
2.2 Handling Check–In & Walk–In Guests
2.3 Checkout Procedures.

UNIT III

3.1 Role of Information Section
3.2 Cash Section in Front Office
3.3 Different types of cleaning
3.4 Polishing of metal, wood etc to be practiced.

UNIT IV

4.1 Carpet cleaning, floor, spring-cleaning.
4.2 Laundry – washing
4.3 Dry cleaning of different fabrics and clothes to be known.

UNIT V

5.1 Furniture and Fixtures of different types of wood, metal etc to be practiced
5.2 Cleaning and maintaining
5.3 Colour Schemes Wall, interior and exterior to be known and practiced.

Books for Reference:

1. Basic Hotel Front Office Procedures – Peter Renner
2. Front Office Procedures – Peter Abbott & Sue Lewry
3. Managing Housekeeping Custodial Operation-Edwin B.Feldman
4. Professional Management of Housekeeping Operations (II Edn.)-Robert J.Martin &Tomas J.A.Jones.
5. House keeping Management-Margaret M.Leappa & Aleta Nitschke

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ELECTIVE COURSE III

TOURISM MANAGEMENT

OBJECTIVES :

1. To make the student comprehend the tour and its concepts.
2. To help the student perceive the significance of Tourism Transport.
3. To introduce the student to the Hygiene and Sanitation.
4. To make the student get acquired with the conceptual importance of Globalisation of the Tourist Industry.
5. To make the student gain proficiency in assessing trends in Industry and Technology.
6. The general aim of this course is to provide the student the aspect and operations of Tourism, as it's a fast growing industry involving aspects like travel, cultural travel, educational and medical, business travel, outgoing travel and incoming travel.

UNIT I TOUR OPERATIONS

1.1 The Origins of the Packaged Tour
1.2 Growth in the Package Vacations
1.3 Types of Tour Operations-Tour operation Economics
1.4 Customised Tours and Excursions
1.5 Control over Tour operating-Direct Marketing

UNIT II DIIFFERENT FORMS OF TRANSPORT

2.1 Tourism Transport-Basic Componenet
2.2 Modes of Transport-Car ownership Air Transport
2.3 Rail Transport-Highspeed Trains
2.5 Sea Transport-IPSA (International Passengership Associates)-TPPC (Trans Pacific Passenger Conference)

UNIT III HYGIENE AND SANITATION REGULATIONS

3.1 Food Poisoning-Protection from Contamination
3.2 Food and Beverage Handling and Personal Hygiene
3.3 Service control areas- Public Dining Rooms
3.4 Contracts with Managerial Personnel
3.5 Social Security and Fringe Benefits

UNIT IV GLOBALIZATION OF THE TOURIST INDUSTRY

4.1 Importance of Tourism to a Destinations Economy
4.2 Tourism Strategies and Investments
4.3 Segmenting and Monitoring the tourist market
4.4 Communicating with the Tourist Market

4.5 Organizing and Managing Tourism Marketing-Influencing Site Selection

UNIT V TECHNOLOGY IN TOURISM SERVICE

5.1 Important areas where technologies can be applied
5.2 Multiple use of Technology-Trends in Industry
5.3 Reservation Systems in the Transport
5.4 Customer Relationship Management (CRM)
5.5 Explanation-WTO,OECD,WTTC

REFERENCES :

1. The Business of Travel Agency &Tour Operations and Management – A.K.Bhatia Sterling Publishers pvt www.sterlingpublishers.com year-2004
2. Marketing for Hospitality and Tourism Philip Kotter, JohnBowen, Jennes Markers year-2002 Published by Pearson Education pvt
3. HRM in Tourism & Hospitality-Darren Lee-Ross-Year-1999 Cassell British Library Cataloging in publication data
4. Hotel Tourism Laws year-2001 Dr.Jagmohan Hegi Frank Bros &Co Publishers Ltd
5. Travel & Tourism Industry- year-2001 Neelam Soni Student Aid Publications Delhi

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ELECTIVE COURSE IV

HOME SCALE FOOD PRESERVATION

OBJECTIVES:

1. To update the knowledge to secure the Basic Principles of Food preservation.
2. To make the Student understand the ways of preservating food.
3. To create a smooth knowledge of preventing the food from spoilage.
4. To create a awareness by Food Preservation through various Chemicals and their Contemporary needs.
5. To prevent and preserve is the basic concept of this course and to enrich the knowledge of chemicals and anti-oxidants in the field of the food preservation.
6. This course aim to deal the consequence of preserving food and its maintainence by using different methods and chemicals.

UNIT I

Food Preservation meaning, objectives and basic principles of food preservation (Asepsis, Removal, Anaerobic Conditions),Food Contamination, Microbial Organisms.

UNIT II :

Food Spoilage
Food Spoilage and its Prevention, Role of Microbes in Food Spoilage
Causes, Types (Physical, Enzymatic and Microbial-Moulds, Yeast and Bacteria)

UNIT III:

Food Preservation Using High and Lower Temperature
Principles, Types, Methods and advantages of each
High Temperature Canning process, Principles involved, Spoilages encountered, aseptic Canning

Low Temperature:-

1. Refrigeration- Principles and Working Systems.
2. Freezing- Principles, Methods, Advantages and Disadvantages

UNIT IV :

Food Preservation using drying, dehydration and radiation Principles, advantages, mechanical devices and methods employed for drying and dehydration. Pretreatment of foods, factors affecting drying and dehydration. Pretreatment of foods,factors affecting drying and dehydration. Radiation-types, uses and safety limits

UNIT V:

Food Preservation using Chemicals, Types of preservatives, advantages and disadvantages permissible limits, related experience: Preparation of Squashes and Juices, Preparation of jams, jellies, marmalade, preparation of pickles, sauces, Ketchups, Preparation of dehydrated products. Industrial visit.

REFERENCES:

1. Food,Facts and Principles(Second Edition) -N.Shakundalamany & M.Shandaksharasamy
2. Food Processing and Preservaion-B.Sivasankar.
3. Food Microbiology (Fourth Edition) -William C.Frazier & Dennis C.Westhoff.
4. Devadas R.P.Nutrition in Tamilnadu Sangan Publishers, 1972
5. Gnana Sundaram, S.A.Manual of Practical paediatric Nutrition, Students Offset Service, T.Nagar, Madras
6. Jellifee, D.B.infant in the subtropics and tropics, Who Geneve, 1968
7. Marting E.A.Roberts, Nutrition in Tamilnadu Sangam Publishers, 1972

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CORE COURSE IX

BASIC BAKING SCIENCE

OBJECTIVES :

- To Differentiate the learner on wheat and its types.
- To classify the learner on types fats eggs yeasts.
- To define the reader on the production of Bread and cakes
- To give an in-depth knowledge on cookies
- To familiarise the learner on Bakery equipments

Unit I

Wheat – Classification – Types - Structure. Milling Process – Flour - Types – Composition – Flour test – Functions – Storage – Sugar – Types – Functions.

Unit II

Fats – Types – Functions – Eggs – Types – Yeast – Types – Functions – Salt – Functions. Leavening Agents – Types – Functions – Stabilizers – Emulsifiers – Improvers.

Unit III

Bread – Methods of Baking – Processing – Characteristics of Breads – Bread Faults – Cake making ingredients – Tips in Cake making – Methods of Making Cake Types – Balancing Cake Formula – Cake faults and remedies.

Unit IV

Cookies – ingredients - Process involved. In cookies – Methods –Cookies faults – Pastries – Types – Methods – Hygiene in Bakery – Personnel Hygiene.

Unit V BAKERY MACHINERY AND EQUIPMENTS

Major Equipments – Minor Equipments – Cleaning of Equipments and Machinery – Standard Weight and Measures – Oven temperature Chart – Temperature conversion Formula.

REFERENCE BOOKS:

1) Basic Baking Science & Craft by S.C. Dubey (S.C. Dubey F-10/5, Malaviya Nagar, New Delhi – 110 017).
2) Beautiful Baking - Consultant Editor – Carole Clements Richard Blady Publishing (Anness Publishers Ltd.)
3) Perfect Baking at Home–Kritika A.Mathew (Vasan Book Depot, Bangalore)
4) Practical Baking – Sultan
5) New Complete Book of Breads - Bernard Clayton (Fireside Rockfeller Centre, New York.
6) Baking made simple – M.K. Gaur & Manish Gaur. (Bakers Machinery & Consultancy Company, Bangalore).

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CORE COURSE X

CATERING MANAGEMENT

OBJECTIVES :

1. To extemplate the function of management and its scope
2. To enrich the personal appraisal in the field of catering
3. To introduce the students about the knowledge of organization and to execute the information regarding food
4. To make the students know about the preservation and maintenance of Quality in food
5. To update the knowledge of consumption for preparing food.
6. The General objective of this course is to ascertain and enrich the students capability of catering management.

UNIT I MANAGEMENT NATURE AND SCOPE

1.1 Meaning and Definitions of Management
1.2 Nature of Management – Management as a Profession
1.3 Importance of Management-Level s of Management
1.4 Fuctions of Management-Planning organizing
1.5 Staffing –Directing-Co-Ordinating-Controlling

UNIT II PERFORMANCE APPRAISAL AND PROMOTION

2.1 Meaning of performance Appraisal
2.2 Features and Advantages of Performance Appraisal
2.3 Methods of Performance Appraisal
2.4 Steps to make performance Appraisal
2.5 Meaning and Criteria for Promotion

UNIT III PRINCIPLES AND FUNTIONS OF CATERING MANAGEMENT

3.1 Principles of Management-Authority and responsibility
3.2 Individual goals subordinate to establishment goals
3.3 Functions of Management –Steps in Organising
3.4 Changes in food preferences and eating habits
3.5 The types of customer or establishment

UNIT IV CATERING SYSTEM

4.1 Problems of the catering industry
4.2 Regeneration food service system for hospitals
4.3 The cook-freeze process-Banqueting
4.4 Preparation of food Storage of frozen items
4.5 The reheating of frozen cooked portions –Quality control

UNIT V CATERING SERVICES

5.1 Measuring gas Consumption

5.2 Atmospheric Steaming oven
5.3 Electrical Installation, Installation and Maintenance
5.4Cost of equipment, Installation and Maintenance
5.5 Energy saving Equipment –Water Treatments

REFERENCES :

1. Catering Management M.D.Jitendra Dominant Publishers & Distributors Year-1999
2. Hospitality Sales & Promotion Strategies for Success Derek Taylor/John O'Connor publication year-2001
3. Principles of Management (Business Mgt)-2014
4. Hotel, Hostel and Hospital Housekeeping –Joan C.Branson & Margaret Lennox Hodder &Stoughton-2004
5. Hotel/Motel Operations – Suzanne Stewart Weissinger , MTA –Delmar Thomson Learning – 2000

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CORE PRACTICAL IV

APPLICATION OF IT IN HOSPITALITY INDUSTRY (P)

OBJECTIVES:

1. To Accure the knowledge with latest techniques of Computer Software.
2. To Access the ability of Computer related to Hotel Management
3. To understand the basic components of Ms-Office and its function
4. To Update the Computer knowledge and ascertain their needs to the process of Hotel Management
5. To extinguish the knowledge of net facility in business.

UNIT I INTERNET &HTML

1. Creating a E-mail ID, sending & receiving e-mail
2. Accessing websites related to hotel industry
3. Designing web pages using html for a hotel (Formatting tags,image tags,tables, frames forms and links)

UNIT II MS-WORD

1. Text Manipulation- changing the font size, font type, font style,making the
   text bold, underling the text, aligning th text (center, left, right, justifies), cut, copy, paste
2. Paragraph indenting & Spacing, bullets&Numbering, Spelling & Grammer check, inserting a picture from clip art, auto shapes, word art.
3. Table manipulation –creating tables, inserting & deleting rows & columns, changing width & height, changing table border.
4. Mail merge concept, printing formats

UNIT III MS-EXCEL

1. Entering the data,changing the fonts, changing row heights & columns width, formatting the data , sorting the data
2. Formula processing – Creating Simple formula,using functions (ABS,SQRT,LEN,SUM,ROUND,AVG,COUNT,CONCATENATE,FIND)
3. Inserting & formatting charts, inserting pictures, printing formats

UNIT-IV MS-POWERPOINT

1. Creating simple presentation,saving,opening an existing presentation,creating a presentation using Auto content wizard & template
2. Using various auto-layouts,charts,table,bullets & clip art.
3. Viewing an existing document in various views-outline view,slide view, slide show view, slide sorter view and note pages view.

UNIT-V MS-ACCESS

1. Creating a Database, Relationships,Creating Table through Design View.
2. Query Form &Reports

REFERENCE BOOKS:

1. MS-Office 2000 Sanjay Saxena,Vikas Publishing House
2. Computer Applications in Business - S.V.Srinivasa Vallabhan, Sultan Chand and Sons, New Delhi
3. Software for windows made simple - Taxali, Tata McGraw Hill Publishing Company
4. MS-Office 2000 (Access only) Sanjay Sexana,vikas Publishing House
5. Computer Applications in Business (Access only) Srinivasa Vallabhan sultan Chand & internet programming and web design S.Aarathi,Kalaikathir Achagam

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ELECTIVE COURSE V

ENTREPRENEURSHIP MANAGEMENT

OBJECTIVES :

1. To face the current challenges and to become the future Entrepreneurship.
2. To develop their thinking with Business mind
3. To create a innovative technique in their future Entrepreneurship
4. To initiate Management control towards their field to become a good Entrepreneurship
5. To template the basic components, plans, strategies to execute a successful ownership
6. The general aim of this course is to extinguish the ability of the student by facing the challenges and executing the talents by becoming a good Entrepreneurship in the competitive field of job making.

UNIT 1 ENTREPRENEURSHIP AN OVERVIEW

1.1 Entrepreneurship challenges in the 21st century
1.2 Creating Indian Entrepreneurship
1.3 The Future of Entrepreneurship
1.4 Entrepreneurship Characteristics
1.5 Corporate Entrepreneurship

UNIT II DEVELOPMENT OF BUSINESS PLAN

2.1 Business forms-Partnership
2.2 Procedure for formation of body corporate
2.3 Pre-operational Requirements and procedural Aspects of creating a venture
2.4 Structure of the Business plan
2.5 Presentation of the Business plan

UNIT III PRODUCT SERVICE AND MARKET DEVELOPMENT

3.1 Product Development Implications
3.2 Quality/Reliability/Dependability
3.3 Time to market-Innovativeness
3.4 Influences on Price-determination
3.5 Direct & Indirect methods of marketing

UNIT IV THE ORGANIZATIONAL PLAN

4.1 Developing the Management Team
4.2 Organization Chart and Functional Responsibilities of Directors
4.3 Legal Forms of Business-Ownership
4.4 Transferability of Interest-Capital Requirements
4.5 Management Control –Attractiveness for Raising Capital

UNIT V STRATEGIES FOR HARVESTING AND ENDING

5.1 Effective Succession of Ownership
5.2 Succession of Business- Transfer to Family Members
5.3 Transfer to NonFamily Memebers
5.4 Options for selling the Business
5.5 Employee Stock Option plan

REFERENCES :

1. Entrepreneurship –Michael P.Peters Mc.Graw Hill Education Private Limited Year-2013
2. Entrepreneurship and new venture creation-A.Sahay,V Sharma Excel Books Publisher-2008
3. Entrepreneurship Development –Vasant Desai Himalaya Publishing House-2008
4. Entrepreneurship Development Dr.S.S.Khanka S.Chand of Company Pvt Ltd Year 2014
5. Principles of Management (Business Management) Dr.J.Jayasankar Publishes by Margham Publications Year-2014

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. Information Technology Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 12.06.2017

Sem.	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Distributed Technologies	6	4	3	25	75	100
	Core Course – II (CC)	Web Services	6	4	3	25	75	100
	Core Course – III (CC)	OOAD and UML	6	4	3	25	75	100
	Core Course – IV (CC)	Organizational Behaviour	6	4	3	25	75	100
	Core Practical – I (CP)	Distributed Technologies Lab	6	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Mobile Computing	6	5	3	25	75	100
	Core Course – VI (CC)	Multimedia Technology	6	5	3	25	75	100
	Core Practical – II (CP)	Mobile Computing Lab	6	4	3	40	60	100
	Elective Course – I (EC)	Any one from the list	6	5	3	25	75	100
	Elective Course – II (EC)	Any one from the list	6	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
I	Core Course – VII (CC)	J2EE Technologies	6	5	3	25	75	100
	Core Course – VIII (CC)	Network Security	6	5	3	25	75	100
	Core Practical – III (CP)	J2EE Technologies Lab	6	4	3	40	60	100
	Elective Course III (EC)	Any one from the list	6	5	3	25	75	100
	Elective Course – IV (EC)	Any one from the list	6	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – IX (CC)	Internet of Things	5	5	3	25	75	100
	Core Course – X (CC)	Distributed Operating Systems	5	5	3	25	75	100
	Core Practical - IV (CP)	Open Source Technologies Lab	8	4	3	40	60	100
	Elective Course – V (EC)	Any one from the list	5	4	3	25	75	100
	Project Work		7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

List of Elective Courses (For 2016 – 2017)

Elective I		Elective II	
1	Cloud Computing	1	Management Information Systems
2	Grid Computing	2	E-Commerce
3	Parallel Computing	3	Marketing Management
Elective III		**Elective IV**	
1	Big Data Analytics	1	Software Engineering
2	Digital Image Processing	2	Software Testing
3	Pattern Recognition	3	Software Metrics
Elective V			
1	Pervasive Computing		
2	Human Computer Interaction		
3	Soft Computing		

Note:

Project :100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External
   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

Reference/Text Books contain the following details:

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

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CORE COURSE I

DISTRIBUTED TECHNOLOGIES

Objective:

To introduce the technologies behind the distributed computing environment and to provide the programming expertise to develop applications for distributed environment.

Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies

Unit II

Advanced ADO, NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO, NET in Distributed Applications

Unit III

Advanced ASP, NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development

Unit IV

Advanced features of ASP.NET – Security in ASP, NET – State Management in ASP, NET – Mobile Application development in ASP, NET – Critical usage of these features in Website development

Unit V

Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through n ASP, NET application

Text Book:

1. Walther, “ASP.NET 3.5”, SAMS Publication, 2005

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CORE COURSE II

WEB SERVICES

Objective:

To impart knowledge on the concepts and applications of Web Services.

UNIT I

Introduction – What are web services? SOAP WSDL UDDI-Why Web Services are important? – The evolution of web applications -Not just another distributed computing platform – Web services and enterprises.

UNIT II

XML Fundamentals XML: The Lingua Franca of web services - XML Documents-XML namespaces: Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema. XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH.

UNIT III

SOAP and WSDL5: The SOAP Model- SOAP- SOAP Messages, SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults- SOAP encoding – SOAP RPC- Using alternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC and SOAP Document-Literal, SOAP web services and the REST Architecture- Looking back to SOAP 1.1: Syntactic differences between SOAP 1.2 and SOAP 1.1- Changes to SOAP-RPC- SOAP Encoding- WSDL structure - The stock quote WSDL interface, definitions, The type element, bindings, services, managing WSDL descriptions, Extending WSDL – Using SOAP and WSDL.

UNIT IV

UDDI: UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

UNIT V

Transactions: ACID Transactions – Distributed Transactions and two phase commit – Dealing with Heuristic outcomes – Scaling transactions to web services – OASIS business transaction protocol – Other web services transaction Protocol Security Everyday security basis – Security is an end to end product – Web service security issues – Types of Security attacks and threats - Web services security road map – WS security

Text Book:

1. "Developing Enterprise Web Services - An Architect's Guide" – Sandeep Chatterjee, James Webber, Pearson Education– Second Indian Reprint 2005.

Reference Book:

1. *"Understanding SOA with Web Services",* Eric Newcomer, Greg Lomow, Pearson Education, and First Indian Reprint 2005.

CORE COURSE III

OOAD AND UML

Objective:

To provide basic understanding on Object Oriented Analysis and Design and to familiarize the modelling mechanisms, facilities, tools and techniques available for the design and development of software applications.

UNIT I

Structured approach to system construction: SSADM/SADT - An overview of object oriented systems development & Life cycle

UNIT II

Various object oriented methodologies – Introduction to UML

UNIT III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

UNIT IV

Object oriented design – Design axioms – Designing classes – Layering the software design: - data access layer, User interface layer, Control/business logic layer

UNIT - V

UML - Examples on: Behavioural models – Structural models – Architectural models from real world problems.

Text Books:

1. **Bahrami Ali**, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. **Booch Grady, Rumbaugh James, Jacobson Ivar**, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (UNIT -5 covered here).

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CORE COURSE IV

ORGANIZATIONAL BEHAVIOUR

Objective:

To enable good understanding on the principles and practices essential for effective functioning of an organization.

UNIT I Introduction:

Elements of OB – Nature and Scope of OB – Contributing Disciplines to OB. Organisational Behaviour in Historical Perspective – **Foundations of Individual Behaviour:** Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.

UNIT II Personality – Perception – Attitudes:

Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. **Values:** Concept of Value – Types of Values – Formation of Values – Values and Behaviour. **Job Satisfaction.**

UNIT III Learning:

Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour. **Motivation:** Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – Motivation and morale.

UNIT IV Organisational Conflicts:

Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management. **Job Frustration – Stress Management.**

UNIT V Communication:

Nature and Need for Communication – Communication Process –Communication Channel – Communication Networks – Communication Barriers – Effective Communication. **Leadership – Organisational Structure – Organisational Culture**.

Text Book

1. S.S Khanka, ***Organizational Behaviour***, S.Chand and Company Ltd, 2002.

Reference Books

1. John W Newstorm and Keith Davis,***Organizational Behaviour***, TMH, 2001.
2. Hugh J Arnold and Daniel C Fieldman, ***Organizational Behaviour*** , Mc Graw Hill, 1996.

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CORE PRACTICALS I

DISTRIBUTED TECHNOLOGIES LAB

Objective:

To provide hands on experience in developing applications for distributed environments.

1) Create a table and insert a few records using Disconnected Access.
2) Develop a project to update and delete few records using Disconnected Access.
3) Develop a project to view the records using GridView, DetailsView, FormView Controls.
4) Develop a project to generate a crystal report from an existing database.
5) Design a web page that makes uses of Ad Rotator Control.
6) Design a web page involving Multi View or Wizard Control.
7) Make use of Image Control involving two hot spots in a web page.
8) Design a simple web site that makes use of Master Pages.
9) Establish the security features in a simple web site with five pages.
10) Use state management concepts in a mobile web application.
11) Develop a web service that has an ASP.NET client.
12) Develop a web service to fetch a data from a table and send it across to the client.

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CORE COURSE V

MOBILE COMPUTING

Objective:

To provide hands on experience in developing applications for distributed environments.

UNIT I

Introduction: Mobile Computing – Networks – Middleware and Gateways – Developing Mobile Computing Applications – Mobile Computing Architecture: Architecture for Mobile Computing – Three-Tier Architecture –Emerging Technologies: - Bluetooth – Rfid -Wireless Broadband (WiMax) - Mobile IP – IPV6 - Java Card.

UNIT II

Global System for Mobile Communications: GSM Architecture – GSM Entities - Call Routing in GSM – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency Allocation – Authentication and Security- Short Message Service (SMS): Mobile Computing Over SMS – Value Added Services through SMS.

UNIT III

GPRS: - GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations –Data Services in GPRS Applications for GPRS – Limitations of GPRS. CDMA and 3G: Spread Spectrum Technology- CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G.

UNIT IV

Getting Started with Android – Activities, Fragments and Intents – Android User Interface: Understanding the Components of a screen- Adapting to Display Orientation – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

UNIT V

Content Providers – Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.

Text Books:

1. Ashok K Talukder, Hasan Ahmed, Roopa R Yavagal, “Mobile Computing”, 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2010.
2. Wei Meng Lee, “Beginning Android 4 Application Development”, Wiley India Pvt. Ltd., 2012.

Reference Books:

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning.
2. Jochen Schiller, “Mobile Communications”, Pearson Education, 2008.
3. Reto Meir, “Professional Android 4 Application Development”, Wiley India Pvt. Ltd., 2012.
4. Pradeep Kotari, “Android Application Development Black Book”, Dreamtech Press, 2014.

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CORE COURSE VI

MULTIMEDIA TECHNOLOGY

Objective:

To teach students about various tools & technologies that provide audio, video data handling capabilities to a computer.

UNIT I

Introduction to Multimedia – Multimedia Authoring and Tools – Graphics and Image Data Representations - Color in Image and Video.

UNIT II

Fundamental Concepts in Video – Basics of Digital Audio - Lossless Compression Algorithms.

UNIT III

Lossy Compression Algorithms - Image Compression Standards - Basic video compression techniques.

UNIT IV

MPEG Video Coding (MPEG-1 and 2) - Basic Audio Compression techniques - MPEG Audio Compression.

UNIT V

Computer and Multimedia Networks- Multimedia network communications and applications – Content based Retrieval in Digital Libraries.

Text Book:

1. **Ze-Nian Li and Mark S. Drew** , Fundamentals of Multimedia , Pearson education/Prentice Hall of India, First Edition,2006, (ISBN 81-7758-823-0) **[Unit-I** ☹Chapters 1,2,3,4); **Unit-II** : (Chapters 5,6,7); **Unit-III (**Chapters 8,9,10); **Unit- IV (**Chapters 11, 13);**Unit- V (**Chapters 15,16,18)**]**

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CORE PRACTICAL II

MOBILE COMPUTING LAB

Objective:

To provide programing experience on application development for Mobile Devices.

1. Create an Application which deals with the Android Content Providers.
2. Create Application using Android Layouts, Views and Events
3. Create an application which uses Files, Preferences and Notifications
4. Create Application to Create, Modify and Query an SQLite Database
5. Create an application for Querying web services and Parsing response
6. Create Application which uses the concept of Services and Background Threats
7. Creating Android Audio Video Application
8. Create an Application which uses Map Activity and points the locations onto the Map Locations
9. Create an Application with One-Time, Repeating Alarms, and Long-Running Background Task as Service.
10. Create an Application for Simple Mobile Game.

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ELECTIVE COURSE I:1

CLOUD COMPUTING

Objective:

To provide understanding on concepts & technologies associated with Cloud Computing.

UNIT I FOUNDATIONS: -Introduction to Cloud Computing :

Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and types of Clouds – Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks – **Migrating into a Cloud:** - Introduction – Broad Approaches – The Seven step model – **Enriching the 'Integration as a Services' Paradigm for the Cloud Era:** - Introduction – The Evolution of SaaS – The Challenges of SaaS Paradigm – Approaching the SaaS Integration Enigma – New Integration Scenarios – The Integration Methodologies – SaaS Integration Services – **The Enterprise Cloud Computing Paradigm:** - Introduction – Background – Issues – Transition Challenges – The Cloud Supply Chain.

UNIT II INFRASTRUCTURE AS A SERVICE :- Virtual Machine Provisioning and Migration Services:

Introduction – Background – Manageability – Migration Services – **Management of Virtual Machines for Cloud Infrastructures:** - Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – **Enhancing Cloud Computing Environments Using a Cluster as a Service:** - Introduction – Related Work – RVWS Design – The Logical Design – **Secure Distributed Data Storage in Cloud Computing:** - Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security – Challenges.

UNIT III PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) Aneka-Integration of Private and Public Clouds :

Introduction– Technologies and Tools – Aneka Cloud Platform - Aneka Resource Provisioning Service – Hybrid Cloud Implementation – **CometCloud: An Autonomic Cloud Engine:** - Introduction – CometCloud – Architecture – Autonomic Behavior of CometCloud – Overview of CometCloud-based Applications – Implementation and Evaluation

UNIT IV PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) T-Systems Cloud-based Solutions for Business Applications:

Introduction – Enterprise Demand of Cloud Computing – Dynamic ICT Service – Importance of Quality and Security in Clouds – Dynamic Data Centre-Producing Business-ready; Dynamic ICT Services – **The MapReduce**

Programming Model and Implementations: - Introduction – MapReduce Programming Model – MapReduce implementations for the Cloud.

UNIT V MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing

Introduction – A typical Usecase – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – **Service Providers Perspective of SLA Management in Cloud Computing:** - Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA – SLA Management in Cloud –Automated Policy-based Management – Performance Prediction for HPC on Clouds: - Introduction – Background – Grid and Cloud – Performance related issues of HPC in the Cloud.

Text Book:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinsky, **"Cloud Computing Principles and Paradigms"**, Wiley India Pvt. Ltd., 2011.

Reference Books:

1. Barrie Sosinsky, ***"Cloud Computing Bible"***, 1st Edition, Wiley India Pvt. Ltd., New Delhi, 2011.
2. Michael Miller, ***"Cloud Computing"***, 1st Edition, Pearson Education Inc., New Delhi, 2008.

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ELECTIVE COURSE I:2

GRID COMPUTING

Objective :

To impart knowledge on architectures, services & toolkits of Grid Computing.

UNIT I Introduction:

Early Grid Activities – Current Grid Activities – An Overview of Grid Business Areas - Grid Applications-Grid Infrastructure. **Grid Computing Organizations and Their Roles:** Organizations Developing Grid Standards and Best Practice Guidelines - Organizations Developing Grid Computing Toolkits and the Framework - Organizations Building and Using Grid-Based Solutions to Solve Computing, Data and Network Requirements - **The Grid Computing Anatomy:** The Grid problem.

UNIT II The Grid Computing Road Map:

Autonomic Computing - Business On Demand and Infrastructure Virtualization - Service-Oriented Architecture and Grid - Semantic Grids. **Merging the Grid Services Architecture with the Web Services Architecture:** Service-Oriented Architecture - XML.Related Technologies, and their Relevance to Web Services - XML Messages and Enveloping - Service Message Description Mechanisms - Relationship between Web Service and Grid Service.

UNIT III Open Grid Services Architecture(OGSA):

Introduction - OGSA Architecture and Goal - **Some Sample Use Cases that Drive the OGSA:** - Commercial Data Center (CDC) - National Fusion Collaboratory (NFS) - Online Media and Entertainment - **The OGSA Platform Components:** -**Open Grid Services Infrastructure (OGSI):** Introduction - Grid Services - A High-Level Introduction to OGSI - Technical Details of OGSI Specification - Introduction to Service Data Concepts.

UNIT IV OGSA Basic Service:

Common Management Model (CMM) - Service Domains - Policy Architecture - Security Architecture - Metering and Accounting - Common Distributed Logging -Distributed Data Access and Replication - **GLOBUS GT3 Toolkit:Architecure:** - GT3 Software Architecture Model.

UNIT V GLOBUS GT3 Toolkit: Programming Model:

Introduction-Service Programming Model - Grid Service Behaviour Implementation - Operation Providers - Grid Service Lifecycle Callbacks and Lifecycle Management - Client Programming Model - **GLOBUS GT3 Toolkit** - **High Level Services:** Introduction - Resource Discovery and Monitoring - Resource Allocation - Data Management - Information Services - Index Services – Resource Information Provider Service –Resource Management Services – Data Management Services.

Text Book:

Joshy Joseph, Craig Fellenstein, ***"Grid Computing"***, Pearson Education, 2004.

Reference Book:

Rawel Plaszczall, Richard Wellner Jr. ***"Grid Computing"***, Pearson Education, 2006.

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ELECTIVE COURSE I:3

PARALLEL COMPUTING

Objective:

To introduce algorithm design for parallel computing architectures.

UNIT I

Introduction to Parallel Computing – Motivating Parallelism – Scope of Parallel Computing – parallel programming platforms: Implicit parallelism trend in microprocessor architecture – Limitations of memory system performances – Dichotomy of parallel platforms – Physical organization of platforms Communication cost in parallel machines – Routing mechanism for interconnection networks

UNIT II

Principles of parallel algorithm Design – Preliminaries – Decomposition techniques – Characteristics of task and interactions – Mapping techniques for load balancing

UNIT III

Methods for containing interaction overhead – Parallel Algorithm models – one –to – All Broadcast and All – to – One Reduction – All – to – All Broadcast and Reduction

UNIT IV

Analytical Modelling of Parallel Programs – Sources of overhead in parallel programs – Performance metrics for parallel systems – The effect of Granularity on performances – Scalability of parallel systems – Minimum execution time and minimum cost – optimal execution time – Asymptotic analysis of parallel programs

UNIT V

Sorting – Issues in sorting on parallel computers – Sorting Networks – Bubble sort and its variables – Quicksort – Bucket and sample sort – Others sorting algorithms

Text Book:

1. Introduction to Parallel Computing, Second edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Education,

Reference Book

1. Introduction to Parallel Processing Algorithms and Architecture, Bchrooz Parhami, Plenum Series, 2002

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ELECTIVE COURSE 2:1

MANAGEMENT INFORMATION SYSTEMS

Objective:

To inculcate the principles and use of computer based information systems for Management of Businesses and Organizations.

UNIT I Introduction to Information Systems:

Why study Information System? – Why Business need Information Technology? – Fundamentals of Information Systems – Overview of Information Systems.

UNIT II Solving Business Problems with Information Systems:

System Approach to Problem Solving – Developing Information System Solution. **Database Management:** Managing Data Resources – Technical Foundation of Database Management.

UNIT III Information Systems for Strategic Advantage: Fundamentals – Strategic Advantage – Strategic Applications and Issues in IT. **Managing:** Enterprise and Global Management.

UNIT IV Business Applications of Information Technology:

The Internet Electronic Commerce – Fundamentals of Electronic Commerce – Information System for Business Operations – Business Information System – Transaction Processing Systems.

UNIT V Information Systems for Managerial Decision Support:

Decision Support Systems – Artificial Intelligence Technology in Business – Management IT – Planning for Business Change with IT – Implementing Business Changes with IT – Security and Control Issues in I/S – Ethical and Societal Challenge of Information Technology.

Text Book

1. James A. O'Brien, ***Management Information Systems,*** Galgotia Publications, Fourth Edition, 1999.

Reference Book

1. Gordon B. Davis, Margrethe H. Olson, ***Management Information Systems***, McGraw Hill, 2000.

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ELECTIVE COURSE 2:2

E-COMMERCE

Objective:

To provide exposure on the principles of E-Commerce and its applications

UNIT I

Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the High way – Network Access Equipment – Global information Distribution Networks.

UNIT II

The Internet as a Network Infrastructure: The Internet Terminology – NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization :Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Internet Connectivity options.

UNIT III

Electronic Commerce and the World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web, Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – mercantile process model – mercantile models from the consumers perspective.

UNIT IV

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues.

UNIT V

Advertising and the Marketing on the Internet: The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer – Data Interface – Emerging Tools. On Demand Education and Digital Copyrights: Computer-based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets, Browsers and Software Agents.

Text Book:

"Frontiers of Electronic Commerce", Ravikalakota & Andrew Whinston, Adison Wesley, 2000.

Reference Book:

"Electronic Commerce", Pete Loshin & Paul A.Murphy, Second edition, Jaico Publishing House, 2000.

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ELECTIVE COURSE 2:3

MARKETING MANAGEMENT

Objectives:

To make the students to know the importance of marketing a developed product and to enrich the knowledge of marketing with development, advertising, selling and management of a new product.

UNIT I Marketing Management:

Meaning of Market, Marketing and Marketing Management – Marketing Functions – Marketing Concepts – Marketing Environment – Approaches to Study of Marketing – Market Segmentation – Brand Positioning – Factors Influencing Buyer's Behaviour.

UNIT II New Product Development:

Meaning of Product, Idea Screening – Concept Development and Testing – Strategy Development – Market Testing – Commercialization – Consumer Adoption Process – Product Life Cycle – Product Mix Decisions – Product Line Decisions – Individual Product Decision – Product Positioning.

UNIT III Managing Marketing Channels:

Nature of Marketing channels – Channel Design Decisions – Channel Management Decisions – Channel Dynamics – Retailing – Types – Decisions – Trends – Wholesaling – Types – Decision Trends – Physical Distribution – Objective – Order Processing – Warehousing – Inventory – Transportation – Distribution Cost Analysis – Packing.

UNIT IV Advertising and Sales Promotion

Advertising – Setting and Objectives – Deciding on the Message – Deciding on the Media – Evaluating the Effectiveness – Sales Promotion – Purpose of Sales Promotion – Decision in Sales Promotion – Objectives of Sales Promotion – Developing Sales Promotion Programme – Pretesting Sales Promotion Programme – Implementing Sales Promotion Programme – Evaluating Sales Promotion Programme – Management of Sales Force.

UNIT V Pricing of Product / Service

Setting the Price – Adopting the Price – Methods of Pricing.

Text Book

1. Philip Kotler, ***Marketing Management*** , Dorling Kindersley Pvt Ltd.,2009.

Reference Books

1. Gordon B. Davis Margrethene H. Olson, ***Management Information Systems***, McGraw Hill, 2000.
2. Edward W. Cundiff, Richard Ralph Still, Norman A. P. Govoni, ***Fundamentals of Modern Marketing,*** Prentice Hall of India,1980.

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CORE COURSE VII

J2EE TECHNOLOGIES

Objective:

To provide understanding on developing distributed enterprise applications using J2EE

UNIT I Client – Server Architecture:

Two Tier Model – 3 Tier Model – n Tier Model – J2EE Architecture - .net Architecture – MPC Architecture.

UNIT II Interaction Services:

RMI – CORBA – XML – JMS.

UNIT III Presentation Services:

JSP – Javamail – Servlet.

UNIT IV Component Model:

EJB: Session beans: Stateless and Statefull – Entity beans – CMP and BMP – Message Driven Beans.

UNIT V Struts Framework:

Introduction – Building a simple struts – Model layers –View layer – controller layer – Validator – Tiles –Declarative Exception Handling –Struts Modules.

Text Books:

1. Jim Keogh "The Complete Reference J2EE "Tata McGraw – Hill Edition 2002.
2. James Holmes "The Complete References Struts Second Edition " Tata McGraw Hill Edition-2007.

Reference Books:

1. Jusin Couch, Daniel H. Steinberg, "J2EE Bible" Wily India (P) Ltd, New Delhi 2002.
2. Paul Tremblett, "Instant Enterprise Java Y-Beans", Tata McGraw Hill Publishing Company, New Delhi, 2001.

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CORE COURSE VIII

NETWORK SECURITY

Objective:

To provide knowledge for establishing secured network based computing and information systems.

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques.

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA.

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security.

Unit IV

Network Security Practices: IP Security-Web Security.

Unit V

System Security: Intruders-Malicious Software-Firewalls.

Text Book

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003.

Reference Books

1. Johannes A. Buchaman, Introduction to cryptography, Springer-Verlag.
2. Atul kahate, Cryptography and Network Security, TMH.

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CORE PRACTICALS III

J2EE TECHNOLOGIES LAB

Objective:

To provide experience in developing distributed enterprise applications using J2EE

1. To find the marks of the students using Remote Method Invocations.
2. To write a Servlet program to calculate the bonus of an employee
3. To write a Servlet program to implement Session Tracking.
4. To write a Servlet program to check authentication for user using Cookies.
5. To write a Servlet program and use JDBC in it.
6. To write a simple program for JSP.
7. To write a JSP program that works with JDBC.
8. To write a JSP Program with Bean Class.
9. To write a EJB Stateless Program to create bonus of an employee.

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ELECTIVE COURSE 3:1

BIG DATA ANALYTICS

Objective:

To impart knowledge in Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals

Unit I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

Unit II

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

Unit III

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

Unit IV

Hadoop foundation for analytics: History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

Unit V

HadoopMapReduce and YARN framework: Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats

Text Book

Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016

Reference Books

1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. “Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013
3. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
4. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

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ELECTIVE COURSE 3:2

DIGITAL IMAGE PROCESSING

Objective:

To impart knowledge on the algorithms and techniques to perform various image processing tasks over digital images.

Unit I

Images and Digital Processing – Digitizing Images – Digital Image Display – Image Processing Software.

Unit II

The Gray Level Histogram – Point Operations – Algebraic Operations – Geometric Operations.

Unit III

Linear System Theory - Harmonic Signals and Complex Signal Analysis – The Fourier Transform : - Filter Design - Processing Sampled Data.

Unit IV

Discrete Image Transforms – Wavelet Transforms – Optics and System Analysis. - Image Restoration – Image Compression.

Unit V

Pattern Recognition: Image Segmentation – Object Measurement – Classification and Estimation - Color and Multispecial Image Processing – Three Dimensional Image Processing.

Text Book:

1. Kenneth R. Castelman, "Digital Image Processing", Pearson Education Inc. New Delhi, 2007.

Reference Book:

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing" 3rd Edition, PHI Publications, New Delhi, 2008.

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ELECTIVE COURSE 3:3

PATTERN RECOGNITION

Objective:

To provide understanding on concepts and techniques used for recognition and segregation of patterns.

Unit I Introduction and Bayesian Decision Theory:

Introduction to pattern recognition, Systems, design cycles, learning and adaptation, Bayesian decision theory, minimum error-rate classification, classifiers, discriminant functions and decisions surfaces.

Unit II Maximum – Likelihood and Bayesian parameter estimation:

Maximum – Likelihood estimation, Bayesian estimation, Bayesian parameter estimation, Gaussian case and general theory, problems of dimensionality, Hidden marker models.

Unit III Nonparametric Techniques:

Density estimation, Parzen windows, Kn – Nearest neighbor estimation, The nearest neighbor rule, metrics and nearest – neighbor classification, fuzzy classification, approximations by series expansions.

Unit IV Linear Discriminant Functions: Linear Discriminant Functions: Linear Discriminant Functions: Linear Discriminant Functions:

Linear discriminant functions and decision surfaces, generalized linear discriminant functions, The two category linearly separable case, minimizing the perception criterion function, relaxation procedures, nonseparable behaviour, Minimum squared-error procedures, The Ho–Kashyap Procedures, support vector machines, multicategory generalizations.

Unit V Multilayer Neural Networks:

Feedforward operation and classification, back propagation algorithm, error surfaces, back propagation as feature mapping, back propagation, Bayes theory and probability, practical techniques for improving backpropagation, regularization, complexity adjustment and pruning.

Text Book:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification”, 2nd Edition, John Wiley & Sons, 2012.

Reference Book:

1. John Hertz, Andres Krogh & Richard G. Palmer, “Introduction to the theory of Neural Computation”, Addison Wesley, 1991.

ELECTIVE COURSE 4:1

SOFTWARE ENGINEERING

Objective:

To provide exposure on the principles and practices used in Software Development.

UNIT I

Need for S/w Engineering: Need for S/w engineering – About software and S/w engineering – A systems approach, - Engineering approach – Members of the development team – Change in S/w engineering. - Modeling the process and Life cycle: The meaning of process – S/w process models – Tools and techniques for processional modeling – Practical process modeling.

UNIT II

Planning and Managing the project: Tracking progress – Project personnel – Effort estimation – Risk management – The project plan – Process models and project management.

UNIT III

Capturing the requirements : The requirement process – Types of Requirements – Characteristics of requirements – Expressing requirements – Additional requirements notations – Prototyping requirements – Requirements Documentation – Participants in the requirements process – Requirements validation – Measuring requirements – Choosing a requirements specification Techniques.

UNIT IV

Designing the system : Design Introduction – Decomposition and Modularity – Architectural styles and strategies – Characteristics of good design – Techniques for improving design – Design evaluation and validation – Documenting the design – Programming standards and procedures – Programming guidelines – Documentation.

UNIT V

Testing Strategies : Testing strategic issues – Test strategies for conventional S/w – Test strategies for object oriented S/w – Validation testing – system testing – S/w testing. Fundamentals – Black-box and White-box testing – White box testing – Black box testing – Mccall's Quality factors – ISO 9126 - QF – S/w Engineering – S/w Maintenance – A S/w engineering process model.

Text Books:

1. Shari Lawrence P. Fleeger, ***"Software Engineering Theory and Practice"***, 2nd Edition, Pearson Education, Delhi, 2001. [(for Units 1–4) Chapters 1, 2, 3, 4, 5, 7]
2. Roger S. Pressman, ***"Software Engineering A Practitioner's Approach"***, 6th Edition, Tata McGraw Hill Publication, **[(for Unit 5) Chapters : 13, 14, 15, 31]**

Reference Books:

1. Ian Sommerville, ***"Software Engineering"***, 6th Edition, Pearson Education, Delhi, 2005.
2. Douglas Bell, ***"Software Engineering for Students-A Programming Approach"***, 4th Edition, Pearson Education, Delhi 2007.

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ELECTIVE COURSE 4:2

SOFTWARE TESTING

Objective:

To provide exposure on the principles and practices used in Software Testing

UNIT I Software Development Life Cycle Models:

Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - **White Box Testing:** What is White Box Testing? – Static Testing – Structural Testing – Challenges - **Black Box Testing:** What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

UNIT II Integration Testing:

What is Integration Testing? – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - **System and Acceptance Testing:** Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT III Performance Testing:

Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - **Regression Testing:** – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT IV Internationalization ($I_{18}n$) Testing:

Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – **Ad hoc Testing:** - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – **Usability and Accessibility Testing:** - What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles

UNIT V Test Planning, Management, Execution and Reporting:

Test Planning -Test Management – Test Process – Test Reporting – Best Practices - **Software Test Automation:** What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

Text Book:

1. Srinivasan Desikan, Gopalaswamy Ramesh, **Software Testing – Principle & Practices**, Pearson Education, New Delhi, 2006.

Reference Books:

1. Ron Patton, ***"Software Testing"***, 2nd Edition, Pearson Education, New Delhi, 2006.
2. William E. Perry, ***"Effective Methods for Software Testing"***, 3rd Ed., Wiley India, 2006.
3. Renu Rajani, Pradeep Oak, ***"Software Testing – Effective Methods, Tools and Techniques"***, TMH Publishing Company Limited, New Delhi, 2004.

ELECTIVE COURSE 4:3
SOFTWARE METRICS

Objectives:

To impart knowledge and to develop research skills on many aspects of framework for software Measurement, software metrics data collection, measurements and predictions, and latest trends in software metrics.

UNIT I

Measurement – measurement in everyday life – measurement in software engineering – the scope software metrics - Basics of measurement - The representational theory of measurement – measurement and models - measurement scales and scale types – meaningfulness in measurement - A goal-based framework for software measurement- classifying software measures- determining what to measure- applying the framework- software measurement validation- software measurement validation in practice

UNIT II

Empirical Investigation – four principles f investigation – planning formal experiments – planning case studies – Software metrics data collection- what is good data – how to define data – how to collect data- how to store and extract data- Analyzing software measurement data – Introduction – analyzing the results of experiments – examples of simple analysis techniques – more advanced methods – overview of statistical tests

UNIT III

Software-Engineering Measurement – Measuring internal product attributes : size – Aspect of software size – length – reuse – functionality – complexity – Measuring internal product attributes – structure –Types of structural measures – control flow structure – modularity and information flow attributes – object oriented metrics- data structure – difficulties with general complexity measures –Measuring external product attributes – modelling software quality – measuring aspects of quality

UNIT IV

Software Reliability : Measurement and Prediction - basics of reliability theory – the software reliability problem – parametric reliability growth models – predictive accuracy – the recalibration of software – reliability growth predictions – the importance of operational environment – wider aspect of software reliability – Resource measurement : Productivity, teams and tools - the meaning of productivity – productivity of what? - Measuring productivity – teams, tools, methods – Making process predictions – Good estimates – cost estimation problems and approaches – models of effort and cost – problems with existing modelling methods – dealing with problems of current estimation methods – implication for process prediction

UNIT V

Measurement and Management : Planning a measurement program – what is a metrics plan – Why and What : developing goals, questions and metrics – Where and When: mapping measures to activities – How: measurement tools – Who: measurers , analysts and audience - revising the plan – Measurement in Practice – Success criteria – Measurement in the small – Measurement in large – lessons learned – Empirical Research in Software Engineering - Problem with empirical research – investigating products – investigating resources - investigating processes - measurement today and tomorrow.

Text Book:

"Software Metrics", Norman E. Fenton, Shari Lawrence Pfleeger A Rigorous & Practical Approach Second Edition 2010, International Thomson Publishing

CORE COURSE IX

INTERNET OF THINGS

Objectives:

To understand the underlying concepts in Internet of Things (IoT) and to provide in-depth knowledge on state of the art in the IoT, challenges and future directions.

UNIT I INTRODUCTION TO IoT

Requirements of IoT: The definition of the Internet of Things, main assumptions and perspectives- Platform for IoT devices. Economics and Technology of the IoT –Issues in IoT and solutions-Architecture of IoT. **Anatomy of IoT:** Traditional Internet Protocol Vs Chirps –Applying network intelligence at propagator nodes-Transport and functional architectures.

UNIT II IoT DEVICES

IoT Devices-Temporary and Ad-hoc devices-Addressing issues-End devices in dedicated networks- Converting states to chirps-RFID integration in the IoT-End devices with higher demands- Small data-Building a web of things-Autonomy and co-ordination-Structuring a tree-Housekeeping message-Role of integrator function-Degrees of functionality-Aggregating end points-Packaging options.

UNIT III DATA AND HUMAN INTERACTION

Data and Human Interaction: Functions of IoT-Analysis and control-Neighborhood and affinities- Public private and other kinds of data- Publishing agent- Searching for and managing agents- High and low level loops- Human interface and control points-Collaborative scheduling tools-Packaging and provisioning- Distributed integrator functions- Filtering the streams-IP Alternative-Protocol based on category classification-Skeletal architecture of chirp packets- Pattern driven-Propagator node networks and operation-Power of local agents and integrator functions-High level interchange.

UNIT IV IoT APPLICATIONS

Moore's Law –Intelligence near the edge- Incorporating legacy devices- Staying in the loop -Social machines-Applications of IoT–Agriculture- Home healthcare-Efficient process control-Factory application- Home automation- Natural sciences- Living applications- Origin of IoT- Open source networking solutions- Shared software and business process vocabularies.

UNIT V CREATING IoT PROJECTS

Creating the IoT projects: Sensor project-Actuator project – Controller-Camera. Using an IoT service platform- Selecting an IoT. **Platform**- The claysterplatform-Interfacing ourdevices using XMPP- Creating control application.

Text Books:

1. ***"Rethinking the Internet of Things-A scalable approach to connecting everything",*** by Francis DaCosta,Apress open publication,2013.
2. ***"Learning Internet of Things"*** by Peter Waher,PACKT Publishing-Birmingham-mumbai-2015.

Reference Books:

1. ***"Internet of Things: A Hands on Approach***", by Arhdeep Bahga and Vijay Madisetti (http://www.internet-of-things-book.com/).
2. ***"Getting started with the internet of things",*** by Cuno Pfister,O'Rielly Publication.

CORE COURSE X

DISTRIBUTED OPERATING SYSTEMS

Objective :

To impart understanding on the working of the Operating Systems for Distributed Computing Environments

UNIT I Fundamentals:

What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment. Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology.

UNIT II Message Passing:

Introduction – Desirable features – Issues in IPC by Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication.

UNIT III Distributed Shard Memory:

Introduction – General Architecture of DSM systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Other Approaches to DSM – Heterogeneous DSM – Advantages of DSM.

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm.

UNIT IV Distributed File Systems:

Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles.

UNIT V Security:

Introduction – Potential Attacks to Computer Systems – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles.

Text Book:

1. Pradeep K Sinha, “Distributed Operating Systems – Concepts and Design”, PHI, 2012.

Reference Book

1. Andrew S Tanenbaum, Distributed Operating Systems, 1e, Pearson Education, 1995.

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CORE PRACTICALS IV

OPEN SOURCE TECHNOLOGIES LAB

Objectives :

To provide web programming experience using open source software platforms and tools.

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
5. Write a PHP program that adds products that are selected from a web page to a shopping cart.
6. Write a PHP program to access the data stored in a mysql table.
7. Write a PHP program interface to create a database and to insert a table into it.

   i). Write a PHP program using classes to create a table.
   ii). Write a PHP program to upload a file to the server.

5. Write a PHP program to create a directory, and to read contents from the directory.
6. Write a shell program to find the details of an user session.
7. Write a shell program to change the extension of a given file.
8. Create a mysql table and execute queries to read, add, remove and modify a record from that table.

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ELECTIVE COURSE 5:1

PERVASIVE COMPUTING

Objective :

To provide an exposure on the technologies, tools and gadgets of Pervasive and Ubiquitous Computing.

UNIT I

Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

UNIT II

Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

UNIT III

Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

UNIT IV

WAP and Beyond: Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition- Voice Standards-Speech applications-Speech and Pervasive Computing

UNIT V

PDA: Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of Pervasive Computing web applications-Pervasive application architecture

Text Book:

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

Reference Book:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006

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ELECTIVE COURSE 5:2

HUMAN COMPUTER INTERACTION

Objectives :

To understand the concepts and techniques for effective interaction between Human and Computers

UNIT I

Cognitive Psychology and Computer Science - Capabilities of Human–Computer Interaction-Goals of Human–Computer Interaction-Roles of Human, Computer and Interaction in HCI-Basic User Interfaces - Advanced User Interfaces - Justification of Interdisciplinary Nature- Standard Framework of HCI-HCI Design Principles-Interface Levels in HCI-Steps in Designing HCI Applications - Graphical User Interface Design -Popular HCI Tools - Architecture of HCI Systems-Advances in HCI-Overview -HCI Sample Exercises **Usability Engineering** HCI and Usability Engineering-Usability Engineering Attributes - Process of Usability-Need for Prototyping.

UNIT II Understanding Process Modelling-

Goals, Operators, Methods, Selection Rules-Cognitive Complexity Theory-Adaptive Control of Thought-Rational-State, Operator, and Result-Belief-Desire-Intention-ICARUS-Connectionist Learning with Adaptive Rule Induction On-line (CLARION)-Subsumption Architecture-**Spoken Dialogue System-** Factors Defining Dialogue System-General Architecture of Spoken Dialogue System-Dialogue Management Strategies-Computational Models for Dialogue Management- Statistical Approaches to Dialogue Management-Learning Automata as Reinforcement Learners.

UNIT III Recommender Systems

HCI Study Based on Personalisation - Personalisation in Recommender Systems -Application Areas of Recommender Systems-Recommender System Field as an Interdisciplinary Area of Research -Phases of Recommender Systems -User Profiling Approaches-Classification of Recommendation Techniques -Advantages and Disadvantages of Recommender System Approaches -Need of Software Agent-based Approach in Recommender Systems -Evaluating Recommender Systems-Integrated Framework for Recommender Systems -Case Study.

UNIT IV Advanced Visualisation Methods-

Ontology Definition -Ontology Visualisation Method -Space Dimensions of Ontology Visualisation -Ontology Languages -Ontology Visualisation Tools - Ontology Reasoning –Reasoner.

UNIT V Ambient Intelligence: The New Dimension of Human–Computer Interaction

Ambient Intelligence Definition-Context-aware Systems and Human–Computer Interaction -Middleware - Modelling Data for AmI Environment -Development of Context-awareness Feature in Smart Class Room— A Case Study - Context-aware Agents for Developing AmI Applications—A Case Study.

Text Book:

1. *K. Meena, R. Sivakumar,* ***"Human–Computer Interaction",*** PHP Learning Private limited Delhi-110092, 2015.

Reference Books:

1. John M. Carroll, ***"Human Computer Interaction–in the New Millennium"***, Pearson Education, 2007.
2. lan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, ***"Human-Computer Interaction"***, Pearson Education, 2009.

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ELECTIVE COURSE 5:3

SOFT COMPUTING

Objective :

To enable a good understanding on different areas of soft computing such as Fuzzy Set Theory, Neural Networks, Neuro-Fuzzy Modelling and their applications.

UNIT I FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II OPTIMIZATION

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III NEURAL NETWORKS

Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV NEURO FUZZY MODELING

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V APPLICATION OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J. S. R. Jang, C.T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, 2004.

REFERENCE BOOKS

1. Timothy J. Ross, "Fuzzy Logic with Engineering Application, " Mc Graw Hill, 1977.
2. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and Machine Learning", Addision Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003. Emereo Pty Limited, July 2008

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Mathematics Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Algebra	6	5	3	25	75	100
	Core Course – II (CC)	Real Analysis	6	5	3	25	75	100
	Core Course – III (CC)	Ordinary Differential Equations	6	5	3	25	75	100
	Core Course – IV (CC)	Graph Theory	6	5	3	25	75	100
	Core Course - V (CC)	Integral Equations, Calculus of Variations and Transforms	6	5	3	25	75	100
	TOTAL		**30**	**25**				**500**
II	Core Course – VI (CC)	Complex Analysis	6	5	3	25	75	100
	Core Course – VII (CC)	Linear Algebra	6	5	3	25	75	100
	Core Course – VIII(CC)	Partial Differential Equations	6	5	3	25	75	100
	Elective Course – I (EC)		6	3	3	25	75	100
	Elective Course – II (EC)		6	3	3	25	75	100
	TOTAL		**30**	**21**				**500**
III	Core Course – IX (CC)	Classical Dynamics	6	5	3	25	75	100
	Core Course – X (CC)	Measure and Integration	6	5	3	25	75	100
	Core Course – XI(CC)	Topology	6	5	3	25	75	100
	Elective Course – III (EC)		6	3	3	25	75	100
	Elective Course – IV (EC)		6	3	3	25	75	100
	TOTAL		**30**	**21**				**500**
IV	Core Course – XII (CC)	Functional Analysis	6	5	3	25	75	100
	Core Course – XIII (CC)	Differential Geometry	6	5	3	25	75	100
	Core Course – XIV(CC)	Advanced Numerical Analysis	6	5	3	25	75	100
	Elective Course – V (EC)		6	3	3	25	75	100
	Project		6	5	-	-	-	100
	TOTAL		**30**	**23**				**500**
GRAND TOTAL			**120**	**90**				**2000**

List of Elective Courses (For 2016 – 2017) :

Elective I		Elective II	
1	Advanced Probability Theory	1	Stochastic Processes
2	Mathematical Modeling	2	Tensor Analysis and Special Theory of Relativity
3	Fuzzy sets and their Applications	3	Non linear Differential Equations
Elective III		**Elective IV**	
1	Design and Analysis of Algorithms	1	Financial Mathematics
2	Discrete Mathematics	2	Advanced Operations Research
3	Automata Theory	3	Combinatorics
Elective V			
1	Algebraic Topology		
2	Fluid Dynamics		
3	Algebraic Number Theory		

Note:

Project :100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

Note:

1. Theory Internal 25 marks External 75 marks
2. Practical ” 40 marks ” 60 marks

Note:

1. Theory Internal 25 marks External 75 marks
2. Practical ” 40 marks ” 60 marks
3. Separate passing minimum is prescribed for Internal and External
   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

Reference/Text Books contain the following details:

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

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CORE COURSE I

ALGEBRA

Objectives

1. To give foundation in Algebraic structures like Groups ,Rings
2. To train the students in problem solving in Algebra

UNIT I

GROUP THEORY: A counting principle – Normal Subgroups and Quotient groups – Homomorphism – Cayley's theorem – Permutation groups – Another counting principle – Sylow's theorems.

UNIT II

RING THEORY : Homomorphisms -Ideals and quotient rings – More ideals and quotient rings –Euclidean Rings-A particular Euclidean Ring.

UNIT III

Polynomial rings – Polynomials over the rational field – polynomials over commutative Rings -Inner Product spaces.

UNIT IV

FIELDS: Extension fields – Roots of Polynomials – More about roots.

UNIT V

The elements of Galois theory– Finite fields.

TEXT BOOK

I.N. Herstein, Topics in Algebra, Second Edn, Wiley Eastern Limited.
UNIT – I -Chapter 2 : Sec 2.5, 2.6, 2.7,2.9, 2.10, 2.11, 2.12
UNIT – II -Chapter 3 : Sec 3.3, 3.4, 3.5,3.7,3.8.
UNIT – III - Chapter 3&4 : 3.9,3.10,3.11, 4.4
UNIT – IV -Chapter 5 : Sec 5.1, 5.3,5.5
UNIT – V -Chapter 5&7:Sec 5.6,7.1

REFERENCE BOOKS

1. David S.Dummit and Richard M.Foote ,Abstract Algebra,Third Edition,Wiley Student Edition,2015.
2. John, B. Fraleigh, A First Course in Abstract Algebra, Addison-Wesley Publishing company.
3. Vijay, K. Khanna, and S.K. Bhambri, A Course in Abstract Algebra, Vikas Publishing House Pvt Limited, 1993.
4. Joseph A.Gallian,Contemporary Abstract Algebra,Fourth Edition,Narosa publishing House,1999.

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CORE COURSE II

REAL ANALYSIS

Objectives:

1. To give the students a thorough knowledge of the various aspects of Real line and Metric Spaces which is imperative for any advanced learning in Pure Mathematics.
2. To train the students in problem-solving as a preparatory for competitive exams.

UNIT I

Basic Topology: Finite, Countable and Uncountable Sets – Metric spaces – Compact sets – Perfect sets – Connected sets.
Numerical Sequences and Series: Sequences – Convergence – Subsequences - Cauchy Sequences – Upper and Lower Limits - Some Special Sequences – Tests of convergence – Power series – Absolute convergence – Addition and multiplication of series – Rearrangements.

UNIT II

Continuity: Limits of functions – Continuous functions – continuity and Compactness – Continuity and connectedness – Discontinuities – Monotonic functions – Infinite limits and limits at infinity. Differentiation: Derivative of a real function – Mean value Theorems - Intermediate value theorem for derivatives – L'Hospital's Rule – Taylor's Theorem – Differentiation of vector valued functions.

UNIT III

Riemann – Stieltjes Integral: Definition and Existence – Properties – Integration and Differentiation – Integration of vector valued functions.

UNIT IV

Sequences and series of functions: Uniform Convergence and Continuity – Uniform Convergence and Differentiation – Equicontinuous families of functions – The Stone – Weierstrass Theorem.

UNIT V

Functions of several variables: Linear Transformations - Differentiation – The Contraction Principle – The Inverse Function Theorem - The Implicit Function Theorem.

TEXT BOOKS

[1] Walter Rudin , Principles of Mathematical Analysis, Third Edition, Mcgraw Hill, 1976.

UNIT – I	Chapters 2 and 3
UNIT – II	Chapters 4 and 5
UNIT – III	Chapter 6
UNIT – IV	Chapter 7
UNIT – V	Chapter 9, Sections 9.1 to 9.29

REFERENCES

1. Tom P. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. A.J. White, Real Analysis : An Introduction, Addison Wesley Publishing Co., Inc. 1968.
3. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
4. N.L.Carothers, Real Analysis, Cambridge University press, Indian edition, 2013.

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CORE COURSE III

ORDINARY DIFFERENTIAL EQUATIONS

Objectives

1. To give an in-depth knowledge of differential equations and their applications.
2. To study the existence, uniqueness, stability behavior of the solutions of the ODE

UNIT I

The general solution of the homogeneous equation– he use of one known solution to find another – The method of variation of parameters – Power Series solutions. A review of power series– Series solutions of first order equations – Second order linear equations; Ordinary points.

UNIT II

Regular Singular Points – Gauss's hypergeometric equation – The Point at infinity - Legendre Polynomials – Bessel functions – Properties of Legendre Polynomials and Bessel functions.

UNIT III

Linear Systems of First Order Equations – Homogeneous Equations with Constant Coefficients – The Existence and Uniqueness of Solutions of Initial Value Problem for First Order Ordinary Differential Equations – The Method of Solutions of Successive Approximations and Picard's Theorem.

UNIT IV

Oscillation Theory and Boundary value problems – Qualitative Properties of Solutions – Sturm Comparison Theorems – Eigenvalues,Eigenfunctions and the Vibrating String.

UNIT V

Nonlinear equations: Autonomous Systems; the phase plane and its phenomena – Types of critical points; Stability – critical points and stability for linear systems – Stability by Liapunov's direct method – Simple critical points of nonlinear systems.

TEXT BOOKS

G.F. Simmons, Differential Equations with Applications and Historical Notes, TMH, New Delhi, 1984.

UNIT – I	Chapter 3: Sections 15, 16, 19 and Chapter 5: Sections 25 to 27
UNIT – II	Chapter 5 : Sections 28 to 31 and Chapter 6: Sections 32 to 35
UNIT – III	Chapter 7: Sections 37, 38 and Chapter 11: Sections 55, 56
UNIT – IV	Chapter 4: Sections 22 to 24
UNIT – V	Chapter 8: Sections 42 to 44

REFERENCES

1. W.T. Reid, Ordinary Differential Equations, John Wiley & Sons, New York, 1971.
2. E.A. Coddington and N. Levinson, Theory of Ordinary Differential Equaitons, McGraw Hill Publishing Company, New York, 1955.

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CORE COURSE IV

GRAPH THEORY

Objectives

1. To give a rigorous study of the basic concepts of Graph Theory.
2. To study the applications of Graph Theory in other disciplines.

***Note*: Theorems, Propositions and results which are starred are to be omitted.**

Unit I Basic Results

Basic Concepts - Subgraphs - Degrees of Vertices - Paths and Connectedness- Operations on Graphs - Directed Graphs: Basic Concepts - Tournaments.

Unit II Connectivity

Vertex Cuts and Edge Cuts - Connectivity and Edge - Connectivity, Trees:Definitions, Characterization and Simple Properties - Counting the Number of Spanning Trees - Cayley's Formula.

Unit III Independent Sets and Matchings

Vertex Independent Sets and Vertex Coverings - Edge Independent Sets -Matchings and Factors - Eulerian Graphs - Hamiltonian Graphs.

Unit IV Graph Colourings

Vertex Colouring - Critical Graphs - Triangle - Free Graphs - Edge Colourings of Graphs - Chromatic Polynomials.

Unit V Planarity

Planar and Nonplanar Graphs - Euler Formula and its Consequences - K5 and K3,3 are Nonplanar Graphs - Dual of a Plane Graph - The Four-Colour Theorem and the Heawood Five-Colour Theorem-Kuratowski's Theorem.

Textbook

1. R. Balakrishnan, K. Ranganathan, A Textbook of Graph Theory, Springer International Edition, New Delhi, 2008.

UNIT I Chapter I & II: 1.1 to 1.4, 1.7, 2.1, 2.2
UNIT II Chapter III & IV: 3.1, 3.2, 4.1, 4.3 to 4.4
UNIT III Chapter V & VI: 5.1 to 5.4, 6.1, 6.2
UNIT IV Chapter VII: 7.1 to 7.4, 7.7
UNIT V Chapter VIII: 8.1 to 8.6

References

1. J.A. Bondy, U.S.R. Murty, Graph Theory with Applications, Mac MilanPress Ltd., 1976.
2. Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraph,CRC press,2010.
3. F.Harary, Graph Theory, Addison - Wesley, Reading, Mass., 1969.

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CORE COURSE V

INTEGRAL EQUATIONS, CALCULUS OF VARIATIONS AND TRANSFORMS

Objectives.

1. To introduce the concept of calculus of variations and integral equations and their applications.
2. To study the different types of transforms and their properties.

UNIT I

Calculus of variations – Maxima and Minima – the simplest case – Natural boundary and transition conditions - variational notation – more general case – constraints and Lagrange's multipliers – variable end points – Sturm-Liouville problems.

UNIT – II

Fourier transform - Fourier sine and cosine transforms - Properties Convolution - Solving integral equations - Finite Fourier transform - Finite Fourier sine and cosine transforms - Fourier integral theorem - Parseval's identity.

UNIT III

Hankel Transform : Definition – Inverse formula – Some important results for Bessel function – Linearity property – Hankel Transform of the derivatives of the function – Hankel Transform of differential operators – Parseval's Theorem

UNIT IV

Linear Integral Equations - Definition, Regularity conditions – special kind of kernels – eigen values and eigen functions – convolution Integral – the inner and scalar product of two functions – Notation – reduction to a system of Algebraic equations – examples– Fredholm alternative - examples – an approximate method.

UNIT V

Method of successive approximations: Iterative scheme – examples – Volterra Integral equation – examples – some results about the resolvent kernel. Classical Fredholm Theory: the method of solution of Fredholm – Fredholm's first theorem – second theorem – third theorem.

TEXT BOOKS

[1] Ram.P.Kanwal – Linear Integral Equations Theory and Practise, Academic Press 1971.

[2] F.B. Hildebrand, Methods of Applied Mathematics II ed. PHI, ND 1972.

[3] A.R. Vasishtha, R.K. Gupta, Integral Transforms, Krishna Prakashan Media Pvt Ltd, India, 2002.

UNIT – I	Chapter 2: Sections 2.1 to 2.9 of [2]
UNIT – II	Chapter 7 of [3]
UNIT – III	Chapter 9 of [3]; UNIT – IV -Chapters 1 and 2 of [1]
UNIT – V	Chapters 3 and 4 of [1]

REFERENCES

[1] S.J. Mikhlin, Linear Integral Equations (translated from Russian), Hindustan Book Agency, 1960.

[2] I.N. Snedden, Mixed Boundary Value Problems in Potential Theory, North Holland, 1966.

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CORE COURSE VI

COMPLEX ANALYSIS

Objectives

1. To learn the various intrinsic concepts and the theory of Complex Analysis.
2. To study the concept of Analyticity, Complex Integration and Infinite Products in depth.

UNIT I

Elementary Point Set Topology: Sets and Elements – Metric Spaces – Connectedness – Compactness – Continuous Functions – Topological Spaces; Conformality: Arcs and Closed Curves – Analytic Functions in Regions – Conformal Mapping – Length and Area; Linear Transformations: The Linear Group – The Cross Ratio – Symmetry

UNIT II

Fundamental theorems in complex integration: Line Integrals – Rectifiable Arcs – Line Integrals as Functions of Arcs – Cauchy's Theorem for a Rectangle – Cauchy's Theorem in a Disk; Cauchy's Integral Formula: The Index of a Point with Respect to a Closed Curve – The Integral Formula – Higher Derivatives.

UNIT III

Local Properties of Analytic Functions - Removable Singularities - Taylor's Theorem – Integral representation of the nth term - Zeros and Poles – Algebraic order of f(z) – Essential Singularity - The Local Mapping – The Open Mapping Theorem - The Maximum Principle.

UNIT IV

The General Form of Cauchy's Theorem: Chains and Cycles – Simple Connectivity – Homology – The General Statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Locally Exact Differentials – Multiply Connected Regions; The Calculus of Residues: The Residue Theorem – The Argument Principle – Evaluation of Definite Integrals

UNIT V

Harmonic Functions: Definition and Basic Properties – The Mean-value Property – Poisson's Formula – Schwarz's Theorem – The Reflection Principle; Power series expansions-Weierstrass's Theorem – The Taylor Series – The Laurent Series;

TEXT BOOK

Lars V. Ahlfors, Complex Analysis, Third Ed. McGraw-Hill Book Company, Tokyo, 1979.

UNIT – I Chapter 3: 1.1-1.6, 2.1-2.4,3.1-3.3
UNIT – II Chapter 4: 1.1-1.5, 2.1-2.3
UNIT – III Chapter 4: 3.1, 3.2, 3.3,3.4
UNIT – IV Chapter 4: 4.1-4.7, 5.1-5.3
UNIT – V Chapter 4: 6.1-6.5, and Chapter 5: 1.1-1.3

REFERENCES

1. Serge Lang, Complex Analysis, Addison Wesley, 1977.
2. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, New Delhi, 1997.
3. Karunakaran, Complex Analysis,Alpha Science international Ltd,Second edition,2005.

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CORE COURSE VII

LINEAR ALGEBRA

Objectives

1. To give the students a thorough knowledge of the various aspects of Linear Algebra
2. To train the students in problem-solving as a preparatory for competitive exam.

UNIT I: Matrices:

Systems of linear Equations - Matrices and Elementary Row operations -Row-reduced echelon Matrices - Matrix Multiplication - Invertible Matrices -Bases and Dimension. (Only revision of Vector spaces and subspaces).

Unit II: Linear transformations:

The algebra of linear transformations - Isomorphism of Vector Spaces - Representations of Linear Transformations by Matrices - Linear Functionals - The Double Dual - The Transpose of a Linear Transformation.

Unit III: Algebra of polynomials:

The algebra of polynomials - Lagrange Interpolation - Polynomial Ideals -The prime factorization of a polynomial - Commutative rings – Determinant functions.

Unit IV: Determinants:

Permutations and the uniqueness of determinants - Classical Adjoint of a (square) matrix - Inverse of an invertible matrix using determinants -Characteristic values - Annihilating polynomials.

Unit V: Diagonalization:

Invariant subspaces - Simultaneous triangulation and simultaneous Diagonalization Direct-sum Decompositions - Invariant Direct sums – Primary Decomposition theorem.

TEXTBOOK

1. Kenneth Hoffman and Ray Alden Kunze, Linear Algebra, Second Edition, Prentice Hall of India Private Limited, New Delhi, 1975.

UNIT I Chapter 1 & 2 1.2-1.6 and 2.3
UNIT II Chapter 3
UNIT III Chapter 4 & 5 4.1 - 4.5 and 5.1 - 5.2
UNIT IV Chapter 5 & 6 5.3, 5.4 and 6.1 - 6.3
UNIT V Chapter 6 6.4 - 6.8

REFERENCES

1. S. Kumaresan, Linear Algebra: A Geometric Approach, Prentice-Hall of India Ltd, 2004.
2. V. Krishnamurthy, V.P. Mainra, J.L. Arora, Introduction to Linear Algebra, East West Press Ltd, 1985.
3. A.R. Rao, P. Bhimashankaram, Linear Algebra, Second Edition, Tata McGraw Hill, 2000.
4. Edgar G.Goodaire, Linear Algebra-Pure & Applied World Scientific, Cambridge University Press India Ltd, 2014

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CORE COURSE VIII

PARTIAL DIFFERENTIAL EQUATIONS

Objectives

1. To give an in-depth knowledge of solving partial differential equations and apply them in scientific and engineering problems.
2. To study the other aspects of PDE

UNIT I

Partial differential equations- origins of first order Partial differential equations- Cauchy's problem for first order equations- Linear equations of the first order- Integral surfaces Passing through a Given curve- surfaces Orthogonal to a given system of surfaces -Non linear Partial differential equations of the first order.

UNIT II

Cauchy's method of characteristics- compatible systems of first order equations- Charpits method- Special types of first order equations- Solutions satisfying given conditions- Jacobi's method.

UNIT III

Partial differential equations of the second order : The origin of second order equations –second order equations in Physics – Higher order equations in Physics - Linear partial differential equations with constant co-efficient- Equations with variable coefficients- Characteristic curves of second order equations

UNIT IV

Characteristics of equations in three variables- The solution of Linear Hyperbolic equations-Separation of variables. The method of Integral Transforms – Non Linear equations of the second order.

Unit V

Laplace equation : Elementary solutions of Laplace's equations-Families of equipotential Surfaces- Boundary value problems-Separation of variables –Problems with Axial Symmetry.

TEXT BOOK

Ian N. Sneddon,Elements of Partial differential equations**,** Dover Publication –INC, New York, 2006.
UNIT I Chapter II Sections 1 to 7
UNIT II Chapter II Sections 8 to 13
UNIT III Chapter III Sections 1 to 6
UNIT IV Chapter III Sections 7 to 11
UNIT V Chapter IV Sections 2 to 6

REFERENCES

1. **M.D.Raisinghania**, Advanced Differential Equations , S.Chand and company Ltd., New Delhi,2001.
2. **E.T.Copson,** Partial Differential Equations, Cambridge University Press

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ELECTIVE I (1)
(Any one)

ADVANCED PROBABILITY THEORY

Objectives:

1. To make the students to understand about fields, σ-fields and random variables.
2. To enable the students to learn about expectations, convergence in random variables and distribution functions.

Unit I Fields and σ Fields:

Class of events –Functions and Inverse functions – Random variables – Limits of random variables.

Unit II Probability Space:

Definition of probability – some simple properties – discrete probability space – General probability space – Induced probability space.

Unit III Distribution functions:

Distribution functions of a random variable –Decomposition of distributive functions- Distributive functions of vector random variables – Correspondence theorem.

Unit IV Expectation and Moments:

Definition of Expectation –Properties of expectation – Moments, Inequalities.

Unit V Convergence of Random Variables:

Convergence in Probability –Convergence almost surely – Convergence in distribution – Convergence in the rth mean -Convergence theorems for Expectations .

TEXT BOOK

B.R. Bhat (2007), MODERN PROBABILITY THEORY,3rd edition, New Age International private ltd, New Delhi.
Unit I : Chapter 1 and 2 Omit (1.1&1.2)
Unit II : Chapter 3 (Omit 3.6)
Unit III : Chapter 4
Unit IV : Chapter 5
Unit V : Chapter 6(6.1 to 6.5)

REFERENCES

1 Chandra T.K and Chatterjee D. (2003),A first course in probability , 2nd Edition, Narosa Publishing House, New Delhi.
2 Kailai Chung and Farid Aitsahlia, Elementary Probability, Springer Verlag 2003, New York.
3 Marek Capinski and Thomasz Zastawniak(2003), Probability through problems, Springer Verlag, New York.
4 Sharma .T.K(2005), A text book of probability and theoretical distribution, Discovery publishing house, New Delhi.

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ELECTIVE I (2)

MATHEMATICAL MODELING

Objectives:

1. To study the different mathematical models in ODE and Difference equations.
2. To study graph theoretical models.

UNIT I - Mathematical Modelling through Ordinary Differential Equations of First order :

Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamics problems – Geometrical problems.

UNIT II - Mathematical Modelling through Systems of Ordinary Differential Equations of First Order :

Population Dynamics – Epidemics – Compartment Models – Economics – Medicine, Arms Race, Battles and International Trade – Dynamics.

UNIT III - Mathematical Modelling through Ordinary Differential Equations of Second Order:

Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second Order – Miscellaneous Mathematical Models.

UNIT IV - Mathematical Modelling through Difference Equations :

Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory.

UNIT V - Mathematical Modelling through Graphs :

Solutions that can be Modelled through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

TEXT BOOK

J.N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Delhi, 1988.

REFERENCES

J. N. Kapur, Mathematical Models in Biology and Medicine, Affiliated East – West Press Pvt Limited, New Delhi, 19

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ELECTIVE I (3)

FUZZY SETS AND THEIR APPLICATIONS

Objectives:

1. To introduce the concept of fuzzy theory and study its application in real problems
2. To study the uncertainty environment through the fuzzy sets that incorporates imprecision and subjectivity into the model formulation and solution process.

UNIT I From Classical Sets To Fuzzy Sets, Fuzzy Sets Verses Crisp Sets:

Fuzzy sets: Basic types – Fuzzy sets: Basic Concepts –Additional Properties of α – cuts- Extension Principle for fuzzy sets **.**

UNIT II Operations On Fuzzy Sets:

Types of operations– Fuzzy complements- Fuzzy Intersections:t-Norms – Fuzzy Unions:t-Conorms - Combinations of Operations**.**

UNIT III Fuzzy Arithmetic:

Fuzzy numbers - Linguistic variables -Arithmetic operations on intervals –Arithmetic operations on Fuzzy numbers **.**

UNIT IV Fuzzy Relations:

Binary Fuzzy Relations – Binary Relations on a Single Set – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations –Fuzzy Ordering Relations – Fuzzy Morphisms.

UNIT V Fuzzy Decision Making:

Individual decision making – Multiperson Decision Making-Ranking methods – Fuzzy Linear programming.

TEXT BOOK

George J. Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic Theory and Applications, Prentice Hall of India, (2005).

UNIT I Chapter 1 Sections 1.3, 1.4, Chapter :2 Sections 2.1 and 2.3
UNIT II Chapter 3 Sections 3.1, 3.2, 3.3, 3.4, 3.5.
UNIT III Chapter 4 Sections 4.1,4.2, 4.3, 4.4.
UNIT IV Chapter 5 Sections 5.3 ,5.4, 5.5, 5.6, 5.7, 5.8.
UNIT V Chapter 15 Sections 15.2,15.3, 15.6, 15.7

REFERENCES

1. H.J. Zimmermann, Fuzzy Set Theory and its Applications, Allied Publishers Limited (1991).
2. M. Ganesh, Introduction to Fuzzy sets and Fuzzy logic, Prentice Hall of India, New Delhi (2006).

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ELECTIVE II (1)
(Any one)

STOCHASTIC PROCESSES

Objectives

1. To understand the stochastic models for many real life probabilistic situations.
2. To learn the well known models like birth-death and queuing to reorient the knowledge of stochastic processes.

UNIT I

Stochastic Processes: Some notions – Specification of Stochastic processes – Stationary processes – Markov Chains – Definitions and examples – Higher Transition probabilities – Generalization of independent Bernoulli trails – Sequence of chain – Dependent trains.

UNIT II

Markov chains : Classification of states and chains – determination of Higher transition probabilities – stability of a Markov system – Reducible chains – Markov chains with continuous state space.

UNIT III

Markov processes with Discrete state space : Poisson processes and their extensions – Poisson process and related distribution – Generalization of Poisson process- Birth and Death process – Markov processes with discrete state space (continuous time Markov Chains).

UNIT IV

Renewal processes and theory : Renewal process – Renewal processes in continuous time – Renewal equation – stopping time – Wald's equation – Renewal theorems.

UNIT V

Stochastic processes in Queuing – Queuing system – General concepts – the queuing model M/M/1 – Steady state Behaviour – transient behaviour of M/M/1 Model – Non-Markovian models - the model GI/M/1.

TEXT BOOK

1. J. Medhi,Stochastic Processes, New age international pblishers,New Delhi–Second edition.

UNIT I	Ch. II & Ch.III	Sec 2.1 to 2.3, Sec 3.1 to 3.3
UNIT II	Ch III – Sec 3.4 tp 3.6, 3.8, 3.9 and 3.11	
UNIT III	Ch IV : Sec 4.1 to 4.5	
UNIT IV	Ch VI : Sec 6.1 to 6.5	
UNIT V	Ch X : Sec 10.1 to 10.3, 10.7 and 10.8 (omit sec 10.2.3 & 10.2.3.1)	

REFERENCES

1. Samuel Karlin, Howard M. Taylor, A first course in stochastic processes, Academic press, Second Edition,1975.
2. Narayan Bhat , Elements of Applied Stochastic Processes,John Wiley ,1972.
3. N.V. Prabhu, Stochastic Processes, Macmillan (NY).

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ELECTIVE II (2)

TENSOR ANALYSIS AND SPECIAL THEORY OF RELATIVITY

Objectives.

1. To introduce the notion of Tensor and study its properties.
2. To study the theory of relativity.

UNIT I

Invariance - Transformations of coordinates and its properties - Transformation by invariance - Transformation by covariance and contra variance - Covariance and contra variance - Tensor and Tensor character of their laws - Algebras of tensors - Quotient tensors - Symmetric and skew symmetric tensors – Relative tensors.

UNIT II

Metric Tensor - The fundamental and associated tensors - Christoffel's symbols - Transformations of Chrisffel's symbols- Covariant Differentiation of Tensors - Formulas for covariant Differentiation- Ricci Theorem - Riemann -Christoffel Tensor and their properties.

UNIT III

Einstein Tensor- Riemannian and Euclidean Spaces (Existence Theorem)-The e-systems and the generalized Kronecker deltas - Application of the e-systems.

UNIT IV

Special Theory of Relativity: Galilean Transformation - Maxwell's equations - The ether Theory – The Principle of Relativity Relativistic Kinamatics : Lorentz Transformation equations - Events and simultaneity - Example Einstein Train - Time dilation - Longitudinal Contraction -Invariant Interval - Proper time and Proper distance – World line - Example - twin paradox - addition of velocities - Relativistic Doppler effect.

UNIT V

Relativistic Dynamics : Momentum – energy – Momentum-energy four vector – Force – Conservation of Energy – Mass and energy – Example – inelastic collision – Principle of equivalence – Lagrangian and Hamiltonian formulations .
Accelerated Systems : Rocket with constant acceleration – example – Rocket with constant thrust .

TEXT BOOK

1. I.S. Sokolnikoff, Tensor Analysis, John Wiley and Sons, New York, 1964
2. D. Greenwood, Classical Dynamics, Prentice Hall of India, New Delhi, 1985

UNIT I	Chapter 2 : Sections 18 to 28 of [1]
UNIT II	Chapter 2 : Sections 29 to 37 of [1]
UNIT III	Chapter 2 : Section 38 to 41 of [1]
UNIT IV	Chapter 7 : Sections 7.1 and 7.2 of [2]
UNIT V	Chapter 7 : Sections 7.3 and 7.4 of [2]

REFERENCES

1. J.L. Synge and A.Schild, Tensor Calculus, Toronto, 1949.
2. A.S. Eddington, The Mathematical Theory of Relativity, Cambridge University Press, 1930.
3. P.G. Bergman, An Introduction to Theory of Relativity, New york, 1942.
4. C.E. Weatherburn, Riemannian Geometry and Tensor Calculus, Cambridge, 1938

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ELECTIVE II (3)

NON LINEAR DIFFERENTIAL EQUATIONS

Objectives.

1. To study Non linear DE and its properties.
2. To study oscillation and stability properties of the solutions.

Unit I

First order systems in two variables and linearization: The general phase plane-some population models – Linear approximation at equilibrium points – Linear systems in matrix form.

Unit II

Averaging Methods: An energy balance method for limit cycles – Amplitude and frequency estimates – slowly varying amplitudes – nearly periodic solutions - periodic solutions: harmony balance – Equivalent linear equation by harmonic balance – Accuracy of a period estimate.

Unit III

Perturbation Methods: Outline of the direct method – Forced Oscillations far from resonance - Forced Oscillations near resonance with Weak excitation – Amplitude equation for undamped pendulum – Amplitude Perturbation for the pendulum equation – Lindstedt's Method – Forced oscillation of a self – excited equation – The Perturbation Method and Fourier series.

Unit IV

Linear Systems: Time Varying Systems – Constant coefficient System – Periodic Coefficients – Floquet Theory – Wronskian.

Unit V

Stability: Poincare stability – solutions, paths and norms – Liapunov stability Stability of linear systems – Comparison theorem for the zero solutions of nearly – linear systems.

TEXT BOOK

Nonlinear Ordinary Differential Equations , D.W.Jordan, & P.Smith, Clarendon Press, Oxford, 1977.

REFERENCES

1. Differential Equations by G.F.Simmons, Tata McGraw Hill, NewDelhi (1979).
2. Ordinary Differential Equations and Stability Theory By D.A.Sanchez, Freeman (1968).
3. Notes on Nonlinear Systems by J.K.Aggarwal, Van Nostrand, 1972.

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CORE COURSE IX

CLASSICAL DYNAMICS

Objectives

1. To give a detailed knowledge of the mechanical system of particles.
2. To study the applications of Lagrange's and Hamilton's equations .

UNIT I

Introductory concepts: The mechanical system - Generalised Coordinates - constraints - virtual work - Energy and momentum.

UNIT II

Lagrange's equation: Derivation and examples - Integrals of the Motion - Small oscillations.

UNIT III

Special Applications of Lagrange's Equations: Rayleigh's dissipation function - impulsive motion - Gyroscopic systems - velocity dependent potentials.

UNIT IV

Hamilton's equations: Hamilton's principle - Hamilton's equations - Other variational principles - phase space.

UNIT V

Hamilton - Jacobi Theory: Hamilton's Principal Function – The Hamilton - Jacobi equation - Separability.

TEXT BOOKS.

1. Donald T. Greenwood,Classical Dynamics, PHI Pvt. Ltd., New Delhi-1985.

UNIT – I Chapter 1: Sections 1.1 to 1.5
UNIT – II Chapter 2: Sections 2.1 to 2.4
UNIT – III Chapter 3 : Sections 3.1 to 3.4
UNIT – IV Chapter 4: Sections 4.1 to 4.4
UNIT – V Chapter 5: Sections 5.1 to 5.3

REFERENCES.

1. H. Goldstein, Classical Mechanics, (2nd Edition), Narosa Publishing House, New Delhi.
2. Narayan Chandra Rana & Promod Sharad Chandra Joag, Classical Mechanics, Tata McGrawHill, 1991.

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CORE COURSE X

MEASURE AND INTEGRATION

Objectives

1. To generalize the concept of integration using measures.
2. To develop the concept o f analysis in abstract situations.

UNIT I

Measure on Real line - Lebesgue outer measure - Measurable sets - Regularity - Measurable function - Borel and Lebesgue measurability.

UNIT II

Integration of non-negative functions - The General integral - Integration of series - Riemann and Lebesgue integrals.

UNIT III

Abstract Measure spaces - Measures and outer measures - Completion of a measure - Measure spaces - Integration with respect to a measure.

UNIT IV

Convergence in Measure- Almost uniform convergence- Signed Measures and Halin Decomposition –The Jordan Decomposition

UNIT V

Measurability in a Product space – The product Measure and Fubini's Theorem.

TEXT BOOKS

1. G.De Barra, Measure Theory and Integration, New age international (p) Limited.

UNIT – I	Chapter II: Sections 2.1 to 2.5
UNIT – II	Chapter III: Sections 3.1 to 3.4
UNIT – III	Chapter V: Sections 5.1 to 5.6
UNIT – IV	Chapter VII: Sections 7.1 and 7.2, Chapter VIII: Sections 8.1 and 8.2
UNIT – V	Chapter X: Sections 10.1 and 10.2

REFERENCES

1. M.E. Munroe,Measure and Integration, by Addison - Wesley Publishing Company, Second Edition, 1971.
2. P.K. Jain, V.P. Gupta, Lebesgue Measure and Integration, New Age International Pvt Limited Publishers, New Delhi, 1986, Reprint 2000.
3. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
4. Inder, K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, New Delhi, 1997.

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CORE COURSE XI

TOPOLOGY

Objectives

1. To study the concepts concerned with properties that are preserved under continuous deformations of objects.
2. To train the students to develop analytical thinking and the study of continuity and connectivity.

UNIT I TOPOLOGICAL SPACES:

Topological spaces - Basis for a topology - The order topology - The product topology on X x Y - The subspace topology - Closed sets and limit points.

UNIT II CONTINUOUS FUNCTIONS :

Continuous functions - the product topology - The metric topology.

UNIT III CONNECTEDNESS:

Connected spaces- connected subspaces of the Real line - Components and local connectedness.

UNIT IV COMPACTNESS:

Compact spaces - compact subspaces of the Real line - Limit Point Compactness – Local Compactness.

UNIT V COUNTABILITY AND SEPARATION AXIOMS:

The countability Axioms - The separation Axioms - Normal spaces - The Urysohn Lemma - The Urysohn metrization Theorem - The Tietz extension theorem.

TEXT BOOK

James R. Munkres, Topology (2nd Edition) Pearson Education Pvt. Ltd., New Delhi-2002 (Third Indian Reprint).

UNIT – I Chapter 2: Sections 12 to 17
UNIT – II Chapter 2 : Sections 18 to 21 (Omit Section 22)
UNIT – III Chapter 3 : Sections 23 to 25.
UNIT – IV Chapter 3 : Sections 26 to 29.
UNIT – V Chapter 4 : Sections 30 to 35.

REFERENCES

1 J. Dugundji, Topology, Prentice Hall of India, ,New Delhi, 1975.
2 George F.Sinmons, Introduction to Topology and Modern Analysis, McGraw Hill Book co.1963.
3 J.L. Kelly, General Topology, Van Nostrand, Reinhold Co., New York
4 L.Steen and J.Seeback, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.

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ELECTIVE III (1)
(Any one)

DESIGN AND ANALYSIS OF ALGORITHMS

Objectives

1. To impart the students the knowledge of design and analysis of algorithms in computer science.
2. To study the complexity of algorithms.

Unit I Algorithms:

Introduction- Algorithm - Algorithm specification: Pseudo code Conventions, Recursive algorithms - Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation, and Practical Complexities.

Unit II Data structures and Queues:

Linear data structures: Concepts of non-primitive data structures – storage structure for arrays - stacks - operations on stacks - queues - priority queues.

Unit III Linked lists and trees:

Linked linear lists - operations on linked linear lists - circularly linked lists -doubly linked linear lists - Non-linear data structures: trees - binary trees -operations on binary trees - storage representation and manipulations of binary trees.

Unit IV Search and Sort:

Divide and conquer - General method - Binary search - Finding the maximum and minimum in a set of items - Merge sort - Quick sort - Selection sort. Basic Traversal and Search Techniques for graphs: Breadth First Search – Depth First Search.

Unit V Interpolations:

Backtracking - The 8-Queens problem - Algebraic problems - The general method - Evaluation and interpolation - Horner's rule - Lagrange interpolation- Newtonian interpolation.

TEXTBOOKS

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer algorithms, Galgotia Publications Pvt. Ltd., 2004. (For Units I, IV, V)
2. Jean-Paul Tremblay and Paul G.Sorenson, An introduction to data structures with applications, Second Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 1995. (For Units II, III)

REFERENCES

1. A.V. Aho, J.E.Hopcroft, J.D. Ullman, The Design and Analysis of Computer Algorithms, Addison-Wesley Publ. Comp., 1974.
2. Seymour E.Goodman and S.T. Hedetniemi, Introduction to the design and analysis of algorithms, McGraw Hill International Edition, 2002.

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ELECTIVE III (2)

DISCRETE MATHEMATICS

Objectives

1. To study the concepts like Boolean algebra, coding theory.
2. To introduce the different notions grammar.

Unit I Relations and Functions:

Binary relations, equivalence relations and partitions, partial order relations, inclusion and exclusion principle, Hasse diagram, Pigeon hole principle. Functions, inverse functions, compositions of functions, recursive functions.

Unit II Mathematical Logic:

Logic operators, Truth tables, Theory of inference and deduction, mathematical calculus, predicate calculus, predicates and qualifiers.

Unit III Lattices:

Lattices as Partially Ordered Sets. Their Properties, Lattices as algebraic Systems, Sub lattices, Direct Product and homomorphism. Some Special Lattices - Complete, Complemented and Distributive Lattices, Isomorphic Lattices.

Unit IV Boolean algebra:

Various Boolean identities, the switching Algebra Example, Sub Algebras, Direct Production and Homomorphism. Boolean Forms and their Equivalence, Midterm Boolean forms, Sum of Products, Canonical Forms. Minimization of Boolean Functions. The Karnuagh Map Method.
Coding Theory: Coding of binary information and error detection, Group codes, decoding and error correction.

Unit V Grammar and Languages:

Phrase structure grammars, rewriting rules, derivation sentential forms, language generated by grammar, regular, context free and context sensitive grammar and languages.

TEXT BOOKS

1. Trembly. J.P & Manohar. P., "Discrete Mathematical Structures with Applications to Computer Science" McGraw- Hill.
2. Liu, C.L., "Elements of Discrete Mathematics", McGraw-Hill Book co.
3. K.D Joshi, "Foundations of Discrete Mathematics", Wiley Eastern Limited.

REFERENCES

1. Kolman, Busy & Ross, "Discrete Mathematical Structures", PHI.
2. Alan Doer: "Applied Discrete Structure for Computer Science", Galgotia Publications Pvt. Ltd.
3. Seymour Lipschutz, M. Lipson: "Discrete Mathematics", McGraw-Hill Edition.
4. Kenneth G. Roden: "Discrete Mathematics and its Applications", McGraw- Hill international editions, Mathematics Series.

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ELECTIVE III (3)

AUTOMATA THEORY

Objectives

1. To make the students to understand the nuances of Automata and Grammar.
2. To make them to understand the applications of these techniques in computer science.

Unit I: - Finite Automata and Regular expressions:

Definitions and examples - Deterministic and Nondeterministic finite Automata - Finite Automata with -moves. (Book 1, Chapter 2: Sections2.1-2.4)

Unit II: - Context free grammar:

Regular expressions and their relationship with automation - Grammar - Ambiguous and unambiguous grammars - Derivation trees – Chomsky Normal form. (Book 1, Chapter 2, Section 2.5, Chapter 4, Sections 4.1-4.3, 4.5,4.6)

Unit III: - Pushdown Automaton:

Pushdown Automaton - Definition and examples - Relation with Context free languages. (Book 1, Chapter 5: Section 5.2, 5.3)

Unit IV: - Finite Automata and lexical analysis:

Role of a lexical analyzer - Minimizing the number of states of a DFA - Implementation of a lexical analyzer. (Book 2, Chapter 3: Section 3.1-3.8)

Unit V: - Basic parsing techniques:

Parsers - Bottom up Parsers - Shift reduce - operator precedence - Top down Parsers - Recursive descent - Predictive parsers. (Book 2, Chapter 5: Section 5.1-5.5)

TEXTBOOKS

1. John E. Hopcroft and Jeffrey D. Ullman, Introduction to Automata theory, Languages and Computations, Narosa Publishing House, Chennai, 2000.
2. A.V. Aho and Jeffrey D. Ullman, Principles of Compiler Design, Narosa Publishing House, Chennai, 2002.

REFERENCES

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Second Edition, Prentice Hall, 1997.
2. A.V. Aho, Monica S. Lam, R. Sethi, J.D. Ullman, Compilers: Principles, Techniques and Tools, Second Edition, Addison-Wesley, 2007.

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ELECTIVE IV (1)
(Any one)

FINANCIAL MATHEMATICS

Objectives

1. To study financial mathematics through various models.
2. To study the various aspects of financial mathematics.

UNIT I SINGLE PERIOD MODELS:

Definitions from Finance - Pricing a forward - One-step Binary Model - a ternary Model - Characterization of no arbitrage - Risk-Neutral Probability Measure.

UNIT II BINOMIAL TREES AND DISCRETE PARAMETER MARTINGALES:

Multi-period Binary model - American Options - Discrete parameter martingales and Markov processes - Martingale Theorems - Binomial Representation Theorem - Overturn to Continuous models.

UNIT III BROWNIAN MOTION:

Definition of the process - Levy's Construction of Brownian Motion - The Reflection Principle and Scaling - Martingales in Continuous time.

UNIT IV STOCHASTIC CALCULUS:

Non-differentiability of Stock prices - Stochastic Integration - Ito's formula - Integration by parts and Stochastic Fubini Theorem - Girsanov Theorem - Brownian Martingale Representation Theorem – Geometric Brownian Motion - The Feynman - Kac Representation.

UNIT V BLOCK-SCHOLES MODEL:

Basic Block-Scholes Model - Block-Scholes price and hedge for European Options - Foreign Exchange - Dividends - Bonds - Market price of risk.

TEXT BOOK

Alison Etheridge ,A Course in Financial Calculus, , Cambridge University Press, Cambridge, 2002.

REFERENCES

1. Martin Boxter and Andrew Rennie, Financial Calculus: An Introduction to Derivatives Pricing, Cambridge University Press, Cambridge, 1996.
2. Damien Lamberton and Bernard Lapeyre, (Translated by Nicolas Rabeau and Farancois Mantion),
3. Introduction to Stochastic Calculus Applied to Finance, Chapman and Hall, 1996.
4. Marek Musiela and Marek Rutkowski, Martingale Methods in Financial Modeling, Springer Verlag, New York, 1988.
5. Robert J.Elliott and P.Ekkehard Kopp, Mathematics of Financial Markets, Springer Verlag, New York, 2001 (3rd Printing)

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ELECTIVE IV (2)

ADVANCED OPERATIONS RESEARCH

Objectives:

1. To enlighten the students in the field of operations research.
2. To help the students to apply OR techniques in business and management problems.

Unit I

Integer Programming.

Unit II

Dynamic (Multistage) programming.

Unit III

Decision Theory and Games.

Unit IV

Inventory Models.

Unit V
Non-linear Programming algorithms.

TEXT BOOK

Hamdy A. Taha, Operations Research, Macmillan Publishing Company, 4th Edition.
Unit I Chapter 8 § 8.1 – 8.5
Unit II Chapter 9 § 9.1 – 9.5
Unit III Chapter 11 § 11.1 – 11.4
Unit IV Chapter 13 § 13.1 – 13.4
Unit V Chapter 19 § 19.1, 19.2

REFERENCES

1. Non Linear Programming, O.L. Mangasarian, McGraw Hill, New York .
2. Non Linear Programming, Theory and Algorithms, Mokther S. Bazaraa and C.M. Shetty,Willy, New York .
3. Operations Research-An Introduction, Prem Kumar Gupta and D.S. Hira, S. Chand

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ELECTIVE IV (3)

COMBINATORICS

Objectives:

1. To introduce the notion of different types of distributions of objects and generating functions.
2. To study the Polya's enumeration theorems.

UNIT I

Permutations and combinations - distributions of distinct objects ~ distributions of non distinct objects - Stirlings formula.

UNIT II

Generating functions. - generating function for combinations - enumerators for permutations - distributions of distinct objects into non-distinct cells - partitions of integers – the Ferrer's graphs - elementary relations.

UNIT III

Recurrence relation - linear recurrence relations with constant coefficients solutions by the technique of generating functions - a special class of nonlinear difference equations - recurrence relations with two indices.

UNIT IV

The principle of inclusion and exclusion - general formula - permutations with restriction on relative positions - derangements - the rook polynomials - permutations with forbidden positions.

UNIT V

Polya's theory of counting - equivalence classes under a permutation group Burnside theorem - equivalence classes of functions - weights and inventories of functions - Polya' s fundamental theorem – generation of Polya's theorem.

TEXT BOOK

Introduction of Combinatorial Mathematics, C.L. Liu, McGraw Hill,1968. Chapters 1 to 5.

REFERENCES

1. Combinatorial Theory, Marshall Hall Jr.,John Wiley & Sons, second edition.
2. Combinatorial Mathematics, H.J. Rayser, Carus Mathematical Monograph, No.14.

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CORE COURSE XII

FUNCTIONAL ANALYSIS

Objectives

1. To study the three structure theorems of Functional Analysis viz., Hahn-Banach theorem, Open mapping theorem and Uniform boundedness principle.
2. To introduce Hilbert spaces and operator theory leading to the spectral theory of operators on a Hilbert space.

UNIT I

Algebraic Systems: Groups – Rings – The structure of rings – Linear spaces – The dimension of a linear space – Linear transformations – Algebras – Banach Spaces : The definition and some examples – Continuous linear transformations – The Hahn-Banach theorem – The natural imbedding of N in N^{**} - The open mapping theorem – The conjugate of an operator

UNIT II

Hilbert Spaces: The definition and some simple properties – Orthogonal complements – Orthonormal sets - The conjugate space H^* - The adjoint of an operator – Self-adjoint operators – Normal and unitary operators – Projections

UNIT III

Finite-Dimensional Spectral Theory: Matrices – Determinants and the spectrum of an operator – The spectral theorem – A survey of the situation

UNIT IV

General Preliminaries on Banach Algebras: The definition and some examples – Regular and singular elements – Topological divisors of zero – The spectrum – The formula for the spectral radius – The radical and semi-simplicity

UNIT V

The Structure of Commutative Banach Algebras : The Gelfand mapping – Applications of the formula $r(x) = \lim \| x^n \|^{1/n}$ - Involutions in Banach Algebras – The Gelfand-Neumark theorem.

TEXT BOOK

G.F.Simmons,Introduction to Topology and Modern Analysis, McGraw-Hill International Ed. 1963.

UNIT – I Chapters 8 and 9
UNIT – II Chapter 10
UNIT – III Chapter 11
UNIT – IV Chapter 12
UNIT – V Chapter 13

REFERENCES

1 Walter Rudin, Functional Analysis, TMH Edition, 1974.
2 B.V. Limaye, Functional Analysis, Wiley Eastern Limited, Bombay, Second Print, 1985.
3 K.Yosida, Functional Analysis, Springer-Verlag, 1974.
4 Laurent Schwarz, Functional Analysis, Courant Institute of Mathematical Sciences, New York University, 1964.

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CORE COURSE XIII

DIFFERENTIAL GEOMETRY

Objectives

1. To introduce the notion of surfaces and their properties.
2. To study geodesics and differential geometry of surfaces.

UNIT I SPACE CURVES:

Definition of a space curve - Arc length - tangent - normal and binormal - curvature and torsion - contact between curves and surfaces- tangent surface- involutes and evolutes- Intrinsic equations - Fundamental Existence Theorem for space curves- Helics.

UNIT II INTRINSIC PROPERTIES OF A SURFACE:

Definition of a surface - curves on a surface - Surface of revolution - Helicoids - Metric- Direction coefficients - families of curves- Isometric correspondence- Intrinsic properties.

UNIT III GEODESICS:

Geodesics - Canonical geodesic equations - Normal property of geodesics- Existence Theorems - Geodesic parallels - Geodesics curvature- Gauss- Bonnet Theorem - Gaussian curvature- surface of constant curvature.

UNIT IV NON INTRINSIC PROPERTIES OF A SURFACE:

The second fundamental form- Principal curvature - Lines of curvature - Developable – Developable associated with space curves and with curves on surface - Minimal surfaces - Ruled surfaces.

UNIT V DIFFERENTIAL GEOMETRY OF SURFACES:

Compact surfaces whose points are umblics- Hilbert's lemma - Compact surface of constant curvature - Complete surface and their characterization - Hilbert's Theorem - Conjugate points on geodesics.

TEXT BOOK

T.J. Willmore, An Introduction to Differential Geometry, Oxford University Press,(17th Impression) New Delhi 2002. (Indian Print).

UNIT – I Chapter I : Sections 1 to 9.
UNIT – II Chapter II: Sections 1 to 9.
UNIT – III Chapter II: Sections 10 to 18.
UNIT – IV Chapter III: Sections 1 to 8.
UNIT – V Chapter IV : Sections 1 to 8

REFERENCES

1. Struik, D.T. Lectures on Classical Differential Geometry, Addison - Wesley, Mass. 1950.
2. Kobayashi S. and Nomizu. K. Foundations of Differential Geometry, Interscience Publishers, 1963.
3. Wihelm Klingenberg: A course in Differential Geometry, Graduate Texts in Mathematics, Springer Verlag, 1978.
4. J.A. Thorpe Elementary topics in Differential Geometry, Under - graduate Texts in Mathematics, Springer - Verlag 1979.

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CORE COURSE XIV

ADVANCED NUMERICAL ANALYSIS

Objectives.

1. To know the theory behind various numerical methods.
2. To apply these methods to solve mathematical problems.

Unit I

Transcendental and polynomial equations:Rate of convergence – Secant Method, Regula Falsi Method, Newton Raphson Method, Muller Method and Chebyshev Method. Polynomial equations: Descartes' Rule of Signs - Iterative Methods: Birge-Vieta method, Bairstow's method Direct Method: Graeffe's root squaring method.

Unit II

System of Linear Algebraic equations and Eigen Value Problems: Error Analysis of Direct methods – Operational count of Gauss elimination, Vector norm, Matrix norm, Error Estimate. Iteration methods - Jacobi iteration method, Gauss Seidel Iteration method, Successive Over Relaxation method - Convergence analysis of iterative methods, Optimal Relaxation parameter for the SOR method. Finding eigen values and eigen vectors – Jacobi method for symmetric matrices and Power methods only.

Unit III

Interpolation and Approximation:- Hermite Interpolations, Piecewise and Spline Interpolation – piecewise linear interpolation, piecewise quadratic interpolation, piecewise cubic interpolation, spline interpolation-cubic Spline interpolation. Bivariate Interpolation- Lagrange Bivariate interpolation. Least square approximation.

Unit IV

Differentiation and Integration: Numerical Differentiation – Optimum choice of Step length – Extrapolation methods – Partial Differentiation. Numerical Integration: Methods based on undetermined coefficients - Gauss Legendre Integration method and Lobatto Integration Methods only.

Unit V

Ordinary differential equations – Singlestep Methods: Local truncation error or Discretization Error, Order of a method, Taylor Series method, Runge-Kutta methods: Explicit Runge–Kutta methods– Minimization of Local Truncation Error, System of Equations, Implicit Runge-Kutta methods. Stability analysis of single step methods (RK methods only).

TEXT BOOKS

M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (p) Limited Publishers, New Delhi, Sixth Edition 2012.
Unit I Chapter 2 § 2.5 (Pages 41-52), 2.9 (Pages 83-99)
Unit II Chapter 3 § 3.3(Pages 134-140), 3.4(Pages 146-164), 3.5(Pages 170-173),
3.7 (Pages179-185) and 3.11 (Pages 196-198)
Unit III Chapter 4 § 4.5 - 4.7 & 4.9 (Pages 284-290)
Unit IV Chapter 5 § 5.2 - 5.5(Pages 320-345) and 5.8(pages 361 – 365 and 380-386)
Unit V Chapter 6 §6.4(Pages 434-459) and 6.5(Pages 468-475)

REFERENCES

1. Kendall E. Atkinson, An Introduction to Numerical Analysis, II Edn., John Wiley & Sons, 1988.
2. M.K. Jain, Numerical Solution of Differential Equations, II Edn., New Age International Pvt Ltd., 1983.
3. Samuel. D. Conte, Carl. De Boor, Elementary Numerical Analysis, Mc Graw-Hill International Edn., 1983.

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ELECTIVE V (1)
(Any one)

ALGEBRAIC TOPOLOGY

Objectives:

1. To introduce the notion of homotopy and covering spaces.
2. To study the Jordan curve theorem.

UNIT I

Homotopy of Paths-The Fundamental Group-Covering spaces.

UNIT II

The Fundamental group of the circle – The Fundamental group of the punctured plane- The Fundamental group of S^n.

UNIT III

Fundamental groups of surfaces- Essential and Inessential maps-The Fundamental theorem of algebra.

UNIT IV

Homotopy type – The Jordan separation theorem.

UNIT V

The Jordan Curve Theorem.

TEXTBOOK

Topology – A first course by James R.Munkres, Prentice-Hall of India Pvt Ltd, Third print.

REFERENCE BOOKS

1. A basic course in Algebraic Topology by William S Massey,Springer , First Edition.
2. Lecture notes on Elementary Topology and Geometry(Under graduate Texts in Mathematics) by I.M.Singer and John A Thorpe,Springer-Verlag,New York.
3. Elements of Algebraic Topology by James R. Munkres ,Addition-Wesley Publishing Company-1984
4. Allen Hatcher,Algebraic Topology,Cambridge University Press ,2002.

*****

ELECTIVE V (2)

FLUID DYNAMICS

Objectives

1. To give the students an introduction to the behaviour of fluids in motion.
2. To give the students a feel of the applications of Complex Analysis in the analysis of the flow of liquids.

UNIT I

Real Fluids and Ideal Fluids - Velocity of a Fluid at a point – Streamlines and Path lines: Steady and Unsteady Flows – The Velocity potential – The Vorticity vector – Local and Particle Rates of Change – The Equation of continuity – Worked examples – Acceleration of a Fluid – Conditions at a rigid boundary – General analysis of fluid motion – Pressure at a point in a Fluid at Rest – Pressure at a point in Moving Fluid – Conditions at a Boundary of Two Inviscid Immiscible Fluids – Euler's equation of motion – Bernoulli's equation – Worked examples.

UNIT II

Discussions of a case of steady motion under conservative body forces – Some potential theorems – Some Flows Involving Axial Symmetry – Some special two-Dimensional Flows-Impulsive Motion.Some three- dimensional Flows: Introduction – Sources, Sinks and Doublets – Images in a Rigid infinite Plane – Axi-Symmetric Flows; Stokes stream function.

UNIT III

Some Two- Dimensional Flows: Meaning of a Two- Dimensional Flow – Use of cylindrical polar co-ordinates – The stream function – The Complex Potential for Two- Dimensional, Irrotational , Incompressible Flow – complex velocity potentials for Standard Two Dimensional Flows – Some worked examples – The Milne- Thomson circle theorem and applications – The theorem of Blasius.

UNIT IV

The use of conformal Transformation and Hydrodynamical Aspects – Vortex rows. Viscous flow Stress components in a real fluid - relations between cartesian components of stress - Translational Motion of Fluid element – The Rate of Strain Quadraic and Principle Stresses – Some further properties of the rate of strain quardric - Stress analysis in fluid motion – Relations between stress and rate of strain - The coefficient of viscosity and laminar flow – The Navier- Stokes equations of motion of a viscous fluid.

UNIT V

Some solvable problems in viscous flow – Steady viscous flow in tubes of uniform cross section – Diffusion of vorticity – Energy Dissipation due to viscosity – Steady Flow past a Fixed Sphere – Dimensional Analysis; Reynolds Number – Prandtl's Boundary Layer.

TEXT BOOK

Text Book of Fluid Dynamics by F.Chorlton ,CBS Publishers & Distributors, New Delhi ,1985.

UNIT I	Chapter 2 and Chapter 3: Sections 3.1 to 3.6
UNIT II	Chapter 3 : Sections 3.7 to 3.11 and chapter 4 : Sections 4.1,4.2,4.3,4.5
UNIT II	Chapter 5 : Sections : 5.1 to 5.9 except 5.7
UNIT IV	Chapter 5 : Section 5.10, 5.12 and Chapter 8 : Sections 8.1 to 8.9
UNIT V	Chapter 8 : Sections 8.10 to 8.16.

REFERENCE

1. Computational Fluid Dynamics: An Introduction, J.F. Wendt J.D. Anderson, G. Degrez and E. Dick, Springer – Verlag, 1996.
2. Computational Fluid Dynamics,The Basics with Applicatios, J. D. Anderson, McGraw Hill, 1995.
3. An Introduction to Fluid Mechanics, Foundation Books, G. K. Batchelor, New Delhi, 1984.
4. A Mathematical Introduction to Fluid Dynamics, A. J. Chorin and A. Marsden, Springer- Verlag, New York, 1993.
5. Foundations of Fluid Mechanics, S. W. Yuan, Prentice Hall of India Pvt Limited, New Delhi, 1976.
6. An Introduction to Fluid Dynamics, R. K. Rathy Oxford and IBH Publishing Company, New Delhi, 1976.

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ELECTIVE V (3)

ALGEBRAIC NUMBER THEORY

Objectives

1. To expose the students to the charm, niceties and nuances in the world of numbers.
2. To highlight some of the Applications of the Theory of Numbers.

UNIT I

Introduction – Divisibility – Primes – The Binomial Theorem – Congruences – Euler's totient - Fermat's, Euler's and Wilson's Theorems – Solutions of congruences – The Chinese Remainder theorem.

UNIT II

Techniques of numerical calculations – Public key cryptography – Prime power Moduli – Primitive roots and Power Residues –Congruences of degree two.

UNIT III

Number theory from an Algebraic Viewpoint – Groups, rings and fields – Quadratic Residues- The Legendre symbol (a/r) where r is an odd prime – Quadratic Reciprocity – The Jacobi Symbol (P/q) where q is an odd positive integer.

UNIT IV

Binary Quadratic Forms – Equivalence and Reduction of Binary Quadratic Forms – Sums of three squares – Positive Definite Binary Quadratic forms – Greatest integer Function – Arithmetic Functions – The Mobius Inversion Formula – Recurrence Functions – Combinatorial number theory .

UNIT V

Diophantine Equations – The equation ax+by=c – Simultaneous Linear Diophantine Equations – Pythagorean Triangles – Assorted examples.

TEXT BOOK

Ivan Niven, Herbert S, Zuckerman and Hugh L, Montgomery, An Introduction to the Theory of Numbers, Fifth edn., John Wiley & Sons Inc, 2004.

UNIT I	Chapter 1 and Chapter 2 : Sections 2.1 to 2.3
UNIT II	Chapter 2 : Sections 2.4 to 2.9
UNIT III	Chapter 2 : Sections 2.10, 2.11 and Chapter 3: Sections 3.1 to 3.3
UNIT IV	Chapter 3 : Sections 3.4 to 3.7 and Chapter 4
UNIT V	Chapter 5: Sections 5.1 to 5.4.

REFERENCES

1. Elementary Number Theory, David M. Burton W.M.C. Brown Publishers, Dubuque, Lawa, 1989.
2. Number Theory, George Andrews, Courier Dover Publications,1994.
3. Fundamentals of Number Theory, William J. Leveque Addison-Wesley Publishing Company, Phillipines, 1977.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Microbiology Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Fundamentals of Biological Sciences	6	4	3	25	75	100
	Core Course – II (CC)	General Microbiology	6	4	3	25	75	100
	Core Course – III (CC)	Virology	5	4	3	25	75	100
	Core Course – IV (CC)	General Biochemistry	5	4	3	25	75	100
	Core Practical – I (CP)	Fundamentals of Biological Sciences, General Microbiology, Virology, General Biochemistry	8	4	3	40	60	100
		TOTAL	**30**	**20**				**500**
II	Core Course – V (CC)	Microbial Physiology	6	5	3	25	75	100
	Core Course – VI (CC)	Environmental and Agricultural Microbiology	6	5	3	25	75	100
	Core Practical – II (CP)	Microbial Physiology, Environmental and Agricultural Microbiology	8	4	3	40	60	100
	Elective Course – I (EC)	Any one from the list	5	5	3	25	75	100
	Elective Course – II (EC)	Any one from the list	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
III	Core Course – VII (CC)	Molecular Biology and Microbial Genetics	6	5	3	25	75	100
	Core Course – VIII (CC)	Immunology	6	5	3	25	75	100
	Core Practical – III (CP)	Molecular Biology and Microbial Genetics, Immunology	8	4	3	40	60	100
	Elective Course – III (EC)	Any one from the list	5	5	3	25	75	100
	Elective Course – IV (EC)	Any one from the list	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – IX (CC)	Medical Microbiology	5	5	3	25	75	100
	Core Course – X (CC)	Bioprocess Technology	5	5	3	25	75	100
	Core Practical - IV (CP)	Medical Microbiology and Bioprocess Technology	8	4	3	40	60	100
	Elective Course – V (EC)	Any one from the list	5	4	3	25	75	100
	Project		7	4	-	-	-	100
		TOTAL	**30**	**22**				**500**
		GRAND TOTAL	**120**	**90**				**2000**

Note:

Project : 100 Marks
Dissertation : 80 Marks
Viva Voice : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

Note:

1. Theory	**Internal**	**25 marks**	**External**	**75 marks**
2. Practical	**"**	**40 marks**	**"**	**60 marks**

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate.

Reference/Text Books contain the following details:

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

S.No	Semester	Elective papers (Any one from the list)
1.	II	Biological Techniques
2.	II	Food and Dairy Microbiology
3.	II	Molecular Taxonomy and Phylogeny
4.	II	Quality control and IPR
5.	III	Medical Laboratory Technology
6.	III	Marine Microbiology
7.	III	Bioinformatics and Biostatistics
8.	IV	Genetic Engineering
9.	IV	Microbial Biotechnology
10.	IV	Microbial Nanotechnology

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CORE COURSE I

FUNDAMENTALS OF BIOLOGICAL SCIENCES

OBJECTIVE

To enable the students to understand the basic knowledge in Biological Sciences

Unit I Algae and Fungi

Thallophytes: Algae-General characteristics- Economic importance- Types of life cycle- Outline of various classifications. Fungi: General characteristics- Classifications and Economic importance

Unit II Plant reproduction

General characteristics- Economic importance and outline of reproduction methods in Bryophytes, Pteridophytes and Gymnosperms.

Unit III Plants

Basics of plant cell – Monocot and dicot - Classification of plant diversity – Classes of plant kingdom- Morphology: Inflorescence types -Racemose, cymose, and Mixed –Special types, Cyathium, Hypanthodium, Verticillaster and Thyrsus. Technical description of flower and floral diagram- Microsporangium and structure of *Polygonum* type embryo sac- Taxonomy: Systems of classification, (Artificial, Phylogenetic and Natural). Outline of Bentham and Hooker's classification.

Unit IV Invertebrates

General characteristics and outline classification upto classes in Protozoa, Porifera, Coelenterata, Platyhelminthes and Ashelminthes; Economoic importance of invertebrates. Classification of Chordata – Characteristic features - protochordata class – Pisces and Amphibia up to orders - General characters - a brief study on Star fish.

Unit V Vertebrates and pests control

Salient features of Reptilia, Aves and Mammalia- Economic importance of Vertebrates. Bioluminescence. Insect pests of rice, sugarcane, coconut, cotton, vegetables, fruits and stored products (with an example of each). Principles of insect control: physical, mechanical, chemical, biological and integrated methods of pest control.

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CORE COURSE II

GENERAL MICROBIOLOGY

OBJECTIVE

To enable the students to understand the basic knowledge in Microbiology

Unit I Ultra structure and function

Bacteria: Morphological types; cell wall – cell walls of Gram negative, Gram positive, halophiles. L-forms and Archaebacteria, Cell wall synthesis, cell membrane, capsule type's composition and function. Structure and function of flagella, fimbriae and pili, gas vesicles, chlorosomes, carboxysomes, magnetosomes and phycobilisomes. Reserve food materials - polyhydroxybutyrate, polyphosphates, cyanophycin and sulphur inclusions. Nuclear material - bacterial chromosomes and bacterial plasmids.

Unit II Microbial Classification

Microbial Taxonomy - Definition and systematics, Nomenclature and identification. Haeckel's three kingdom classification, Whittaker's five kingdom approach. Three domain classification; Taxon, species, strain, type culture; Major characteristics used in taxonomy – morphological, physiological, metabolic, serological and molecular. Phylogenetic relationships – Cladogram, Dendrogram; Classification and salient features of bacteria according to Bergey's Manual of Determinative Bacteriology (9th edition).

Unit III Fungi and Viruses

Fungi: Classification of fungi based on Alexopoulos system. - characteristics of Fungi – Filamentous, non-filamentous and dimorphic fungi -Morphology, structure and life cycle of *Aspergillus niger* and *Saccharomyces cerevisiae.* Parasitism, mutualism and symbiosis with plants and animals. Industrial uses of yeast and moulds. Viruses: ICTV system of classification, General properties, Morphology and ultra-structure of virus - capsid and their arrangements, types of envelopes and their composition, viral genome (RNA, DNA); Viroids, Prions - structure and importance.

Unit IV Algae and Protozoans

Classification of Algae based on Fritsch system – General characters of Blue-green Algae (Cyanobacteria) Macroalgae - Biological and Economic importance of algae. Protozoa –structural characteristics, classification and reproduction.

Unit V Cultivation methods of microbes

Isolation of different types of bacteria - Fungi – Actinomycetes - Cyanobacteria - Protozoa. Physical and Chemical requirements for growth; Pure culture methods. Anaerobic culture techniques. Preservation methods of microbes. Type culture collections. Physical and chemical methods of controlling microorganisms.

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CORE COURSE III

VIROLOGY

OBJECTIVE

The course is designed to develop the student with enough knowledge about general account of viruses, bacteriophages, plant, animal and human viral diseases. To train up the student in gaining knowledge about instrumentation relevant to virology

Unit I General Virology

Terminologies , Discovery, nomenclature, classification and properties of viruses, Morphology and ultra structure – capsid and their arrangement, envelope - types and their composition, viral genome – types and structure. Sub viral agents- viroids, prions, virusoids and satellite viruses.

Unit II General Methods of Diagnosis and Serology

Characterization and Cultivation of viruses- Embryonated eggs, Primary and secondary cell cultures, monolayer cell cultures- cell strains, cell lines and transgenic system. Serological methods- haemagglutination, haemagglutination inhibition, complement fixation, immunofluorescence, ELISA, RIA and assay of viruses.

Unit III Microbial Viruses

Bacteriophages- one step growth curve, Life cycle- Lytic and Lysogenic, Classification, Morphological groups - virulent dsDNA phage, ssDNA phage, phage lambda, Temperate and Transposable phage, Phage Mu, M13, T4, P1, Bacteriophage typing, Phage therapy (bacteriophage therapy), Cyanophages, Mycoviruses (Mycophages), Rhizobiophages.

Unit IV Animal and Human Viruses

Classification, Multiplication, Epidemiology, Pathogenesis, Diagnosis, Prevention and Treatment of animal viruses- DNA containing viruses- Papovavirus, Simian Virus – 40 (SV40), Adenoviruses, Herpes viruses, Pox viruses. RNA containing viruses- Picornavirus, Togaviruses (Arboviruses), Rhabdoviruses, Orthomyxoviruses, Reoviridae, Retroviridae, Human Immuno Deficiency virus (HIV), SARS, Influenza viruses and Emerging viruses. Viral Vaccines, Interferon and Antiviral drugs.

Unit V Plant Viruses

History, Classification and nomenclature of plant viruses, Transmission, Multiplication, symptoms and control of plant viral diseases- Tobamo virus group, Potex virus, Poty virus, Tymo virus, Tomato spotted wilt, Cauliflower mosaic virus, Potato leaf roll virus, Rice tungro virus, Mosaic disease of sugarcane.

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CORE COURSE IV

GENERAL BIOCHEMISTRY

OBJECTIVES

To provide basic understanding of Cell and its function, chemical nature of biological macromolecules, metabolism and mechanism of molecular recognition including control.

Unit I Cell and its function

Composition of living matter. Biochemistry of bacterial, animal and plant cell. Specialized components of microorganisms and their structure and function.

Unit II Enzymes

Enzymes as biocatalysts, enzyme classification, specificity, active site, unit activity, isozymes. Enzyme kinetics: Michaelis – Menton equation for simple enzymes. Enzyme inhibition.

Unit III Types of macromolecules and their biosynthesis

Structural features and chemistry of macromolecules. Nucleic acid – properties, biosynthesis of purines and pyrimidines - Structure of DNA and RNA. Proteins – classification – aminoacids - primary-secondary-tertiary – quaternary and three dimensional structure of proteins. Carbohydrates - mono, di, oligo and polysaccharides. Lipids and biomolecules: Fatty acids, properties, -oxidation - biosynthesis of cholesterol.

Unit IV Bioenergetics

Bioenergetics and strategy of metabolism - flow of energy through biosphere, strategy of energy production in the cell. Oxidation – reduction reactions, coupled reactions and group transfer. ATP production, structural features of biomembranes, transport, free energy and spontaneity of reaction, G, G°, G' and equilibrium. Basic concepts of acids, base, pH and buffers.

Unit V Metabolism – basic Concepts

Cell metabolism - catabolic principles and break down of carbohydrates, lipids, proteins and nucleic acids - vitamins and their role as coenzymes.

REFERENCES

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CORE PRACTICAL I

FUNDAMENTALS OF BIOLOGICAL SCIENCES, GENERAL MICROBIOLOGY, VIROLOGY, GENERAL BIOCHEMISTRY (P)

Fundamentals of Biological Sciences

- Stem and root sections of a monocot and a dicot plant
- Demonstration of computer program- Vertebrate Dissection Guides: The Frog.

General Microbiology

- Principles and methods of sterilization
- Direct microscopic observations of bacterial shape- cocci, rods and chains; fungal spore- mycelium, yeast budding
- Preparation of media: Nutrient broth, Nutrient agar, plates, slants and soft agar
- Micrometry - counting and measurements
- Pure techniques - serial dilution - pour plate, spread plate, streak plate methods and stab culture techniques
- Bacterial Staining methods - simple, Gram's, acid fast, flagella, capsule and spore.
- Fungal Staining methods - Lacto-phenol cotton blue
- Motility of bacteria
- Enumeration of bacteria/ yeast cell; viable count (plate count) , total count (Haemocytometer)
- Isolation and purification of cyanobacteria, actinomycetes and fungi

Virology

- Isolation and characterization of bacteriophage and cyanophage from natural resources
- Phage titration – T4 phage
- Study of virus infected plant samples- animal tissue culture- chick embryo fibroblast culture preparation
- Transmission methods – mechanical

General Biochemistry

- Preparation of buffer (Tris, phosphate, acetate buffer)
- Determination of (H+)ion concentration
- Verification of Beer-Lambert's law using coloured solution
- Preparation of standard graph for the following and estimating the concentration in a microbial sample i) glucose –anthrone method, ii) bovine

serum albumin (Lowry's method) and iii) Nucleic acid – DNA (diphenylamine method), RNA (Orcinol method).

- Separation of aminoacids by paper chromatography and identification of aminoacid
- Separation of proteins by PAGE, SDS – PAGE – Demonstration.

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1. James G Cappuccino and Natalie Sherman. Microbiology. 10th edition, The Benjamin/Cummings pub.co. California. 1996.
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CORE COURSE V

MICROBIAL PHYSIOLOGY

OBJECTIVES

To understand the growth, enzymology and physiological processes of microbes

Unit I Cell structure and function

Bacterial cell wall - Biosynthesis of peptidoglycan - outer membrane, teichoic acid – Exopolysaccharides; cytoplasmic membrane, pili, fimbriae, S-layer. Transport mechanisms – active, passive, facilitated diffusions – uni, sym, antiports. Electron carriers – artificial electron donors – inhibitors – uncouplers – energy bond – phosphorylation.

Unit II Microbial growth

Bacterial growth - Phases of growth curve – measurement of growth – calculations of growth rate – generation time – synchronous growth – induction of synchronous growth, synchrony index – factors affecting growth – pH, temperature, substrate and osmotic condition. Survival at extreme environments – starvation – adaptative mechanisms in thermophilic, alkalophilic, osmophilic and psychrophilic.

Unit III Microbial pigments and photosynthesis

Autotrophs - cyanobacteria - photosynthetic bacteria and green algae – heterotrophs – bacteria, fungi, myxotrophs. Brief account of photosynthetic and accessory pigments – chlorophyll – fluorescence, phosphorescence - bacteriochlorophyll – rhodopsin – carotenoids – phycobiliproteins.

Unit IV Carbon assimilation

Carbohydrates – anabolism – autotrophy – oxygenic – anoxygenic photosynthesis – autotrophic generation of ATP; fixation of CO_2 – Calvin cycle (C3) – C4 pathways. Respiratory metabolism – Embden Mayer Hoff pathway – Entner Doudroff pathway – glyoxalate pathway – Krebs cycle – oxidative and substrate level phosphorylation – reverse TCA cycle – gluconeogenesis – Fermentation of carbohydrates – homo and heterolactic fermentations.

Unit V Spore structure and function

Cell division – endospore – structure – properties – germination. Microbial sporulation and morphogenesis – Bacteria including cyanobacteria and actinobacteria, fungi and algae.

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1. Caldwell DR. Microbial Physiology and metabolism, Wm. C. Brown Publishers, USA 1995.
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CORE COURSE VI

ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

OBJECTIVES

To enable the students to get exposure on various aspects of environmental and agricultural microbiology

Unit I Air microbiology and Biogeochemical cycles

Aerobiology- Significance of air microflora - Microbial air pollution- sources, biological indicators and effects on plants and human beings. Enumeration of bacteria from air, Air sampling devices, Outline of Airborne diseases (Bacterial, Fungal and Viral), Air sanitation. Biogeochemical cycles -Nitrogen, Carbon, Phosphorous, Sulphur, Iron and their importance.

Unit II Aquatic microbiology

Microbes in marine and fresh water environment – eutrophication – Water pollution – sources and nature of pollutants in water – sewage – treatment of liquid waste – primary, secondary and tertiary treatment – water borne diseases – Assessment of water quality – BOD and COD. Solid waste treatment – saccarification and pyrolysis.

Unit III Recycling of Liquid and Solid wastes

Recycling of Liquid and Solid wastes-Composting-Biogas, Mushroom and SCP production from waste. Biodegradation of complex polymers (Cellulose, Hemicellulose, Lignin, Chitin and Pectin), Bioremediation (*In-situ, Ex-situ,* Intrinsic), Bioaugmentation and Biostimulation. Bioleaching (Copper and Uranium) -Xenobiotics degradation (Heavy metals). A brief note on panchakavya.

Unit IV Soil Microbiology

Microbial association with plants - Phyllosphere, Rhizosphere, Mycorrhizae, nitrogen fixing organism – symbiosis, asymbiosis, associate symbiosis – phosphate solubilizers – application of biofertilizers in agriculture. Biology of nitrogen fixation – genes and regulations in *Rhizobium.*

Unit V Plant diseases and its control

Bacterial, viral and fungal plant pathogens. Morphological, physiological changes with reference to disease establishment in plants – plant protection – phenolics – phytoalexins and related compounds. Disadvantages of chemical pesticides. Microbial pesticides- types, mechanisms, advantages and limitations.

REFERENCES

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CORE PRACTICAL II

MICROBIAL PHYSIOLOGY, ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY (P)

Microbial Physiology

- Bacterial growth curve – Turbidity method
- Effect of temperature, pH and salinity on bacterial growth
- Starch, casein, gelatin and lipid hydrolysis tests
- Biochemical tests: IMViC, TSI, Urease, Catalase, Oxidase, Hydrogen sulphide, coagulase, nitrate reduction tests
- Carbohydrate fermentation test

Environmental and Agricultural Microbiology

- Enumeration of Microbial population from rhizosphere and Non-rhizosphere soil
- Localization of Arbuscular Mycorrhizae (AM)
- Isolation of *Azospirillum* and *Azotobacter* from soil
- Isolation of *Rhizobium* sp. from root nodules of legumes
- Isolation of phosphate solubilizing bacteria from soil
- Isolation of Cyanobacteria from agricultural soil and water
- Isolation of bacterial and fungal pathogens from plants
- Isolation and identification of air-borne microbes using Andersen sampler.
- Determination of BOD and COD of polluted and pond water.
- Assessment of water quality by MPN technique
- Demonstration of the plant diseases: a) Tobacco mosaic; b) Bacterial blight of paddy; c)Downy mildew of bajra; d) Powdery mildew of cucurbits; e) Head smut of sorghum; f)Red rot of sugar cane.

REFERENCES

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ELECTIVE COURSE

BIOLOGICAL TECHNIQUES

OBJECTIVES

To educate the students with the basic principles of biological techniques so as to develop their research aptitude and career prospects.

Unit I Microscopic techniques

Components of microscopes - Basic principles and methods of Bright field, Dark field, Phase contrast, Fluorescence, Polarization and confocal microscopes. Electron Microscopy – Principle, Techniques and applications of Transmission Electron microscope (TEM), Scanning Electron Microscope (SEM) and Atomic Force Microscope (AFM). Microtomy – Basic and Freezing microtome – specimen preparation.

Unit II Analytical Techniques Spectroscopic methods

UV- Visible, Atomic Absorption Spectrophotometer, Atomic Emission Spectroscopy. Centrifugation – Principle, types and applications. Electro-analytical methods- Potentiometric, Conductimetric, Coulometric and Voltametric analyses. Biosensors. Principles of radioactivity, GM and LS counter.

Unit III Chromatographic Techniques

Chromatography - Paper, Thin layer, Ion exchange, affinity and gel permeation - Principle, preparation of columns, adsorption and elution. GC, GC - MS and HPLC - principle and their applications.

Unit IV Electrophoresis and its Applications

Electrophoresis – Principle and applications of Agarose and Pulse field gel electrophoresis, counter current and rocket immuno electrophoresis, SDS-PAGE and 2D gel electrophoresis.

Unit V Molecular Techniques

Isolation and quantification of nucleic acid – DNA, RNA and Plasmids. Amplification of DNA - Polymerase chain reaction and Real time and reverse transcriptase PCR. Gene cloning techniques – Restriction digestion and phosphatase treatment of cloning vectors. Gene transfer mechanisms – chemical and electroporation. Method of detection of clones –colony hybridization, Blue - White selection and immunochemical detection

REFERENCES

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ELECTIVE COURSE

FOOD AND DAIRY MICROBIOLOGY

OBJECTIVES

To make the students to learn about microbial illness in foods and importance of microbial fermented foods.

Unit I Food and microbes

Types of microorganisms in food – Bacteria, molds, yeast and protozoa. Source of contamination- Factors influencing microbial growth in food.

Unit II Food fermentation

Food fermentations: methods of fermentations and organisms used -Cheese, bread, wine, beer. Fermented vegetables. Food and enzymes from microorganisms - single cell protein and mushrooms. Prebiotics, Probiotics and synbiotics. Advantages of probiotics.

Unit III Fermented food products

Contamination, spoilage and preservation of cereals and cereals products, sugar and sugar products, vegetables, fruits, meat and meat products, Fish and other sea foods, egg and poultry, dairy and fermentative products (ice cream).

Unit IV Food preservation method

Food preservations: principles- methods of preservations- Physical and chemical methods. Canning: classification of can, structure of cans, canning of food items, Thermal process time calculations for canned foods.

Unit V Food borne diseases and control

Food borne diseases and food poisoning. General principles underlying food spoilage and contamination – *Staphylococcus, Clostridium, Escherichia coli* and *Salmonella* infections, Hepatitis, Amoebiosis and Mycotoxins. Spoilage in canned foods. Food sanitation and control measures, HACCP, GMP, GLP.

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ELECTIVE COURSE

MOLECULAR TAXONOMY AND PHYLOGENY

OBJECTIVES

To gain knowledge about microbial taxonomy and molecular phylogeny

Unit I Microbial Taxonomy

Introduction to microbial taxonomy – morphological, biochemical and molecular taxonomy. Basic concepts of numerical taxonomy. Positive and negative aspects of each taxonomical methods. Morphological phylogeny.

UNIT II Biochemical and molecular taxonomy

Chemotaxonomy - fatty acid, protein finger printing, Isozyme typing, pigments andpolyamines. Biochemical phylogeny. Molecular taxonomy - G +C content, DNA –DNA hybridization, Plasmid profiles, RFLP, RAPD, STRR and LTRR, REP –PCR, rRNA based DNA finger printing methods

Unit III 16S rRNA based finger printing

Types of rRNA - 23s rRNA, 16S rRNA and 5S rRNA. Isolation of DNA, amplification of 16S rDNA using PCR technique. Sequencing of 23s rRNA, 16S rRNA and 5S rRNA. Importance of 16S rRNA in identification of prokaryotes. Methods of 16S rRNA / rDNA fingerprinting.

UNIT IV Sequence analysis

Submission of rDNA sequences in GenBank – Bankit and Sequin guidelines. NCBI, EMBL and DDBJ – retrieving sequences. RNA structure prediction, Restriction enzyme patterns. Ribosomal Database Project - Designing primers and probes. Sequence comparison, alignment and data base searching – ClastalW, FASTA and BLAST. DNA barcoding.

UNIT V Molecular phylogeny

Introduction to Molecular phylogeny – tree terminology, software programs for making phylogenetic trees – MEGA, Phylib, RAPDistance. Cladogram, additive trees and ultrametric trees, rooted, unrooted trees and tree shapes.

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ELECTIVE COURSE

QUALITY CONTROL AND IPR

OBJECTIVES

To gain knowledge about intellectual property rights, copyrights, trademarks and geographical limitation. Explain various concepts of biotechnological inventions and their commercialisation. Ethics of biological Goods manufacturing practice, usage of animals, plants and their biosafety assessment.

Unit I Bioethics

Legality, Morality and Ethics, the principles of bioethics, autonomy, human rights, beneficience, privacy, justice and equality.

Unit II Biosafety

Concept and issues, rational vs subjective, perceptions of risk and benefits of Biosafety. Biosafety concern levels – Individual, institution, society, region, country and world- Lab associated Infections.

Unit III Biosafety Assessment (BSA)

BSA of biotechnology and pharmaceutical products such as drugs, vaccines and biomolecules.

Unit IV Quality Control

Quality control in food process technology- WHO Standards- Quality Control in Dairy product technology- Quality control in portable water.

Unit V IPR

GATT and IPR, IPR in India, WTO Act, Convention on Biodiversity (CBD), patent cooperation treaty (PCT), forms of patents and patentability, process of patenting, Indian and international agencies involved in IPR and patenting, Global scenario of patents and India's position, patenting of biological material, GLP and GMP.

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CORE COURSE VII

MOLECULAR BIOLOGY AND MICROBIAL GENETICS

OBJECTIVES

In addition to the most essential fundamentals of the subject, the paper aims to impart the current updated knowledge on molecular genetics of prokaryotes. It also endeavours to provide the required fundamental details on eukaryotic molecular genetics.

Unit I Genetic material, DNA replication and repair

Identification of genetic material (Griffith, Avery and Hershey and Chase experiments). Organization of genetic material: Bacteria – Eukaryotes: nucleus and nucleosomes, lamp brush and giant chromosomes. DNA replication - Meselson – Stahl experiment, Molecular mechanisms of DNA Replication – bidirectional and rolling circle replication. Differences between prokaryotic and eukaryotic replication. Plasmids – types, structure and replication. Inhibitors of DNA replication - DNA repair – mechanism of excision repair, SOS repair and mismatch repair.

Unit II Transcription and translation

Process of transcription – initiation, elongation – termination. Synthesis of mRNA in prokaryotes and eukaryotes. RNA splicing. Synthesis of rRNA and tRNA. RNA processing – capping and polyadenylation. Inhibitors of transcription. Genetic code, process of translation – initiation, elongation and termination. Signal sequences and protein transport. Inhibitors of translation.

Unit III Regulation of gene expression

Organization of Genes in Prokaryotes and Eukaryotes - Introduction - Operon concept, *lac*, *trp,* arabinose operons, promoters and repressors. Regulation of gene expression – Transcriptional control – promoters, terminators, attenuators and anti terminators; Induction and repression; Translational control – ribosome binding, codon usage, antisense RNA; post-transcriptional gene silencing – RNAi.

Unit IV Gene transfer and genetic recombination mechanisms

Transformation – competence cells, regulation, general process; Transduction – general and specialized; Conjugation – Discovery, mechanism of F^+ *v/s* F^-, Hfr^+ *v/s* F^-, F' *v/s* F^-, triparental mating, self transmissible and mobilizable plasmids, pili. Linkage and genetic maps – genetic mapping of T4 phage. C-value paradox. Hardy Weinberg Equilibrium.

Unit V Mutation and transposable elements

Types and molecular basis of mutation– Agents of mutation - Importance of mutations in evolution of species. Discovery of insertion sequences, complex and compound transposons – T10, T5, and retroposon – Nomenclature-Insertion sequences – Mechanism – Transposons of *E. coli*, Bacteriophage and Yeast. Importance of transposable elements in horizontal transfer of genes and evolution.

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CORE COURSE VIII

IMMUNOLOGY

OBJECTIVES

The aim of the course is to teach the types of immunity, immune system, antigen, antigen - antibody reaction, T and B cell activation, lymphokines and cytokines, hyper sensitivity reaction, immune deficiency disorders, immunohematology and transplantation of immunity.

Unit I Immune system

History of Immunology, Types of immunity- innate and acquired. Humoral and cell mediated immunity. Central and peripheral lymphoid organs- Thymus, bone marrow, spleen, lymph nodes and other peripheral lymphoid tissues GALT. Haematopoiesis, Cells of the immune system- lymphocytes, mononuclear phagocytes- dendritic cells, granulocytes. NK cells and mast cells, cytokines.

Unit II T and B cell, Antigen –antibody reactions

T and B-cell receptors, Antigen recognition- processing and presentation to T-cells. Interaction of T and B cells. Antigen and antibody – properties, types and functions. Antigen –antibody reactions - Precipitation, agglutination, complement fixation, RIA, ELISA, Western blotting and immunofluorescence.

Unit III T and B cell activation

B cell receptor complex, B cell maturation, antibody diversity, understanding self – non self discrimination, T_H cell subpopulation, organization of T cell receptor, cell mediated effectors responses. Complement system: Basics of complement protein - different pathways of complement activation - classical and alternative.

Unit IV MHC, Cytokines and Lymphokines

Structure of MHC molecules- Human Leucocyte Antigen- Functions of MHC. Cytokine and lymphokines structure and their receptors. Hypersensitivity reaction and their types. Auto immune disorders, transplantation and cancer immunology.

Unit V Immunotechnology and its applications

Production of polyclonal, monoclonal antibodies and phage display - techniques and applications. Immunization practices- active and passive

immunization. Vaccines- killed and attenuated, recombinant vaccines, DNA and peptide vaccines. Applications of immunotechniques – Flow cytometry, Immunoelectron microscopy, Immunohistochemistry and Bioplex array.

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CORE PRACTICAL III

MOLECULAR BIOLOGY AND MICROBIAL GENETICS, IMMUNOLOGY (P)

Microbial Genetics and Molecular Biology

- Isolation of antibiotic resistant microbes
- Isolation of mutants by spontaneous mutation – Gradient plate technique
- Isolation of auxotrophic and antibiotic resistant mutants by physical and chemical mutagens
- Competent cell preparation and Bacterial transformation
- Generalized transduction in *E. coli*.
- Isolation of microbial genomic DNA
- Isolation of plasmids from *E.coli* (mini preparation).
- Characterization of plasmid DNA by agarose gel electrophoresis.
- Restriction digestion and Ligation of DNA
- Polymerase Chain Reaction
- Blotting techniques (Southern, Northern, Western and Dot blottings)

Immunology

- Collection of venous blood from human and separation, preservation and storage of serum/plasma
- Identification and enumeration of RBC, WBC and total cell count.
- Estimation of Haemoglobulin content
- Agglutination reactions - blood grouping and WIDAL (slide and tube tests)
- Immunoelectrophoresis – Graber and William's technique.
- Counter- current immuno electrophoresis
- Précipitation reaction – Ouchterlony's Double Immuno Diffusion technique.
- Serum electrophoresis
- Enzyme Linked Immunosorbent Assay (ELISA)
- Handling of Laboratory animals and raising antibodies.
- Dissection of primary and secondary lymphoid organs in a selected laboratory animal

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ELECTIVE COURSE

MEDICAL LABORATORY TECHNOLOGY

OBJECTIVES

- To train students to work as laboratory technicians and assist pathologist.
- To encourage and prepare the graduates to improve their standard in medical sectors.

UNIT I Laboratory

Professional conduct, code of behaviour, staff health, safety and immunization, Reception, Labeling and Disposal of specimen and culture. Laboratory hazards and safety, First aid, Quality control in laboratory works.

UNIT II Clinical pathology

Urine analysis: Physical, chemical and microscopic examination, specific gravity, Test for albumin, acetone, bile salt and pigments, phosphate, urobilinogen, occult blood and urine deposits. Stool and Sputum analysis: Physical, chemical and microscopic examination (protozoa, helminthes). Examination of body fluids-CS, acidic and plural, hydatid fluids.

UNIT III Hematology

Anaemia - definition, types and investigation. Enumeration and investigation of RBCs, WBCs and Platelets. Blood coagulation and disorder, ESR determination.

UNIT IV Blood banking and Serology

Blood and Rh grouping, blood and plasma collection, screening and storage, safe transfusion of blood cross matching, Quality control, blood donation program, donor motivation and screening. Serology - WIDAL, RPR and ELISA tests.

UNIT V Clinical Microbiology and Biochemistry

Isolation and identification of microbes from clinical specimens - typhoid and bacillary dysentery, Antibiotic sensitivity test. Estimation of sugar from blood and urine. GCT. Estimation of Proteins and Cholesterol from blood.

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ELECTIVE COURSE

MARINE MICROBIOLOGY

OBJECTIVES

This subject aims to introduce the students to understand microbial diversity, significance, dynamics of marine environment, Marine food borne pathogens, and marine microbial products.

Unit I Marine Microbial Habitats and Diversity

Marine environment–properties of seawater , chemical and physical factors of marine environment-Ecology of coastal, shallow and deep sea microorganism **-** significance of marine microflora. Diversity of microorganism - Archaea**,** bacteria, actinobacteria, cyanobacteria, algae, fungi, viruses and protozoa in the mangroves and coral environments - Microbial endosymbionts – epiphytes - coral-microbial association, sponge-microbial association.

Unit II Cultivation of Marine microbes and Nutrient cycling.

Methods of studying marine microorganisms- sample collection- isolation and identification: Cultural, Morphological, physiological, biochemical and Molecular characteristics- Preservation methods of marine microbes. Role of microorganisms in carbon, nitrogen, phosphorous and sulphur cycles in the sea under different environments and mangroves.

Unit III Marine extremophiles and Bioremediation

Survival at extreme environments – starvation – adaptive mechanisms in thermophilic, alkalophilic, osmophilic and barophilic, psychrophilic microorganisms – hyperthermophiles, halophiles and their importance. Microbial consortia and genetically engineered microbes in bioremediation of polluted marine sites - heavy metals and crude oil. Biofouling and their control.

Unit IV Seafood microbiology

Pathogenic microorganisms, distribution, indicator organisms, prevention and control of water pollution, quality standards, International and National standards. Microbiology of processed finfish and shellfish products. Rapid diagnosis of contamination in seafoods and aquaculture products.

Unit V Marine microbial products

Marine microbial products – Carrageenan, agar-agar, sea weed fertilizers – Astaxanthin, β carotene – enzyme – antibiotics – antitumour agents-

polysaccharide – biosurfactants and pigments. Preservation methods of sea foods. Quality control and regulations for microbial quality of fishes, shellfish and Marine living resources used for food and drugs

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ELECTIVE COURSE

BIOINFORMATICS AND BIOSTATISTICS

OBJECTIVE

- To gain insight about computer based technology for the study of biological molecules.
- To equip statistical skills to solve biological problems.

Unit I Biology and computer

Basics of computers –types, servers, operating systems, UNIX, Linux. Finding scientific articles - Pubmed.

Unit II Genomics

Biological databases NCBI, EMBL, DDBJ – sequencing genomes - pairwise sequence comparison - BLAST and FASTA. Multiple sequence alignments, Phylogenetic alignment - Phylip.

Unit III Proteomics

Protein Data Bank, Swiss- prot – PIR, SCOP, CATH - secondary structure prediction – Chou Fassman, GOR method -predicting 3 D structure - protein modeling, abinitio - visualization tool RASMOL.

Unit IV Biostatistics I

Introduction – Population and sample – Variables – Collection and presentation of data – Descriptive statistics - Measures of Central tendency – Mean (arithmetic, harmonic and geometric) Median and Mode – Measures of dispersion – range, mean deviation, variance and standard deviation.

Unit V Biostatistics II

Inferential statistics – Probability and distributions – Poisson, Binomial and Normal distribution – Chi-square test – Hypothesis test - Student's t-test – Correlation and Regression – ANOVA.

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CORE COURSE IX

MEDICAL MICROBIOLOGY

OBJECTIVES

To impart and explain the students with the advanced knowledge on the characteristics of medically important human microbial pathogens with focus on the diseases caused by them, disease pathogenesis, lab diagnosis, prophylaxis, control etc.

UNIT I Introduction to Medical Microbiology

Significance of Microbiology in Medicine, Classification of medically important microbes, Normal microbial flora of the human body: normal flora of skin, eye, throat, gastrointestinal tract and urogenital tract - Infections- Sources, types – opportunistic, nosocomial and community acquired infections - Mode of transmission, carriers and their types – investigation of epidemic diseases.

Unit II Medical Bacteriology

Morphological, cultural and biochemical characteristics of and epidemiology, mechanism of bacterial pathogenesis, lab diagnosis, prophylaxis and control of medically important diseases caused by*: Staphylococcus aureus,* Group A Streptococci, *Corynebacterium diphtheriae, Clostridium tetani, Bacillus anthracis, Leptospira interrogans, Treponema pallidum, Mycobacterium tuberculosis, Escherichia coli, Vibrio cholerae, Niesserriae, Haemophilus influenza, Helicobacter pylori, Pseudomonas* and *Salmonella.* Brief note on Chlamydia, Rickettsia Mycoplasama, anaerobic bacterial infections, Atypical Mycobacterium, Zoonotic bacterial pathogens, Antibiotic susceptibility test: Kirby – Bauer disk diffusion method.

Unit III Medical Mycology

Morphological and cultural characteristics of and epidemiology, mechanism of fungal pathogenesis, lab diagnosis and treatment of medically important diseases caused by*:* Superficial mycosis – *Tinea versicolor*. Cutaneous mycoses: *Microsporum*, *Trichophyton*, *Epidermophyton*. Subcutaneous mycoses: Sporotrichosis, Chromoblastomycosis, Zygomycosis. Systemic Mycoses – *Histoplasma capsulatum*, *Blastomyces dermatitidis*, *Cryptococcus neoformans*, *Coccidioides immitis*, *Paracoccidioides brasiliensis*. Opportunistic mycoses: Candidiasis, Cryptococcosis and Aspergillosis. Antifungal susceptibility testing.

Unit IV Medical Virology

General properties of and epidemiology, pathogenesis, lab diagnosis and treatment of medically important viral diseases caused by: Influenza viruses, Measles, Mumps, Rubella, Chicken Pox, Hepatitis A,B,C, Dand E, Poliomyelitis, HIV, Human Papilloma Virus, Rabies, Yellow fever, Dengue and Japanese Encephalitis viruses. Brief note on oncogenic viruses.

Unit V Medical Parasitology and emergence of antibiotic resistant pathogens

Morphology of, and pathogenesis, laboratory diagnosis and treatment of medically important protozoan diseases caused by: *Entomoeba histolytica, Giardia lamblia, Trichmonas vaginalis, Plasmodium vivax*, *Leishmania donovani*, *Taenia solium, Ascaris lumbricoides, Ancyclostoma duodenale* and *Wuchereria bancrofti.* Brief note on the emergence of MDR bacterial, fungal pathogens, extremely drug resistant (XDR) pathogens and superbugs.

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CORE COURSE X

BIOPROCESS TECHNOLOGY

OBJECTIVES

To learn the process involved in the industrial production of microbial products. Understand the strategies of strain selection and improvement. Understand the process of fermentation. Familiarize with types of fermentors and downstream processing. To learn the role of microbes in food preparation, preservation and spoilage. To understand the quality of food and products.

Unit I Industrially important microbes and their improvement

Screening methods for industrial microbes – detection and assay of fermentation products– classification of fermentation types – strain selection and improvement. Mutation and recombinant DNA techniques for strain improvement. Preservation of cultures after strain improvement.

Unit II Fermenter – types and function

Fermenters – Basic functions, design and components – asepsis and containment requirements – body construction and temperature control – aeration and agitation systems – sterilization of fermenter, air supply, and medium; aseptic inoculation methods – sampling methods, valve systems – a brief idea on monitoring and control devices and types of fermenters. Photobioreactors.

Unit III Fermentation process

Growth of cultures in the fermenter. Importance of media in fermentation, media formulation and modification. Kinetics of growth in batch and continuous culture, specific growth rate, steady state in a chemostat, fed-batch fermentation, yield of biomass, product, calculation for productivity, substrate utilization kinetics. Fermentation process: Inoculum development. Storage of cultures for repeated fermentations, scaling up of process from shake flask to industrial fermentation.

Unit IV Food microbiology

Microbiology of fermented milk – starter cultures, butter milk, cream, yoghurt, kafir, kumiss, acidophilus milk and cheese. Microbes as sources of food (*Spirulina*, *Saccharomyces cerviceae*, *Rhizopus* sp.). Food intoxications: *Staphylococcus aureus*, *Clostridium botulinum* and mycotoxins; Food infections: *Bacillus cereus*, *Vibrio parahaemolyticus*, *Escherichia coli*, Salmonellosis, Shigellosis and *Campylobacter jejuni* – spoilage of canned foods – Detection of

spoilage and characterization. Food sanitation in food manufacture and in the retail trade; Food control agencies and their regulations.

Unit V Legal protection and IPR

GATT and IPR, forms of IPR, IPR in India, WTO, TRIPS Convention on Biodiversity (CBD), Patent Co-operation Treaty (PCT), forms of patents and patentability, process of patenting, Indian and international agencies involved in IPR and patenting, Global scenario of patents and India's position, patenting of biological materials.

REFERENCES

1. Adams MR and Moss MO. Food Microbiology. 1st edition. Reprinted, Published by New Age International (P) Limited. Publishers, New Delhi. 2005.
2. Agarwal AK and Pradeep Parihar. Industrial Microbiology. Published by Student Edition, Behind Nasrani Cinema, Chopasani Road, Jodhpur. 2006.
3. Banwart GJ. Basic Food Microbiology. 2nd edition, CBS Publishers and Distributors, New Delhi. 2004.
4. Casida LE Jr. Industrial Microbiology, 5th edition, Wiley Eastern Ltd., New Delhi. 1993.
5. Crueger W and Crueger A. Biotechnology: A Test Book of Industrial Microbiology, 2nd edition, Panima Publishing corporation, New Delhi. 2000.
6. Frazier WC and Westhoff DC. Food Microbiology 4th edition, Tata McGraw – Hill Publishing Company Limited – New Delhi. 1997.
7. Kalaichelvan PT and Arul Pandi. Bioprocess Technology, MJP Publishers, Chennai .2007.
8. Patel AH. Industrial Microbiology. Published by Macmillan India Ltd., New Delhi. 2005.
9. Peppler HJ and Perlman D. Microbial Technology – Fermentation Technology. 2nd edition, Published by Academic Press (An imprint of Elsevier). Volume I and II. 2004.
10. Sivakumar PK, Joe MM and Sukesh K. An introduction to Industrial Microbiology. First edition, S. Chand and Company Ltd, New Delhi. 2010.
11. Stanbury PF, Whitaker A and Hall SJ. Principles of Fermentation Technology, 2nd edition, Aditya Book (p) Ltd., New Delhi. 1999.
12. Willey JM, Sherwood LM, and Woolverton CJ. Prescott's Microbiology. 9th edition. McGraw Hill Higher Education. 2013.

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CORE PRACTICAL IV

MEDICAL MICROBIOLOGY AND BIOPROCESS TECHNOLOGY (P)

MEDICAL MICROBIOLOGY

- Collection, coding and transport of clinical specimens for microbiological examinations
- Isolation and identification of upper respiratory tract bacterial pathogen – *Streptococcus pyogenes*
- Isolation and identification of *Staphylococcus aureus* from clinical specimen
- Isolation and identification of lower respiratory tract bacterial pathogen – *Pseudomonas aeuroginosa*
- Isolation and identification of gastrointestinal bacterial pathogens – *Salmonella, Shigella* and *Vibrio*
- Isolation and identification of urinary tract pathogens – *E. coli and Klebsiella pnemoniae*
- Isolation and identification of bacterial pathogen causing enteric fever – *Salmonella typhi, S. paratyphi* A and B
- Isolation and identification of clinically important yeast and molds - *Candida albicans, Cryptococcus neoformans, Fusarium spp. and Aspergillus spp.*
- Antibiotic susceptibility test – Disc diffusion method (Kirby –Bauer)
- Determination of MIC of any one antibiotic against any one bacterial species.
- Examination of blood smears for *Plasmodium spp.*
- Examination of faeces for parasites

BIOPROCESS TECHNOLOGY

Production, quantification, extraction and characterization of the following

- Alcohol - Wine
- Organic acid – Citric acid – Solid state and submerged fermentation.
- Amino acid– Glutamic acid.
- Extra cellular enzymes – Protease by submerged fermentation and Cellulase by solid state fermentation.

REFERENCES

1. Monica Cheesbrough. District Laboratory Practice in Tropical Countries - Part I and II 2nd edition. Cambridge University Press, New Delhi. 2006.
2. Rajan S. Manual for Medical Laboratory Technology. Anajanaa Book House, Chennai. 2012.
3. Betty A Forbes, Daniel F Sahm and Alice S Weissfeld. Bailey and Scott's Diagnostic Microbiology, Mosby Elsevier. 12th edition. 2007.
4. Mackie and McCartney. Practical Medical Microbiology, South Asia Edition. 14th edition. 2006.
5. Rajan S and Selvi Christy R. Experimental Procedures in Life Sciences. Anajanaa Book House, Chennai. 2011.

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ELECTIVE COURSE

GENETIC ENGINEERING

OBJECTIVES

To impart the learners with the advanced knowledge and growing significance of genetic and protein engineering/ DNA cloning. To educate the students with the advanced tools, techniques and methods employed in DNA/ gene cloning and expression as well as in protein engineering strategies.

UNIT I Introduction to gene cloning strategies

Gene cloning: Steps - Isolation and purification of nucleic acids (genomic DNA, RNA and Plasmids) – Methods of handling and quantification of DNA and RNA. Analyses of DNA/ RNA and proteins: Agarose Gel and SDS – PAGE - Blotting – types of blotting – Southern, Northern and Western Blotting. Chromosome walking.

UNIT II Tools and methods in gene cloning

Restriction endonucleases – nomenclature, classification and characteristics - DNA methylases – DNA polymerases - Ligases – Adapters, Linkers and Homopolymer tailing – Gene transfer techniques: electroporation, microinjection, protoplast fusion and microparticle bombardment – Screening for recombinants: Direct: Insertional inactivation, plaque phenotype and indirect methods: Immunochemical detection, nucleic acid hybridization, Dot and Colony Blotting. Methods of DNA cloning. Construction and applications of Genomic DNA and cDNA libraries.

UNIT III Gene cloning vectors for prokaryotes and eukaryotes

Cloning Vectors – properties - types of vectors – plasmids – host range and incompatibility – plasmids vectors for cloning in *E. coli* (pBR322 and derivatives, pUC vectors and pGEM3Z) - Vectors constructed based on bacteriophages (M13 and Lambda), cosmids, phasmids, phagemids and BACs - Eukaryotic vectors - Yeast vectors – animal and plant vectors – expression vectors: *E. coli lac* and T7 phage promoter based vectors - shuttle vectors - Expression of foreign genes in bacteria, animal, plant, algae and fungi – merits and demerits.

UNIT IV Techniques in genetic engineering

Characterization of cloned DNA: Restriction mapping - restriction fragment length polymorphism (RFLP) - Polymerase chain reaction (PCR) – Principles,

types and their applications. DNA sequencing: Primer walking, Chemical method: Maxam and Gilbert method, Sanger's method: traditional (dideoxy) and automated sequencing methods. Pyrosequencing – DNA chips and micro array.

UNIT V Protein engineering and techniques

Site directed mutagenesis – methods - Design and construction of novel proteins and enzymes, Basic concepts in enzyme engineering, engineering for kinetic properties of enzymes. protein folding, protein sequencing, protein crystallization. Data analysis - Mass spectrometry based methods for protein identification, MALDI-TOF, 2D gel electrophoresis – Applications of protein engineering: Examples of engineered proteins.

REFERENCES

1. Old RW and Primrose SB. Principles of gene manipulations – An introduction to genetic engineering, 5 ed. University of California Press, 1995.
2. Winnacker EL. From Genes to Clones. – Introduction to gene technology. Wiley-Blackwell. 1987.
3. Nicholl DST. An introduction to genetic engineering. Cambridge University Press.1994.
4. Brown TA. Gene Cloning. London; New York: Chapman and Hall.1995.
5. Pinler A. Genetic engineering of microorganisms. Protein Structure, Stability and Folding by Kenneth P. Murphy. Published by Humana Press Inc. 2001.
6. Jeffrey L, Cleland and Charles S Craik. Protein Engineering Principles and Practice Published by Wiley-Liss Inc. 1996.
7. Paul R Carey. Protein Engineering and Design, Published by Academic Press Inc. 1996.
8. Glick BR. Molecular Biotechnology – Principles and applications of recombinant DNA. 3rd edition, ASM Press, Washington, DC. 2003.
9. Old RW and Primrose SB. Principles of Gene Manipulation - An Introduction to Genetic Engineering. 5th edition. Blackwell Scientific Publications, London. 2003.
10. Winnacker EL. From Genes to Clones – Introduction to Gene Cloning, 1st edition. Indian reprint, Panima publishing Corporation, New Delhi. 2003.
11. Nicholl D. An introduction to genetic engineering. 3rd Cambridge University Press, Cambridge. 2008.
12. Brown TA. Genomes. 2nd Ed, John Wiley and sons. 2012.
13. Brown TA. Gene Cloning and DNA analysis introduction. 4th Ed. Blackwell Science Ltd., London. 2001.

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ELECTIVE COURSE

MICROBIAL BIOTECHNOLOGY

OBJECTIVES

To impart the potential applications of microbial and molecular biotechnology in medicine, agriculture and various other current industrial processes.

UNIT I Microbial production of therapeutic agents and vaccines

History – Microbial vs molecular biotechnology and Commercialization – concerns and consequences - Pharmaceuticals - interferons and growth hormones, enzymes: DNase I and alginate lyase, Monoclonal antibodies - HIV therapeutic agents. Subunit vaccines: Herpes simplex virus, Foot and mouth disease virus, TB, Peptide vaccines – genetic immunization – vector vaccines.

UNIT II Microbial production of commercial products

Microbial production of restriction endonucleases: *Pst*I, Dye: Indigo, Antibiotics: Synthesis of Novel antibiotics. Biopolymers: Xanthan gum and PHA. Microbial production of alcohol, lactic acid, streptomycin, L- glutamic acid, lipase and riboflavin.

UNIT III Production of PGPR, biofertilizers and biocontrol agents

Plant growth promoting bacteria (PGPR) – genetic engineering of nitrogenase gene cluster, hydrogenase and Nodulation. Mass cultivation of microbial biofertilizers: Cyanobacteria (*Sprirulina*), *Azolla* and other nitrogen fixers (*Rhizobia, Azospirillum, Azotobacter* and VAM) Biocontrol of pathogens: Siderophores, antibiotics and enzymes. Release of genetically engineered organisms - Ice nucleation and anti-freeze proteins. Microbial herbicides. Microbial insecticides (*Pseudomonas* and *Bacillus thrungiensis*): - genetic engineering of Bt strains – Bt cotton – viral insecticides – entomopathogenic fungi.

UNIT IV Plant and algal biotechnology and bioremediation

Ti plasmid derived vector systems - Development of insect, virus and herbicide resistant plants, stress and senescence tolerant plants, modification of flower nutritional content, sweetening by genetic engineering. Plant as bioreactors. Production of food, colourant and fuel from microalgae.

UNIT V Animal biotechnology and IPR

Transgenic animals: methods of creating transgenic mice, cattle and sheep. Human gene therapy – *in vivo* and *ex vivo* gene therapy. Molecular diagnostics for genetic diseases. Biosafety and Bioethics. Intellectual Property Rights: Patents - copy right and neighboring rights, patents for invention, - Drafting and filing a patent application, exploitation of patented invention. Indian patent laws.

REFERENCES

1. GIick BR and Pasternak JJ. Molecular Biotechnology – Principles and Applications of Recombinant DNA. ASM Press, Washington DC. 2003.
2. Winnacker EL. From Genes to Clones – Introduction to Gene Technology. First Indian reprint, PANIAMA publishing Co-operation, New Delhi. 2003.
3. Old RW and Primrose SB. Principles of Gene Manipulation - An Introduction to Genetic Engineering 5th Ed. Blackwell Scientific Publications, London. 1995.
4. Brown TA. Gene cloning and DNA analysis introduction. 4th Ed. Blackwell Science Ltd., London. 2001.
5. Watson JD, Gillman M, Iknowski J and Zollar M. Recombinant DNA. 2nd edition. Scientific American Books, WH freeman and Company, New York. 2001.
6. Raledge C and Kristiansen B. Basic Biotechnology, 2nd edition, Cambridge University Press. 2001.
7. Balasubramanian D, Bryce CFA, Dharmalingam K, Green J, Jayaraman K. Concepts in Biotechnology University Press, India. 1996.
8. Borowitzka MA and Borowitzka LJ. Microalgal Biotechnology, Cambridge University Press. 1989.
9. Alan T Bull. Microbial Diversity and Bioprospecting. ASM press. Washington, D.C. 2004.
10. Gerbardt P, Murray RG, Wood WA, Kreig NR. Methods for General and Molecular Bacteriology – American Society for Microbiology Washington D.C. 1994.
11. Glazer AN, Nikaido H. Microbial Biotechnology – Fundamentals of Applied Microbiology WH Freeman and Company, New York. 1994.
12. Pnolella P. Introduction to Molecular Biology, WCB Mc Graw Hill, Boston, Massacheutts. 1998.
13. Walsh G and Headon DR. Protein Biotechnology, John Wiley and Sons, New York. 1994.

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ELECTIVE COURSE

MICROBIAL NANOTECHNOLOGY

OBJECTIVE

To make the students realized the role of microbes and other eukaryotic systems in the synthesis of nanoparticles. To provide the knowledge of advanced methods of synthesis and designing of nano particles as well as to educate them the potential applications of nano particles/ materials in a variety of areas.

Unit I Introduction to bionanotechnology

Milestones in History – bionanotechnology – concept and future prospects – application in Life Sciences. Terminologies – nanotechnology, bionanotechnology, nanobiomaterials, biocompatibility, nanomedicine, nanowires, quantum Dots, nanocomposite, nanoparticles, nanosensors. Biotechnology to bionanotechnology, natural bionanomachines. Current status of bionanotechnology.

Unit II Synthesis of nanoparticles

Molecular nanotechnology – nanomachines – collagen. Uses of nanoparticles – cancer therapy – manipulation of cell and biomolecules. Cytoskeleton and cell organelles. Types of nanoparticles production – physical, chemical and biological. Microbial synthesis (bacteria, fungi and yeast) of nanoparticles – mechanism of synthesis.

Unit III Types of nanoparticles and methods of characterization

Nanoparticles – types, functions – Silver, Gold and Titanium. Physical and chemical properties of nanoparticles. Characterization of nanoparticles – UV-Vis spectroscopy, particle size analyzer, Electron Microscopy – HRTEM, SEM, AFM, EDS, XRD. Other tools and techniques required for bionanotechnology: rDNA technology, site directed mutagenesis, fusion proteins, X- Ray crystallography, NMR. Bioinformatics: molecular modeling, docking, computer assisted molecular design.

Unit IV Applications of bionanotechnology

Drug and gene delivery – protein mediated and nanoparticle mediated. Uses of nanoparticles in MRI, DNA and Protein Microarrays. Nanotechnology in health sectors. Nanomedicines, Antibacterial activities of nanoparticles. Nanotechnology in agriculture. Toxicology in nanoparticles – Dosimetry.

Unit V Merits and demerits of nanoparticles

Advantages of nanoparticles – drug targeting, protein detection, MRI, development of green chemistry – commercial viability of nanoparticles. Disadvantages – pollution and health risks associated with nanoparticles.

REFERENCES

1. Parthasarathy BK. Introduction to Nanotechnology, Isha Publication. 2007.
2. Elisabeth Papazoglou and Aravind Parthasarathy. Bionanotechnology. Morgan and Claypool Publishers. 2007.
3. Bernd Rehm. Microbial Bionanotechnology: Biological Self-assembly Systems and Biopolymer-based Nanostructures. Horizon Scientific Press. 2006.
4. David E Reisner and Joseph D Bronzino. Bionanotechnology: Global Prospects. CRC Press. 2008.
5. Ehud Gazit. Plenty of Room for Biology at the Bottom: An Introduction to Bionanotechnology. Imperial College Press. 2006.
6. Kamali Kannangara. Nanotechnology: Basic science and emerging technologies- Mick Wilson, Overseas Press. 2005.
7. Mark A Ratner and Bandyopadhyay AK. Nano Materials. Nanotechnology: A gentle introduction to the Next Big Idea, New Age Publishers. 2002.
8. Pradeep T. Nano Essentials understanding nanoscience and Nanotechnology. 1st edition. TMH publications. 2007.
9. Parag Diwan and Asish Bharadwaj. Nanomedicines, Pentagan Press. 2006.
10. Vladimir P Torchilin. Nanoparticles as Drug Carriers. Imperial College Press, North Eastern University, USA. 2006.
11. Rao CNR, Muller A, Cheetham AK, The Chemistry of Nanomaterials Synthesis, Properties and Applications. 2004.
12. Pradeep T, Nano: The Essentials Tata Mgraw Hill, New Delhi. 2007.
13. Niemeyer CM and Mirkin CA. Nanobiotechnology: Concepts, Applications and Perspectives, Wiley-VCH Verlag GmbH and Co., KgaA, Weiheim. 2004.
14. Mirkin CA and Niemeyer CM. Nanobiotechnology- II, More Concepts and Applications Wiley-VCH, Verlag GmbH and Co. 2007.
15. Claudio Nicolini. Nanobiotechnology and Nanobiosciences Pan Stanford Publishing Pte. Ltd. 2009.
16. David Goodsell S. Bionanotechnology, Lessons from Nature, Wiley-Liss, Inc. 2004.
17. Bhushan B. Handbook of Nanotechnology by, Springer, Heidelberg. 2004.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. Physics Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext	
I	Core Course – I (CC)	Mathematical Physics	6	4	3	25	75	100
	Core Course – II (CC)	Classical Dynamics and Relativity	6	4	3	25	75	100
	Core Course – III (CC)	Electronics	5	4	3	25	75	100
	Core Course – IV (CC)	Methods of Spectroscopy	5	4	3	25	75	100
	Core Practical – I (CP)	Physics Practical – I (General and Electronics)	8	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Electromagnetic Theory	6	5	3	25	75	100
	Core Course – VI (CC)	Quantum Mechanics	6	5	3	25	75	100
	Core Practical – II (CP)	Physics Practical – II (Microprocessor and Programming)	8	4	3	40	60	100
	Elective Course – I (EC)	Microprocessor and Microcontroller	5	5	3	25	75	100
	Elective Course – II (EC)	Numerical Methods and C++ Programming	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII (CC)	Statistical Mechanics	6	5	3	25	75	100
	Core Course – VIII (CC)	Solid State Physics	6	5	3	25	75	100
	Core Practical – III (CP)	Physics Practical – III (General and Electronics)	8	4	3	40	60	100
	Elective Course – III (EC)	Crystal Growth and Thin Film Physics	5	5	3	25	75	100
	Elective Course – IV (EC)	Nonlinear Optics	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – IX (CC)	Nuclear and Particle Physics	5	5	3	25	75	100
	Core Course – X (CC)	Advanced Physics	5	5	3	25	75	100
	Core Practical - IV (CP)	Physics Practical – IV (Electronics)	8	4	3	40	60	100
	Elective Course – V (EC)	Nanophysics	5	4	3	25	75	100
	Project		7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Project : 100 Marks
Dissertation: 80 Marks
Viva Voice : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate.

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CORE COURSE I

MATHEMATICAL PHYSICS

OBJECTIVE

- To learn various mathematical concepts and techniques in vector space, groups and functions of special types to solve physical problems.

Unit I Vector Analysis

Concept of vector and scalar fields – Gradient, divergence, curl and Laplacian – Vector identities – Line integral, surface integral and volume integral – Gauss theorem, Green's theorem, Stoke's theorem and their applications – Definitions in linear independence of vectors – Schmidt's orthogonalisation process – Schwartz inequality.

Unit II Matrix Theory and Tensors

Matrix Theory: Characteristic equation of a matrix – Eigenvalues and eigenvectors – Cayley–Hamilton theorem -Reduction of a matrix to diagonal form – Jacobi method – Sylvester's theorem.
Tensors: Contravariant, covariant and mixed tensors – Rank of a tensor – Symmetric and antisymmetric tensors – Contraction of tensor – Quotient law.

Unit III Group Theory

Basic definitions – Multiplication table – Subgroups, cosets and classes – Point and space groups – Homomorphism and isomorphism – Reducible and irreducible representations – Schur's lemma -- The great orthogonality theorem (qualitative treatment without proof) – Formation of character table of C_{2v} and C_{3v} -- Elementary ideas of rotation groups.

Unit IV Complex Analysis

Cauchy-Riemann conditions – Complex integration – Cauchy's integral theorem and integral formula – Taylor's and Laurent's series – Residues and singularities - Cauchy's residue theorem – Evaluation of definite integrals.

Unit V Special Functions

Basic properties of gamma and beta functions -- Legendre, Bessel, Laugerre and Hermite differential equation: Series solution, Rodriguez formula, generating function, recurrence relations and orthogonality relations.

Books for Study (Relevant chapters from)

1. B.D. Gupta, *Mathematical Physics* (Vikas Pub., Noida, 2015) 4th edition.
2. A.K. Sexena, *Mathematical Physics* (Narosa, New Delhi, 2015).
3. A.W. Joshi, *Matrices and Tensors in Physics* (New Age, New Delhi, 2006).
4. G. Aruldhas, *Molecular Structure and Spectroscopy* (PHI, New Delhi, 2009).
5. H.K. Dass and Rama Verma, *Mathematical Physics* (S. Chand, New Delhi ,2008).

Books for Reference

1. L.A. Pipes and L.R. Harvill, *Applied Mathematics for Engineers and Physicists* (McGraw Hill, Singapore, 1967).
2. B.V. Ramana, *Higher Engineering Mathematics* (MaGraw Hill, New Delhi, 2013).

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CORE COURSE II

CLASSICAL DYNAMICS AND RELATIVITY

OBJECTIVE

- To learn various mathematical techniques of classical mechanics and their applications to physical systems and introduce relativistic dynamics.

Unit I Fundamental Principles and Lagrangian Formulation

Mechanics of a particle and a system of particles – Conservation laws – Constraints – Generalized coordinates – D'Alembert's principle and Lagrange's equation – Hamilton's principle – Lagrange's equations of motion – Conservation theorems and symmetry properties – Applications to linear harmonic oscillator, pendulum, compound pendulum, charged particles in an electromagnetic field and Atwood's machine.

Unit II Motion Under Central Force

Conservation of energy and angular momentum – Inverse square law – Kepler's problem – Virial theorem – Scattering in a central force field – Artificial satellites – Geo stationary satellites – Eccentricity of orbit of satellites – Escape velocity.

Unit III Rigid Body Dynamics and Oscillatory Motion

Euler's angles – Moments and products of inertia – Euler's equations - Symmetrical top – Theory of small oscillations – Normal modes and frequencies – Linear triatomic molecule – Wave equation and motion – Phase velocity – Group velocity -- Dispersion.

Unit IV Hamilton's Formulation

Hamilton's canonical equations of motion – Hamilton's equations from variational principle – Principle of least action – Canonical transformations – Poission bracket – Hamilton--Jacobi method – Action and angle variables – Kepler's problem in action-angle variables – Applications of Hamilton's equations of motion to linear harmonic oscillator, pendulum, compound pendulum and charged particles in an electromagnetic field.

Unit V Relativistic Mechanics

Reviews of basic ideas of special relativity – Energy momentum four -vector – Minkowski's four-dimensional space – Lorentz transformation as rotation in Minkowski's space – Composition of Lorentz transformation about two orthogonal directions – Thomas precession – Elements of general theory of relativity.

Books for Study

1. H. Goldstein, C.P. Poole and J.L. Safko, *Classical Mechanics* (Pearson Education and Dorling Kindersley, New Delhi, 2007).
2. S.L. Gupta, V. Kumar and H.V. Sharma, *Classical Mechanics* (Pragati Prakashan, Meerut, 2001).
3. N.C. Rana and P.S. Joag, *Classical Mechanics* (Tata McGraw-Hill, New Delhi, 1991).

Books for Reference

1. V.B. Bhatia, *Classical Mechanics* (Narosa, New Delhi, 1997).
2. T.L. Chow, *Classical Mechanics* (John-Wiley, New York, 1995).

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CORE COURSE III

ELECTRONICS

OBJECTIVE

- To understand the working of advanced semiconductor devices and digital circuits and the utility of OP-AMP and learn the basics of integrated circuit fabrication, applications of timer IC-555 and building block of digital systems.

Unit I Semiconductor Devices

Varactor, Schottky, tunnel, Gunn, optoelectronic, LASER, LED and photo diodes – Hall effect in a semiconductor -- Depletion and enhancement type MOSFFT – Characteristics of UJT and SCR – Power control DIAC and TRIAC.

Unit II Operation Amplifier

Wien bridge and phase-shift oscillators – Triangular, saw-tooth and square-waves generators – Schmitt trigger – Voltage control oscillator – Phase-locked loops -- Weighted resistor and binary R-2R ladder digital to analog converters -- Counter type and successive approximation analog to digital converters -- Solving simultaneous and differential equations

Unit III Digital Circuits-I

Digital comparator – Parity generator/checker – Data selector -- BCD to decimal decoder –Seven segment decoder – Encoders – RS, JK, D and JK master-slave flip-flops.

Unit IV Digital Circuits-II

Serial-in serial-out, serial-in parallel-out and parallel-in serial-out shift registers – Synchronous, asynchronous, ring and up/down (using mod 10) counters -- Multiplexers – Demultiplexers.

Unit V IC Fabrication and IC Timer

Basic monolithic ICs – Epitaxial growth – Masking – Etching impurity diffusion – Fabricating monolithic resistors, diodes, transistors, inductors and capacitors – Circuit layout – Contacts and inter connections – Charge coupled device – Applications of CCDs -- 555 timer: Description of the functional diagram, applications of monostable and astable operations and pulse generation.

Books for Study (Relevant chapters in)

1. T.F. Schubert, E.M. Kim, *Active and Nonlinear Electronics* (John Wiley, New York, 1996).
2. L. Floyd, *Electronic Devices* (Pearson Education, New York, 2004).
3. J. Millman, C. Halkias and C.D. Parikh, *Integrated Electronics, Analog and Digital Circuits and Systems* (TMGH, 2010).
4. D.P. Leach and A.P. Malvino, *Digital Principals and Applications* (Tata McGraw-Hill, New Delhi, 2006).
5. R.A. Gayakwad, *Op-Amps & Linear Integrated Circuits* (Printice Hall, New Delhi, 1999).

Books for Reference

1. R.L. Geiger, P.E. Allen and N.R Strader, *VLSI Design Techniques for Analog and Digital Circuits* (McGraw--Hill, Singapore, 1990).
2. D. Roy Choudhury and S.B. Jain, *Linear Integrated Circuit* (New Age International Publications, New Delhi, 2010).
3. D. Chattopadhyay and P.C. Rakshit, *Electronics Fundamentals and Applications* (New Age International Publications, New Delhi, 2010).

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CORE COURSE IV

METHODS OF SPECTROSCOPY

OBJECTIVE

- To familiarize with the basic principles of various spectroscopic techniques and their applications in the determination of atomic structure, chemical composition and physical properties of materials.

Unit I Atomic Spectroscopy

Quantum states of an electron in atom – Hydrogen atom spectrum – Electron spin -- Stern—Gerlach experiment – Spin-orbit interaction – Two electron system -- LS-JJ coupling schemes – Spectroscopic terms and selection rules - Hyperfine structure – Zeeman and Paschen—Back effect of one and two electron systems – Selection rules – Stark effect.

Unit II Microwave and Infrared Absorption Spectroscopies

Microwave Spectroscopy: Rotation of diatomic molecules – Rotational spectra of polyatomic molecules – Spectrum of nonrigid rotator – Experimental technique – Polyatomic molecules – Linear, symmetric top and asymmetric top molecules.

Infrared Absorption Spectroscopy: Vibrating diatomic molecule – Anharmonic oscillator – Diatomic vibrating rotator – Vibration-rotation spectrum of carbon monoxide – Influence of rotation on the spectrum of polyatomic molecules – Linear and symmetric top molecules – Influence of nuclear spin -- FT techniques.

Unit III Raman Spectroscopy

Quantum theory of Raman effect – Classical theory of Raman effect – Pure rotational Raman spectra – Linear molecules – Symmetric top molecules – Vibration Raman spectra – Rotational fine structure – Structural determination – Raman spectra – Instrumentation – Raman effect and molecular structure – Raman activity of molecular vibrations -- Surface enhanced Raman spectroscopy.

Unit IV Nuclear Magnetic Resonance Spectroscopy

Basic principles -- Bloch equations and solutions – Shielding and deshielding effects – Chemical shift – Spin lattice and spin-spin relaxation – Coupling constants – Experimental technique – Double coil method – Structural diagnosis and hydrogen bonding.

Unit V UV and ESR Spectroscopies

UV: Theory and instrumentation – Types of transition in inorganic work – Change in position and intensity of absorption – Charge transfer transition – Molecular weight data.
ESR: Theory of ESR – Resonance conditions – Experimental study – ESR spectrometer – Crystalline solids and free radicals in solution – Determination of g factor.

Books for Study

1. C.N. Banwell, *Fundamentals of Molecular Spectroscopy* (McGraw Hill, New York, 1981).
2. G. Aruldhas, *Molecular Structure and Spectroscopy* (Prentice Hall, New Delhi, 2006).
3. D.N. Sathyanarayana, *Vibrational* Spectroscopy (New Age International, New Delhi, 2015).

Books for Reference

1. J. Michael Hollas, *Modern Spectroscopy* (Wiley India, New Delhi, 2004).
2. B.P. Straughan and S. Walker, *Spectroscopy* Volumes I--III (Chapman and Hall, New York, 1976).

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CORE PRACTICAL I

PHYSICS PRACTICAL I (GENERAL AND ELECTRONICS)

OBJECTIVE

- Experimental determination of certain physical constants and properties and verification of characteristics and applications of electronic components and devices.

Any **TWELVE** experiments (Six experiments from each part)

A. General Experiments

1. Determination of q, n, σ by elliptical fringes method
2. Determination of Stefan's constant
3. Determination of bulk modulus of a liquid by ultrasonic wave propagation
4. Determination of Rydberg's constant
5. Study of Hall effect in a semiconductor
6. Determination of dielectric constant at high frequency by Lecher wire
7. Michelson interferometer -- Determination of wavelength of monochromatic source.
8. Determination of wavelength of monochromatic source using biprism
9. Charge of an electron by spectrometer
10. Dissociation energy of iodine molecule -- Absorption spectrum
11. Spectrum photo -- Cu/Fe arc spectrum
12. Polarization of light -- Verification of Malus law and Brewster angle of glass
13. BH loop – Energy loss of a magnetic material – Anchor ring using B.G./CRO
14. Determination of e/m of an electron by magnetron method
15. Determination of dielectric loss using CRO

B. Electronics Experiments

1. Construction of dual regulated power supply
2. Astable and monostable multivibrators using IC555
3. Characteristics of UJT
4. Characteristics of SCR
5. Design and study of Wein bridge oscillator using op-amp
6. Design and study of square and triangular waves generators using op-amp
7. Solving ordinary differential equation using op-amp
8. V-I characteristics of a solar cell
9. Up/down counter using mod 10
10. Operation of shift register using serial-in serial-out, serial-in parallel-out and parallel-in serial-out

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CORE COURSE V

ELECTROMAGNETIC THEORY

OBJECTIVE

- To learn the theory for the fields produced by stationary and moving charge and charged systems and propagation of electromagnetic fields.

Unit I Electrostatics and Polarization

Gauss's law – Field due to an infinite, straight, uniformly charged wire – Multipole expansion of a charge distribution -- Field inside a uniformly polarized sphere – Electric field inside a dielectric – Electric displacement and polarizability – Claussius-Mossotti relation – Polarization of polar molecules and Langevin equation and Debye relation – Electrostatic energy.

Unit II Boundary Value Problems in Electrostatics

Boundary conditions – Potential at a point between the plates of a spherical capacitor – Potential at a point due to uniformly charged disc – Method of image charges – Point charge in the presence of a grounded conducting sphere -- Point charge in the presence of a charged, insulated conducting sphere -- Conducting sphere in a uniform electric field – Laplace equation in rectangular coordinates.

Unit III Magnetostatics

Magnetic scalar and vector potentials – Magnetic dipole in a uniform field – Magnetization current – Magnetic intensity – Magnetic susceptibility and permeability – Hysteresis – Correspondences in electrostatics and magnetostatics.

Unit IV Field Equations and Conservation Laws

Continuity equation – Displacement current – Maxwell's equations and their physical significance – Poynting theorem – Energy in electromagnetic fields – Electromagnetic potentials – Maxwell's equations in terms of electromagnetic potentials – Lorentz and Coulomb gauges.

Unit V Electromagnetic Waves and Wave Propagation

Electromagnetic waves in free space – Propagation of electromagnetic waves in isotropic dielectrics and in anisotropic dielectrics – Reflection and refraction of electromagnetic waves: Kinematic and dynamic properties – TM and TE modes – Propagation in rectangular waveguides – Cavity resonator.

Books for Study

1. J.D. Jackson, *Classical Electrodynamics* (John-Wiley, New York, 1999) 3rd edition
2. K.K. Chopra and G.C. Agarwal, *Electromagnetic Theory* (K. Nath & Co., Meerut).
3. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems* (PHI, New Delhi, 2015).

Books for Reference

1. D.J. Griffiths, *Introduction to Electrodynamics* (Pearson, Essex, 2014) 4th edition.
2. T.L. Chow, *Electromagnetic Theory* (Jones and Bartlett Learning, 2012).

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CORE COURSE VI

QUANTUM MECHANICS

OBJECTIVE

- To learn the fundamental concepts and certain theoretical methods of quantum mechanics and their applications to microscopic systems.

Unit I Schrödinger Equation and General Formulation

Schrödinger equation and its plane wave solution – Physical meaning and conditions on the wave function – Expectation values – Hermitian operators and their properties – Commutator relations -- Uncertainty relation -- Bra and ket vectors -- Hilbert space – Schrödinger, Heisenberg and interaction pictures.

Unit II Exactly Solvable Systems

Linear harmonic oscillator: Solving the one-dimensional Schrödinger equation and abstract operator method – Particle in a box -- Rectangular barrier potential – Rigid rotator – Hydrogen atom.

Unit III Approximation Methods

Time-independent perturbation theory: Non-degenerate (first-order) and degenerate perturbation theories -- Stark effect – WKB approximation and its application to tunneling problem and quantization rules.
Time-dependent perturbation theory: Constant and harmonic perturbations -- Transition probability – Sudden approximation.

Unit IV Scattering Theory and Angular Momentum

Scattering theory: Scattering amplitude and cross-section – Green's function approach -- Born approximation and its application to square-well and screened-Coulomb potentials.
Angular momentum: Components of orbital angular momentum – Properties of **L** and $\mathbf{L}^2$ -- Eigenpairs of $\mathbf{L}^2$ and L_z – Spin angular momentum.

Unit V Relativistic Quantum Mechanics

Klein--Gordon equation for a free particle and its solution – Dirac equation for a free particle and Dirac matrices -- Charge and current densities – Plane wave solution – Negative energy states – Zitterbewegung – Spin of a Dirac particle – Spin-orbit coupling.

Books for Study

1. L. Schiff, *Quantum Mechanics* (Tata McGraw Hill, New Delhi, 2014) 4th edition.
2. P. M. Mathews and K. Venkatesan, *A Text Book of Quantum Mechanics* (Tata McGraw Hill, New Delhi, 1987).
3. S. Rajasekar and R. Velusamy, *Quantum Mechanics I: The Fundamentals* (CRC Press, Boca Raton, 2015).

Books for Reference

1. R. Shankar, *Principles of Quantum Mechanics* (Springer, New Delhi, 2007).
2. A.K. Ghatak and S. Lokanathan, *Quantum Mechanics: Theory & Applications* (Macmillan, Chennai, 2004) 5th edition.

CORE PRACTICAL II

PHYSICS PRACTICAL II

(MICRPROCESSOR AND PROGRAMMING)

OBJECTIVE

- To develop programming skills of microprocessor and C++ programming in solving some mathematical problems and their applications.

Any **FIFTEEN** experiments (At least SIX experiments from each part)

A. Microprocessor (8085)

1. Finding the largest and smallest numbers in a data array
2. Arranging a set of numbers in ascending and descending orders
3. Study of multibyte decimal addition
4. Study of multibyte decimal subtraction
5. Interfacing hexa key board (IC 8212)
6. Study of seven segment display
7. Study of DAC interfacing (DAC 0900)
8. Study of ADC interfacing (ADC 0809)
9. Study of timer interfacing (IC 8253)
10. Study of programmable interrupt controller (IC 8259)
11. Traffic control system
12. Digital clock
13. Generation of square and sine waves using DAC 0800
14. Digital thermometer (temperature controller)
15. Control of stepper motor using microprocessor

B. C++ Programming

1. Least-squares curve fitting – Straight-line fit
2. Least-squares curve fitting – Exponential fit
3. Real roots of one-dimensional nonlinear equations -- Newton Raphson method
4. Complex roots of one-dimensional nonlinear equations -- Newton-- Raphson method
5. Interpolation – Lagrange method
6. Numerical integration – Composite trapezoidal rule
7. Numerical integration – Composite Simpson's 1/3 rule
8. Solution of a second-order ODE – Euler method
9. Solution of a first-order ODE – Fourth-order Runge--Kutta method
10. Uniform random number generation – Park and Miller method
11. Gaussian random number generation – Box and Muller method
12. Evaluation of definite integrals – Monte Carlo method
13. Calculation of mean and standard deviation of a set of uniform random numbers
14. Computation of eigenvalues of linear harmonic oscillator by numerically solving Schrödinger equation
15. Monte Carlo simulation of electronic distribution of hydrogen atom

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ELECTIVE COURSE I

MICROPROCESSOR AND MICROCONTROLLER

OBJECTIVE

- To learn basic principles of architecture and functioning of microprocessor and microcontroller and programming and interfacing aspects of them.

Unit I Microprocessor Architecture and Interfacing

Intel 8085 microprocessor architecture – Pin configuration – Instruction cycle – Timing diagram – Instruction and data formats – Addressing modes -- Memory mapping and I/O mapping I/O scheme -- Memory mapping I/O interfacing -- Data transfer schemes -- Synchronous and asynchronous data transfer – Interrupt driven data transfer - Interrupts of Intel 8085.

Unit II Assembly Language Programs (8085 only)

BCD arithmetic -- Addition and subtraction two 8-bit and 16-bit numbers -- Largest and smallest numbers in a data set – Ascending order and descending order – Sum of a series of a 8-bit numbers – Sum of a series of multibyte decimal numbers – Square root of a number – Block movement of data -- Time delay – Square-wave generator.

Unit III Peripheral Devices and Microprocessor Applications

Generation of control signals for memory and I/O devices -- I/O ports -- Programmable peripheral interface -- Architecture of 8255A -- Control word -- Programmable interrupt controller (8259) -- Programmable counter -- Intel 8253 -- Architecture, control word and operation – Block diagram and interfacing of analog to digital converter (ADC 0800) – Digital to analog converter (DAC 0800) – Stepper motor – Traffic control.

Unit IV Microcontroller 8051

Features of 8051 – Architecture – Pin configuration – Memory organization -- External data and program memory -- Counters and timers – Serial data input/output – Interrupt structure – External interrupts – Addressing modes -- Comparison between microprocessor and microcontroller.

Unit V 8051 Instruction Set and Programming

Instruction set – Data transfer, arithmetic and logical instructions – Boolean variable manipulation instructions – Program and machine control instructions – Simple programs – Addition and subtraction of two 8-bit and 16-bit numbers – Division – Multiplication -- Largest number in a set – Sum of a set of numbers.

Books for Study

1. B. Ram, *Fundamentals of Microprocessor and Microcomputers* (Dhanpat Rai Pub., New Delhi, 2006).
2. M.A. Mazidi, J.G. Mazidi and R.D. Mckinlay, *The 8051 Microcontroller and Embbeded Systems using Assembly and C* (Dorling Kindersley, New Delhi, 2013).
3. A.P. Godse and D.A. Godse, *Microprocessors and Microcontrollers* (Technical Pub., Pune, 2008).

Books for Reference

1. R. Gaonkar, *Microprocessor Architecture, Programming and Applications with 8085* (Penram International Publishing , Mumbai, 2006) 5th edition.
2. K. Ayala, *The Microcontroller* (Cengage Learning India, New Delhi, 2013) 3rd edition.

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ELECTIVE COURSE II

NUMERICAL METHODS AND C++ PROGRAMMING

OBJECTIVE

- To learn numerical methods of computing certain mathematical quantities, construction and evaluation of a function and solution of an ordinary differential equation and C++ computer programming necessary for numerical simulation of physical problems.

Unit I Programming in C++

Constants and variables -- I/O operators and statements -- Header files -- Main function – Conditional statements -- Switch statement -- Void function -- Function program -- For, while and do-while statements -- Break, continue and goto statements -- Arrays.

Unit II Curve Fitting and Interpolation

Curve fitting: Method of least-squares - Straight-line fit -- Exponential and power-law fits.

Interpolation: Newton interpolation polynomial: Linear interpolation, Higher-order polynomials and first-order divided differences – Gregory--Newton interpolation polynomials – Lagrange interpolation.

Unit III Solutions of Linear and Nonlinear Equations

Simultaneous linear equations: Upper triangular form and back substitution – Augmented matrix -- Gauss elimination method -- Jordan's modification -- Inverse of a matrix by Gauss--Jordan method.

Roots of nonlinear equations: Newton--Raphson method -- Termination criteria -- Pitfalls – Order of convergence.

Unit IV Numerical Integration and Differentiation

Numerical integration: Trapezoidal and Simpson's 1/3 rules -- Errors in the formulae -- Composite trapezoidal and Simpson's 1/3 rules -- Errors in the formulae.

Numerical differentiation: Two- and four-point formulae for first-order derivative -- Three- and five-point formulae for second-order derivative.

Unit V Numerical Solution of Ordinary Differential Equations

First-order equations: Euler and improved Euler methods – Local and global truncation errors -- Fourth-order Runge--Kutta method -- Geometric description of the formula.

Second-order equations: Euler methods and fourth-order Runge--Kutta method.

Books for Study (Relevant chapters in)

1. J. R. Hubbard, *Programming with C++* (McGraw-Hill, New Delhi, 2006).
2. J.H. Mathews, *Numerical Methods for Mathematics, Science and Engineering* (Prentice-Hall of India, New Delhi, 1998).
3. P.B. Patil and U.P. Verma, *Numerical Computational Methods* (Narosa, New Delhi, 2013).

Books for Reference

1. E. Balagurusamy, *Objected Oriented Programming in C++* (McGraw Hill, New Delhi, 2013) 6th edition.
2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, *Numerical Methods for Scientific and Engineering Computation* (New Age International, New Delhi, 1993).

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CORE COURSE VII

STATISTICAL MECHANICS

OBJECTIVES

- To learn the basics of classical and quantum statistical mechanics and to understand some of their applications.

Unit I Thermodynamics

Thermodynamical laws and their consequences – Entropy -- Changes in entropy in reversible processes -- Principle of increase of entropy -- Thermodynamic functions -- Enthalpy, Helmholtz and Gibbs functions -- Phase transitions -- Clausius-Clayperon equation -- van der Wall equation of state.

Unit II Kinetic Theory

Boltzmann transport equation and its validity -- Boltzmann's H-theorem -- Relation between H-function and entropy -- Maxwell--Boltzmann distribution -- Mean free path – Conservation laws -- Transport phenomena – Viscosity of gases -- Thermal conductivity -- Diffusion process.

Unit III Classical Statistical Mechanics

Review of probability theory -- Macro and micro states – Phase space -- Statistical ensembles -- Density function -- Liouville's theorem -- Maxwell--Boltzmann distribution law -- Micro canonical ensemble – Ideal gas – Entropy – Partition function – Equipartition theorem -- Canonical and grand canonical ensembles.

Unit IV Quantum Statistical Mechanics

Basic concepts -- Ideal quantum gas – Bose--Einstein statistics -- Photon statistics -- Fermi--Dirac statistics -- Sackur-Tetrode equation – Equation of state -- Bose--Einstein condensation -- Comparison of classical and quantum statistics.

Unit V Applications of Quantum statistical Mechanics

Ideal Bose System: Photons – Black body and Planck radiation – Specific heat of solids – Liquid helium.
Ideal Fermi System: Properties – Degeneracy – Electron gas -- Pauli paramagnetism.
Ferromagnetism: Ising and Heisenberg models.

Books for Study

1. S.K. Sinha, *Introduction to Statistical Mechanics* (Narosa, New Delhi, 2007).
2. F. Reif, *Fundamentals of Statistical and Thermal Physics* (McGraw Hill, Singapore, 1985).
3. K. Huang, *Statistical Mechanics* (Wiley Eastern Limited, New Delhi, 1963).

Books for Reference

1. Singhal, Agarwal, Prakash, *Thermodynamics and Statistical Physics* (Prakashan, Meerut, 2003).
2. W. Greiner, L. Neise and H. Stocker, *Thermodynamics and Statistical Mechanics* (Springer, New York, 1995).

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CORE COURSE VIII

SOLID STATE PHYSICS

OBJECTIVE

- *To learn the basics of crystal structure and underlying theoretical development for the description of certain properties and phenomena of solid states.*

Unit I Crystal Structure

Basics of crystal systems – Bravias lattices – Defects and Dislocations – Bonding of Solids – Reciprocal lattice – Ewald's sphere construction – Bragg's law – Atomic scattering factor – Diffraction – Structure factor – Experimental techniques – Laue, Powder, Rotation methods – Translational and orientational orders - Kinds of liquid crystalline order and quasicrystals.

Unit II Lattice Vibrations and Thermal Properties

Vibration of monoatomic lattices – Lattices with two atoms per primitive cell – Quantization of lattice vibrations – Phonon momentum – Inelastic scattering of neutrons by phonons – Lattice heat capacity – Einstein model – Density of modes in one-dimension and three dimension – Debye model of the lattice heat capacity – Thermal conductivity – Umklapp process.

Unit III Free Electron Theory, Energy Bands and Semiconductor Crystals

Energy levels and density of orbitals – Fermi-Dirac distribution – Free electron gas in 3D – Heat capacity of electron gas – Electrical conductivity – Motion in magnetic fields – Hall effect – Thermal conductivity – Nearly conductivity of metals – Nearly free electron model – Electron in a periodic potential – Semiconductors – Band gap – Effective mass – Intrinsic carrier concentration.

Unit IV Dia, Para, Ferro and Antiferro-Magnetisms

Langevin classical theory of dia- and para-magnetisms – Weiss theory – Quantum theory of paramagnetism – Paramagnetic susceptibility of conduction electrons – Hund's rules – Ferroelectric order – Curie point and the exchange integral – Temperature dependence of saturation magnetization – Magnons – Ferromagnetic order -- Antiferromagnetic order -- Ferromagnetic domains – Origin of domains – Coercive force and hysteresis.

Unit V Ferroelectricity and Superconductivity

General properties and classification of ferroelectric materials – Dipole theory of ferroelectricity – Ferroelectric domains – Occurrence of superconductivity – Meissner effect – Thermodynamics of superconducting transition – London equation – Coherence length – BCS theory – Flux quantization – Type-I and type-II superconductors – Josephson superconductor tunneling – DC and AC Josephson effect – SQUID – Applications of superconductors.

Books for Study

1. C. Kittel, *Introduction to Solid State Physics* (Wiley Eastern, New Delhi, 2007) 7th edition.
2. S.O. Pillai, *Solid State Physics* (New Age International, New Delhi, 2005) 6th edition.
3. H.C. Gupta, *Solid State Physics* (Vikas Publishing House, Noida, 2001) 2nd edition.

Books for Reference

1. N.W, Ashcroft and N.D. Mermin, *Solid State Physics* (Holt, Rinehart and Winston, Philadelphia, 1976).
2. Rita John, *Solid State Physics* (McGraw Hill, New Delhi, 2014).
3. A.J. Dekker, *Solid State Physics* (McMillan, Chennai, 1971).

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CORE PRACTICAL III

PHYSICS PRACTICAL III

(GENERAL AND ELECTRONICS)

OBJECTIVE

- Experimental determination of certain physical constants and properties and verification of characteristics and applications of electronic components and devices.

Any **FIFTEEN** experiments (At least SIX experiments from each part)

A. General Experiments

1. Determination of q, n, σ by hyperbolic fringes method
2. Determination of thermal conductivity of a good conductor – Forbe's method
3. Determination of bulk modulus of a liquid using ultrasonic interferometer
4. Planck's constant - Photoelectric cell
5. Band gap energy of a semiconductor -- Four-probe method
6. Determination of L of a coil by Anderson's method
7. Determination of e/m of an electron by Thomson's method
8. Determinations of wavelength of a laser source using plane diffraction grating and
   thickness of a wire
9. Polarizability of liquids by finding the refractive indices at different wavelengths
10. Study of a fiber optic cable -- Numerical aperture and other parameters
11. Magnetic susceptibility of a paramagnetic solution using Quincke's tube method
12. Determination of specific rotator power of a liquid using polarimeter
13. Four-probe method – Determination of resistivities of powdered samples
14. Determination of magnetic susceptibility of liquid by Guoy method
15. Determination of coefficient of coupling by AC bridge method

B. Electronics Experiments

1. Characteristics of LED and photo diodes
2. Characteristics of laser diode and tunnel diode
3. Digital to analog converters using op-amp
4. Study of phase-shift oscillator using op-amp
5. Design and study of Schmitt trigger using op-amp
6. Flip-flops -- - RS, JK and D
7. Decoder and encoder
8. Temperature coefficient using 555 timer
9. Design of pre-emphasis and de-emphasis circuits
10. Pulse-width and pulse-position modulations

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ELECTIVE COURSE III

CRYSTAL GROWTH AND THIN FILM PHYSICS

OBJECTIVE

- To understand the theoretical concepts involved in crystal growth and thin film sciences and to learn the basic characterizing techniques of materials.

Unit I Basic Concepts, Nucleation and Kinetics of Growth

Ambient phase equilibrium – Super saturation – Equilibrium of finite phases - Equation of Thomson-Gibbs – Types of nucleation – Formation of critical nucleus – Classical theory of nucleation – Homo and heterogeneous formation of 3D nuclei – Rate of nucleation – Growth from vapor phase, solutions and melts – Epitaxial growth – Growth mechanism and classification – Kinetics of growth of epitaxial films – Mechanisms and controls for nanostructures in 0 and 1 dimensions.

Unit II Crystallization Principles and Growth Techniques

Classes of crystal system – Crystal symmetry – Solvents and solutions – Solubility diagram – Super solubility – Expression for super saturation – Metastable zone and induction period – Miers TC diagram – Solution growth – Low and high temperatures solution growth – Slow cooling and solvent evaporation methods – Constant temperature bath as a crystallizer.

Unit III Gel, Melt and Vapor Growth Techniques

Principle of gel technique – Various types of gel -- Structure and importance of gel – Methods of gel growth and advantages -- Melt technique – Czochralski growth – Floating zone – Bridgeman method – Horizontal gradient freeze – Flux growth – Hydrothermal growth – Vapor-phase growth – Physical vapor deposition – Chemical vapor deposition – Stoichiometry.

Unit IV Thin Film Deposition Techniques

Vacuum evaporation -- Hertz-Knudsen equation -- Evaporation from a source and film thickness uniformity -- E-beam, pulsed laser and ion beam evaporations -- Glow discharge and plasmas -- Mechanisms and yield of sputtering processes – DC, rf, magnetically enhanced, reactive sputterings – Spray pyrolysis – Electro deposition – Sol-gel technique.

Unit V Characterization Techniques

X–ray diffraction – Powder and single crystal – Fourier transform infrared analysis – Elemental dispersive X-ray analysis – Transmission and scanning electron microscopy – UV-vis-NIR spectrometer – Chemical etching –

Vickers micro hardness – Basic principles and operations of AFM and STM -- X-ray photoelectron spectroscopy for chemical analysis -- Ultraviolet photoemission spectroscopy analysis for work function of the material -- Photoluminescence – Thermoluminescence.

Books for Study (Relevant chapters in)

1. I.V. Markov, *Crystal Growth for Beginners: Fundamentals of Nucleation, Crystal Growth and Epitaxy* (2004) 2nd edition.
2. P. Santhanaragavan and P. Ramasamy, *Crystal Growth Process and Methods* (KRU Publications, Kumbakonam, 2001).
3. A. Goswami, *Thin Film Fundamentals* (New Age, New Delhi, 2008).
4. H.H. Willard, L.L. Meritt, J.A. Dean, F.A. Sette, *Instrumental Methods of Analysis* (CBS Publishers, New Delhi, 1986).
5. S. Zhang, L. Li and A. Kumar, *Materials Characterization Techniques* (CRC Press, Bota Racon, 2009).

Books for Reference

1. J.C. Brice, *Crystal Growth Process* (John Wiley, New York, 1986).
2. M. Ohring, *Materials Science of Thin Films* (Academic Press, Boston, 2002) 2nd edition.
3. E. N. Kaufmann, *Characterization of Materials, Volume-I* (John Wiley, New Jersey, 2012).

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ELECTIVE COURSE IV

NONLINEAR OPTICS

OBJECTIVE

- To learn the basic principles and working of lasers, basic processes and features of nonlinear optical materials and fiber optics.

Unit I Lasers

Gas lasers – He-Ne, Ar^+ ion lasers – Solid state lasers – Ruby – Nd:YAG, Ti sapphire – Organic dye laser – Rhodamine – Semiconductor lasers – Diode laser, p-n-junction laser and GaAs laser.

Unit II Basics of Nonlinear Optics

Wave propagation in an anisotropic crystal – Polarization response of materials to light –Harmonic generation – Second harmonic generation – Sum and difference frequency generation– Phase matching – Third harmonic generation – Terahertz -- Bistability – Self-focusing.

Unit III Multiphoton Processes

Two photon process – Theory and experiment – Three photon process - Parametric generation of light – Oscillator – Amplifier – Stimulated Raman scattering – Intensity dependent refractive index -- Optical Kerr effect -- Foucault effect – Photorefractive, electronic and optic effects.

Unit IV Nonlinear Optical Materials

Basic requirements – Inorganics – Borates – Organics – Urea, Nitroaniline – Semiorganics – Thoreau complex – Laser induced surface damage threshold.

Unit V Fiber Optics

Step – Graded index fibers – Wave propagation – Fiber modes – Single and multimode fibers –Numerical aperture – Dispersion – Fiber bandwidth – Fiber losses -- Scattering, absorption, bending, leaky mode and mode coupling losses -- Attenuation coefficient -- Material absorption.

Books for Study

1. K.R. Nambiar, *Lasers: Principles, Types and Applications* (New Age Inter-national Publishers Ltd, New Delhi, 2014).
2. B.B. Laud, *Lasers and Nonlinear Optics*, 3rd Edn. (New Age, New Delhi, 2011).
3. R.W. Boyd, *Nonlinear Optics*, 2nd Edn. (Academic Press, New York, 2003).
4. G.P. Agarwal, *Fiber-Optics Communication Systems*, 3rd Edn. (John Wiley, Singapore, 2003).

Books for Reference

1. W.T. Silvast, *Laser Fundamentals* (Cambridge University Press, Cambridge, 2003).
2. D.L. Mills, *Nonlinear Optics – Basic Concepts* (Springer, Berlin, 1998).

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CORE COURSE IX

NUCLEAR AND PARTICLE PHYSICS

OBJECTIVE

- To learn the various aspects of nucleus and its behavior under various conditions.

Unit I Nuclear Properties

Nuclear energy levels - Nuclear angular momentum, parity, isospin – Nuclear magnetic dipole moment – Nuclear electric quadropole moment - Ground state of deuteron – Magnetic dipole moment of deuteron – Proton-neutron scattering at low energies – Scattering length, phase shift – Nature and properties of nuclear forces – Spin dependence – Charge symmetry – Charge independence – Repulsion at short distances – Exchange forces – Meson theory.

Unit II Radioactive Decays

Alpha emission – Geiger-Nuttal law – Gamow theory – Neutrino hypothesis – Fermi theory of beta decay – Selection rules – Nonconservation of parity – Gamma emission – Selection rules -- Nuclear isomerism -- Gamma ray spectroscopy – Mossbauer effect -- Interaction of charged particles and X-rays with matter – Types and basic principles of particle detectors.

Unit III Nuclear Reactions and Nuclear Models

Reciprocity theorem – Breit-Wigner formula – Resonance theory – Liquid drop model – Shell model -- Evidences for shell model -- Magic numbers -- Harmonic oscillator – Square-well potential -- Spin-orbit interaction – Collective model of a nucleus.

Unit IV Fission and Fusion Reactors

Characteristics of fission – Mass distribution of fragments – Radioactive decay processes – Fission cross-section – Energy in fission – Bohr-Wheeler's theory of nuclear fission – Fission reactors – Thermal reactors – Homogeneous reactors – Heterogeneous reactors – Basic fusion processes -- Characteristics of fusion – Solar fusion – Controlled fusion reactors.

Unit V Particle Physics

Nucleons, leptons, mesons, baryons, hyperons, hadrons, strange particles - Classification of fundamental forces and elementary particles – Basic conservation laws – Additional conservation laws: Baryonic, leptonic, strangeness and isospin charges/quantum numbers – Gell-mann--Nishijima

formula - Invariance under charge conjugation (C), parity (P) and time reversal (T) – CPT theorem -- Parity nonconservation in weak interactions – CP violation – Eight-fold way and supermultiplets – SU(3) symmetry and quark model.

Books for Study (Relevant chapters in)

1. K. S. Krane, *Introductory of Nuclear Physics* (John-Wiley, New York, 1987).
2. S. B. Patel, *Nuclear Physics: An Introduction* (New Age, New Delhi, 2009).
3. D. C. Cheng and G. K. O'Neill, *Elementary Particle Physics: An Introduction* (Addison-Wesley, New York, 1979).
4. D.C. Tayal, *Nuclear Physics* (Himalaya Pub. House, New Delhi, 2011).
5. S.L. Kakani and S. Kakani, *Nuclear and Particle Physics* (Anshan Publ., New Delhi, 2009).

Books for Reference

1. R.C. Sharma, *Nuclear Physics* (K. Nath and Co, Meerut, 2004).
2. B. L. Cohen, *Concepts of Nuclear Physics* (Tata McGraw Hill, New Delhi, 1988).

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CORE COURSE X

ADVANCED PHYSICS

OBJECTIVE

- To learn the basics and the advanced applications of physics in the fields of astrophysics, space physics, biomedical science and wireless communication.

Unit I Astrophysics and Radio Astronomy

Astrophysics: Physical properties of stars - Life cycle of a star - End products of stellar evolution – Structure of milky way - Expanding universe - Future prospects.
Radio Astronomy (RA): Radio telescopes - Synchrotron radiation - Spectral lines in RA - Major discoveries in RA - RA in India - Hot big bang cosmology.

Unit II India's Space Programme

Overview - Methodological issues in cost beneficial analysis of space programme - The INSAT system - Broadcasting - Telecommunication - Meteorology - Indian remote sensing programme – Geoinformatics (basic idea only) - The launching programme

Unit III Biomedical Instruments

Ear and hearing Aids: Basic measurements of ear function - Air and bone conduction - Masking - Middle ear impedance audiometry - Oto-acoustic emission - Types of hearing aids and Cochlear implants - Sensory substitution aids - Electrophysiology: Source of biological potentials - Signal size and electrodes - Functions - Features of ECG, EEG and EMG. Cardiac and blood related devices: Pacemakers - Electromagnetic compatibility – Defibrillators - Artificial heart valves - Cardiopulmonary bypass - Haemodialysis.

Unit IV Wireless Communication Technology-I

Cellular Radio: IMTS, AMPS control system - Security and privacy - Cellular telephone specifications and operations - Cell site equipments - Fax and data communication using cellular phones and CDPD - Digital cellular systems. Personal Communication Systems (PCS): Differences between CS and PCS, IS-1 36 TDMA PCS, GSM, IS-95 CDMA PCS - Comparison of modulation schemes - Data communication with PCS.

Unit V Wireless Communication Technology – II

Satellite orbits – Satellites for communication - Satellites and transponders - Signal and noise calculations - InMARST, MSAT system using low - and medium-earth orbit stations. Paging (one-way and two-ways) and messaging system - Voice paging - LAN topologies - Ethernet bridges - Wireless LANs - Radio LANs - Bluetooth - Wireless bridges - Connections using infrared wireless modems - Wireless packet data services.

Books for Study (Relevant chapters in)

1. A.W. Joshi, *Horizons of Physics* (Wiley Eastern Ltd, New Delhi, 2000).
2. R.D. Begamure (Ed.), *Scientific Truths About Our Universe: Know Your Universe: Part I & II* (Pune, 2002).
3. U. Shankar, *The Economics of India's Space Programme – An Exploratory Analysis* (Oxford University Press, Delhi, 2007) 2nd reprint.
4. Mohan Sundar Rajan, Space Today (National Book Trust India, New Delhi, 2012) 5th revised reprint.
5. B.H. Brown, *et a*l, *Medical Physics and Biomedical Engineering* (Overseas Press, New Delhi, 2005).
6. R. Blake, *Wireless Communication Technology* (DELMAR, New Delhi, 2001).

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CORE PRACTICAL IV

PHYSICS PRACTICAL IV

(ELECTRONICS)

OBJECTIVE

- V*erification of characteristics and applications of electronic components and devices.*

Any **FIFTEEN** experiments

1. Characteristics of LVDT
2. Characteristics of LDR
3. Characteristics of strain guage
4. Characteristics of load cell
5. Characteristics of torque transducer
6. Calibration of thermistor
7. Digital to analog converter -- R-2R and weighted method
8. Study of frequency multiplexer using PLL
9. Digital comparator using XOR and NAND gates
10. Study of Hall effect
11. Four bit binary up and down counter using IC 7473
12. BCD to 7 segment display
13. Study of RAM
14. Study of A/D converter -- Counter ramp type method
15. Study of Arithmetic Logic Unit (ALU) -- IC 74181
16. Construction and study of characteristics of Chua's diode
17. Study of nonlinear dynamics of Chua's circuit
18. Construction of memristor
19. Pulse code modulation and demodulation
20. Voltage controlled oscillator using IC 555
21. Microwave IC – Filter Characteristics
22. Characteristics of a voltage dependent resistor (VDR)
23. Transmission characteristics of optical fiber link
24. Design of AC/DC voltage regulator using SCR
25. Characteristics of Gunn diode oscillator

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ELECTIVE COURSE V

NANOPHYSICS

OBJECTIVES

- To learn the structures, properties, characterization and applications of nanomaterials.

Unit I Introduction to Nano and Types of Nanomaterials

Need and origin of nano -- Nano and energetic – Top-down and bottom-up approaches – Introductory ideas of 1D, 2D and 3D nanostructured materials -- Quantum dots -- Quantum wire – Quantum well -- Exciton confinement in quantum dots.

Unit II Carbon Nanostructures

Carbon molecules and carbon bond -- C_{60}: Discovery and structure of C_{60} and its crystal -- Superconductivity in C_{60} -- Carbon nanotubes: Fabrication – Structure – Electrical properties – Vibrational properties – Mechanical properties -- Applications (fuel cells, chemical sensors, catalysts).

Unit III Fabrication of Nanomaterials

Synthesis of oxide nanoparticles by sol-gel method -- Electrochemical deposition method – Electrospinning method – Lithography -- Atomic layer deposition -- Langmuir--Blodgett films -- Zeolite cages -- Core shell structures – Organic and inorganic hybrids.

Unit IV Characterization of Nanomaterials

Principles, experimental set-up, procedure and utility of scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning tunneling microscope (STM) and scanning probe microscopy (SPM).

Unit V Applications

Molecular electronics and nanoelectronics – Nanorobots -- Biological applications of nanoparticles -- Catalysis by gold nanoparticles – Band-gap engineered quantum devices -- Nanomechanics -- CNT emitters – Photoelectrochemical cells -- Photonic crystals – Plasmon waveguides.

Books for Study

1. T.Pradeep et al., *A Textbook of Nanoscience and Nanotechnology* (Tata McGraw Hill, New Delhi, 2012).
2. R.W. Kelsall, I.W. Hamley and M. Geoghegan, *Nanoscale Science and Nanotechnology* (John-Wiley & Sons, Chichester, 2005).
3. G. Cao, *Nanostructures and Nanomaterials* (Imperial College Press, London, 2004).
4. C.P. Poole and F.J. Owens, *Introduction to Nanotechnology* (Wiley, New Delhi, 2003).

Books for References

1. H.S. Nalwa, *Nanostructured Materials and Nanotechnology* (Academic Press, San Diego, 2002).
2. M. Wilson, K. Kannangara, G. Smith, M. Simmons, B. Raguse, *Nanotechnology: Basic Science and Emerging Technologies* (Overseas Press, New Delhi, 2005).

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
M.Sc. Visual Communication Course Structure under CBCS
(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Dynamics of Visual Communication	6	4	3	25	75	100
	Core Course – II (CC)	Image and Imagination	6	4	3	25	75	100
	Core Course – III (CC)	Design Principles and Packaging	5	4	3	25	75	100
	Core Course – IV (CC)	Introduction to Film Studies	5	4	3	25	75	100
	Core Practical – I (CP)	Professional Photography (P)	8	4	3	40	60	100
		TOTAL	**30**	**20**				**500**
II	Core Course – V (CC)	Writing for the Media	6	5	3	25	75	100
	Core Course – VI (CC)	Theories of Communication and Visual Analysis	6	5	3	25	75	100
	Core Practical – II (CP)	Multimedia and Applications (P)	8	4	3	40	60	100
	Elective Course – I (EC)	Advertising and Public Relations	5	5	3	25	75	100
	Elective Course – II (EC)	Fundamentals of Sound	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
III	Core Course – VII (CC)	Development Communication	6	5	3	25	75	100
	Core Course – VIII (CC)	Communication Research Methods	6	5	3	25	75	100
	Core Practical – III (CP)	Audio and Video Production Techniques (P)	8	4	3	40	60	100
	Elective Course – III (EC)	Audio Visual Media	5	5	3	25	75	100
	Elective Course – IV (EC)	Contemporary Media Systems	5	5	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – IX (CC)	Media Management	5	5	3	25	75	100
	Core Course – X (CC)	Media Ethics	5	5	3	25	75	100
	Core Practical - IV (CP)	Web Designing Principles and Techniques (P)	8	4	3	40	60	100
	Elective Course – V (EC)	Culture and Communication	5	4	3	25	75	100
	Project	Dissertation & Internship	7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Note:

Project	: 100 Marks
Dissertation	: 80 Marks
Viva Voice	: 20 Marks

Core Papers	-	10
Core Practical	-	4
Elective Papers	-	5
Project	-	1

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

Note:

1. Theory	Internal	25 marks	External	75 marks
2. Practical	”	40 marks	”	60 marks

3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The passing minimum not less than 50% in the aggregate.

Project

Dissertation	60 Marks	[2 reviews – 20+20	=	40 marks
		Report Valuation	=	20 marks]
Internship	20 Marks			20 marks
Viva	20 Marks			20 marks

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CORE COURSE I

DYNAMICS OF VISUAL COMMUNICATION

Objective:

To understand principles of visual communication fundamentals to learn the Different perspectives on visual application, design, language and culture.

Unit I

Light and visual – Visualization process – Visual image – Principles of Colour: Psychology of colour, Colour theory and meanings – Sensual and perceptual theories – Attributes of visuals: Colour, Form, Depth and Movement.

Unit II

Visual language and culture – World culture, society and ethics, Understanding Popular Culture and Sub culture – Abstract thinking, Linear and lateral thinking – Holistic visual thinking.

Unit III

Visual media – Principles – Image and Imagination - Perspectives of visual images – Visual perception – Communication design, Graphic design and informational designs – Visual persuasion in various fields.

Unit IV

Introduction semiotics – Analysis - Aspects of signs and symbols – Sign and meanings – Description of signs – Denotations and connotations – Paradigmatic and syntagmatic aspects of signs – Signs and codes – reference systems – Audience interpretations - The semiotic and structuralistic approach to Visuals – Psychoanalysis and visuality; Subjectivity and unconscious – Voyeuristic gaze to the laconian gaze.

Unit V

Visual perspectives and its special features: photography, motion picture, television, computer graphics, new media, World Wide Web. Feministic approach to visual media – Postmodern and postcolonial approach to visuals – Marxixt approach to visual texts.

References:

1. Visual Communication – Images with messages 3rd Edition, Paul Martin Lester, Thomson Wadsworth, USA 2003.
2. Palmer, Frederic: Visual Elements of Art and Design, 1989, Longman.
3. Luin Annette, Power of the images, Rutledge and Kegan Paul, London 1985.
4. Nick Lacy, Images and Representation, Macmillan, London 1998.
5. John Fiske, Understanding Popular Culture, Unwin Hyman, London 1989.
6. Pradeep Manda. Visual Media Communication. Authors Press, New Delhi 2001.

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CORE COURSE II

IMAGE AND IMAGINATION

Objective:

To understand principles of design elements and develop the creative thinking by learning the basics through theories of image and imagination process.

UNIT I

Elements of Visual literacy; Image and Imagination; and Modern Image Makers. Elements of design; Principles of design: Unity, balance, rhythm, proportion, Movement; Language of design: white space, fonts, pictures, page layout and design.

UNIT II

Sensation and perception; Learning and thinking; Human Intelligence; Aptitude and personality Development; Motivation and creativity; Schools of psychology; Application of psychological concepts of visual communication.

UNIT III

Principles of perspective; Composition; Light and shade; Surface textures; Building visual vocabulary by exaggeration; Distortion, Stylization and Abstraction.

UNIT IV

The psychology of human perception; Form perception; Depth and distance perception; Binocular and monocular cues; Perceptual constancy; Illusion; Building visual vocabulary by exaggeration, distortion, stylization and abstraction; The visual and personal identity.

UNIT V

Thinking : Theories and models of thinking – Information Processing Theory, S-R theory, Cognitive theories, Simulation Models, Types of Thinking – Free Association, Imaginal Thought, Reasoning – Types, Problem Solving, Decision Making, Creative Thinking, Concept Formation, Language And Thought. Linear and lateral thinking – holistic visual thinking.

REFERENCES

1. Nick Lacy, Images and Representation, Macmillan, London 1998.
2. Stuart Price, Media Studies, Pitman, London 1993.
3. John Berger, Ways of Seeing, BBC and Penguin, London 1972.
4. Kulin Annette, Power of the Images, Rutledge and Kegan Paul, London 1985.

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CORE COURSE III

DESIGN PRINCIPLES AND PACKAGING

Objective:

To understand principles and elements of design with the various design software applications and exhibiting the nuances packaging processes.

Unit I

A brief history of graphic design – Elements of design – Principles of design – Process of Design – Functions of Design – Creativity and creative process – Traditional and modern design.

Unit II

Text and images: typography – styles and features –Colour in design – colour theory and combinations – Design and composition – Graphic design softwares – Features and applications of Coral Draw, Photoshop, Illustrator, Quark Xpress, Page Maker.

Unit III

Definition of packaging – History of packaging – The changing face of retailing – Packaging and social change – Packaging design today – Future developments – Types of packaging; basic, surprising, interactive and promotional.

Unit IV

Packaging process: Analysis of product – deciding the mode of packaging – Flexible packaging – Paper – Plastic films –Foils and specialty films – containers; Board based containers – Plastic containers –Glass containers – Metal containers – Labeling and Legislations; Nutritional and barcode labeling – Legal requirements.

Unit V

Final process of packaging: Lamination – Die cutting – Creasing – Folding – Strapping and stapling– Radio Frequency Identification tags and types.

References:

1. Bridgewater, Peter. An Introduction to Graphic Design. Quintel Publications, London 1997.
2. Gollingwood, R.G. The Principles of Art. Oxford University Press, New York 1958.
3. Nakamira, Sadao. The colour source book for Graphic Designers. Shoin Pub. Co Japan 1990.
4. Best of Graphic Design. Page One publicshing, Singapore 1993.
5. Hillman, David. Multimedia Technology Applications. Galgotia Pub. New Delhi 1998.
6. Steven Sonsino, Packaging design–Graphics materials technology, Thames & Hudson Ltd., London 1990
7. Packaging Graphics + Design by Renee Philliphs, Rockport Publishers, USA, 2001
8. The perfect Package by Catharine M. Fishel, Rockport Publishers, USA, 2000.
9. Packaging by Design Library, Rockport Publishers, USA, 1995.

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CORE COURSE IV

INTRODUCTION TO FILM STUDIES

Objective:

To know the background of Indian and foreign cinema and identify the techniques in film productions and film as medium of social change.

Unit I

Short History of Indian cinema – Brief history and trends of foreign cinema – Film as a medium of communication and Social change – Growth of Tamil Cinema – contributions of Tamil cinema to social and political awareness – Film Industry status – contemporary tends.

Unit II

Planning, Pre-production: Concept / story development – Scripting / Screen play writing – Budgeting – casting – locations – financing. Production: Shooting – Problems of artists – direction, cinematography. Post-Production: Editing - sound recording – dubbing – special effects – graphics and final mixing – distribution and exhibition.

Unit III

Mis-en-scene – space and time – framing – Film culture – Film genres – dividing a feature film into parts and genres (language, style, grammar, syntax), Documentary genres, Role of a cinematography, Editing dimensions of film editing – deconstruction of film, Award winning films – review – The power of sound, Foley sound, theatrical sound formats.

Unit IV

Camera Production: the shot, scene, sequence, story board, types of script, location shooting. Single camera Vs. multi camera production – rehearsal – digital intermediate – video format.

Unit V

Documentary and short films – World union of documentary film makers – cinema of reality – real life characters – real issues – story material – propaganda films and corporate films – films of expression – Indian documentary forms – National film policy.

References;

1. Ashish Rajadhyasha, Paul Wileman, Encyclopedia of Indian Cinema, Oxford Uni. Press, New Delhi 2005.
2. Proferes, Nicholas, Film Directing Fundamentals, Oxford University Press, 2001. Paul Wheeler, Digital Cinematography, Focal Press 2001
3. Monoco, James. How to read a film, Routledge, London 2001 Thoraval, Yves. The Cinema of India (1896 -2000).
4. Jag Moham, Documentary Films and Indian Awakening, Publications Division, New Delhi 1980.
5. Gaston Roberge, Another Cinema for Another society, Seagull Publications Calcutta 1985.
6. Sanjit Narwekar, Spectrum India 1994, 3rd Bombay International Film Festival for Documentary, Short and Animation Films.

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CORE PRACTICAL I

PROFESSIONAL PHOTOGRAPHY (P)

List of Practical's

Students has to choose any *ten* topics given below

1. Framing and Composition – Same elements in different positions
2. Lighting – Same subject in different lighting (Key light, Fill light, Back light & Background lighting)
3. Forms & Texture – Natural & Artificial
4. Patterns – Natural & Artificial
5. Portraits – Single & Group
6. Still Life
7. Nature (Landscape)
8. Animals
9. People
10. Travel Photograph
11. Action Photograph
12. News Photograph
13. Colour Correction & Cropping
14. Photographs & Special Effects
15. Caption & Cutline Writing

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CORE COURSE V

WRITING FOR THE MEDIA

Objective:

To know the writing style for different media with an understanding of its medium and audience characteristics for its diverse programmes.

UNIT I

Nature and characteristics of a Newspaper- Readers‟ perception – Information medium – Deadline – content variety – general and specialized newspapers – Editorial policy and style – language – inverted pyramid – source attribution - writing features and articles

UNIT II

General and specialized magazines – contents – target readers – language – writing style – pictures and illustrations – features and special articles – a comparative analysis – Freelancing.

UNIT III

Nature and characteristics of Radio – Radio for information, education and entertainment – Time and deadline factor – News headlines and highlights – News features – talk shows – interviews – Radio audiences – audience participation - language and style – New wave FM Radio – Radio Jockeying – target audience – content variety and style – music- competition – technological factors in writing for electronic media

UNIT IV

News writing- news angle, multiangled stories, feature openers, development of story, news formula, sign posting, accuracy and field work.

UNIT V

Internet as a medium - nature and characteristics – users profile – Newspapers online – hypertext - textual and visual limitations – language and style – multimedia support – contents online: informational, educational and entertainment – authenticity and piracy issues – regulations.

REFERENCE

1. Robert Hilliard, Writing for Television and Radio, Hasting House, New York, 1982.
2. Timothy Gerard, Writing for Multimedia: Entertainment Education, Training, Advertising and World Wide Web, Focal Press, Oxford, 1997.
3. Rosemary Horstmann, Writing for Radio, A and C Black, London, 1991.
4. Gerald Kelsey, Writing for Television, A and C Black, London, 1990.
5. J. Michael Stracynski, The Complete Book of Script writing: Television, Radio,
6. Motion Pictures, The stage Play, Writers‟ Digest Books, 1982.
7. David Keith Cohler, Broadcast Journalism: A Guide for the Presentation of Radio and Television News, Prentice-Hall, 1985.
8. Jill Dick, Writing for Magazines, A and C Black, London, 1996.

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CORE COURSE VI

THEORIES OF COMMUNICATION AND VISUAL ANALYSIS

Objective:

To understand the theoretical knowledge on communication from the normative period to the present practices with the sociological, psychological, Marxist, semiotic and feminist approach to theoretical perspective in visual medium.

Unit I

Communication Theory: Introduction – Communication concepts and theory – Media systems and theories; Authoritarian, Libertarian, Social Responsibility and communist theories – Basic communication theories – Two step flow of information – theories of selective influence.

Unit II

Defining Communication models; Aristotle‟s model – Lasswell‟s model – Shannon & Weaver‟s mathematical model – Newcomb‟s model – Osgood Schramm model – Gerbner‟s model – Katz and Lazerfeld‟s model – David Berlo‟s model – White‟s Gatekeeper‟s model.

Unit III

Media uses and effects: effects theory – Uses and Gratifications theory – media dependency theory –social learning theory – cultivation analysis – agenda setting theory – diffusion of innovation – cultural studies and critical approaches.

Unit IV

Visual analysis theories: Sign and meaning making process; The semiotic and structuralistic approach to Visuals – Psychoanalysis and visuality; Subjectivity and unconscious – Voyeuristic gaze to the laconian gaze.

Unit V

Feministic approach to visual media – Postmodern and postcolonial approach to visuals – Marxixt approach to visual texts.

References

1. Mass Communication theory (6th edn) South Asia Edition, Sage, New Delhi, 2010
2. Theories of Mass Communication by Mattelart et.al, Sage, London 1998.
3. Essentials of Mass Commuiniction by Asa Berger, Sage, New Delhi 2000.
4. Understanding Media Theory by Kevin Williams, Oxford University Press, New York 2003.
5. Visual Methodologies, Gillan Rose, Sage Publications, London 2001.
6. Media Analyzing Techniques, Berger Asa, Sage Publications, New York 1998.
7. Ways of Seeing, Berger J, BBC London 1972.
8. Gender Trouble, Butler J. Routledge, London, 1990.

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CORE PRACTICAL II

MULTIMEDIA AND APPLICATIONS (P)

List of Practical's

Students has to choose any *Five* topics given below

1. Animation aspects. Color and texture.
2. Animation principles. Preparing for animation.
3. Animation for integration
4. Create a 2D animation Ad for a Product
5. Concept, Story and Scripting for 3D Feature
6. Character Designs using 3D Software
7. Design and Layouts of backgrounds using 3D Software
8. Key frame animation of characters using 3D Animation software
9. Texturing of backgrounds and characters using 3D package
10. Application of 3D titling

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ELECTIVE COURSE I

ADVERTISING AND PUBLIC RELATIONS

Objective:

To understand the advertising basics with the marketing perspective and the role of public relations as an industry and also the need for PR in media centre's itself.

Unit I

Role of Advertisement in Social and Economic Developments – Market Conditions – Perfect and Imperfect Conditions – Advertisement as a source of anti-cyclical measures. Advertising – Various Fields of Advertising – Advertising Jobs and Talents needed to fill them – Career Planning – Breaking into Advertising – Need for a successful career in Advertising.

Unit II

Psychology in advertising - Understanding the minds of the people – Exploiting the Weakness of Humanism – Family Prestige – Custom and Traditions – Individual Personality – Modeling in Advertisements.

Unit III

Kinds of Advertisements in Press Media – Selection of Media – Production of successful Advertisement – Types of Advertisements: a) Media Wise – Print, Radio, T.V, Films – b) Outdoor and Indoor – Bus Panels, Hoardings, Direct Mail, Exhibitions.

Unit IV

Advertising in India- Media wise – Audio-Visual Media – Advertisements servicing – Advertising policy in India – Advertising Agency System – Code and Ethics in Advertisement. Study of Efficiency in Advertising – Scientific Study of Advertising – Economy in Advertising – Types of advertising Research.

Unit V

Public Relations- Definition – Public Relations as an art in the system of management – Need for good Public Relations a) Information source of the concern b) Feedback c) Smooth internal / external relations for employee d) Management relations with employee. Traits of a good Public Relations Officer – Organizing a Public Relations Office – Training for efficient system of Public Relations

Need for good Public Relations arrangement in Media centers – Public Relations in Indian Press Media – Public Relations System in Radio a) Source to make the

Media effective b) Method of collecting programme through Public Relations – Public Relations System in Television Media – Public Relation System in Private Sector, Public Sector – Planning the Process for Public Relations – Types of Publicity – a) Meaning of publicity b) Publicity for Welfare Sake c) Cost Free Nature Publicity.

References:

1. Ahuja B.N and Chhabra, S.S, Advertising and Public Relations, Surjeet Publications, Delhi , 1990
2. David A.Aaker and John G Myers, Advertising Management, Prentice Hall of India Pvt. Ltd., New Delhi. 1983, 2nd Edition
3. John S.Wright and Daniel S. Warner Advertising, Mc Graw Hill Book Company Inc., New York, 1962
4. Mehta, D.S, Hand Book of Public Relations in India, Allied Publishers Limited., New Delhi, Reprinted 1991
5. Sontakki, C.N, Advertising, Kalyani Publishers, Ludhiana, 1989
6. John S Wright et al., Advertising, Mc Graw Hill Book Company, New York, 1962

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ELECTIVE COURSE II

FUNDAMENTALS OF SOUND

Objective:

To have knowledge of sound from basics to the digital along studio communication set up and its functioning of various accessories associated with the sound recording.

UNIT I

Perception of sound - hearing sensitivity - frequency range- sound- wave length; the speed of sound; measuring sound; psychoacoustics - dBA and dBC concepts ; musical sounds, noise - signal dynamic range - pitch - harmonics-equalization-reverberation time, Sabine formula.

UNIT II

Sound isolation and room acoustics- means of control- treatments- studio layout – room dimensions- Basic set-up of recording system-analog, digital,- cables and connectors, interference, microphone , musical stands, equipment inter-connection – input, out meters-the essence of recording engineering.

UNIT III

The production chain and responsibilities - recording session, production charts and log, laying tracks, mono, stereo, panning, surround, filters and pad - studio communication, environment, head phones: types and uses, ambience noise, dolby A,B,C,SR,bdx. LFE.

UNIT IV

Microphones types - direction pick up pattern, phantom power, noise, choosing the right mike, technique - Sound reproduction devices - zero level, monitors, specifications listening test-Compression ratios -various sound file extensions-time code, synchronization –positioning of microphones – speech-musical instrument s- standard rules,1/3 rule, care and handling - foley & sound effect creation.

UNIT V

Mixing console - Echo and reverberation - special effects units- equalizers & compressors, plug-ins - digital recording software - editing techniques. Input devices - Storage - Output devices - file transfer protocols- networking of studio -streaming - basics of broadcasting- AM, FM, mobile radio, internet radios, community radio, educational radio broadcasts, audio publishing .

REFERENCES:

1. Philip Newell, Elsivier. Recording Studio Design. Oxford: Focal press. 2005.
2. Strutt, John Williams, Baron. The Theory of Sound. Rayleigh. 1996.
3. Fahy, Frank Foundations of Engineering Acoustics. Academic Press. 2001
4. Acoustics and Psychoacoustics (2nd ed.). Oxford: Focal Press, 2001.
5. Morfey, Christopher L. Dictionary of Acoustics.. Academic press.2001.
6. Holman, Tomlinson. Surround Sound: Up and Running.. Oxford: Focal press.1999.
7. AlecNisbet. The Use of Microphones. Oxford: Focal Press, 2004.
8. Salkin, Glyn. Sound Recording and Reproduction. Oxford: Focal Press, 1996.

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CORE COURSE VII

DEVELOPMENT COMMUNICATION

Objective:

To have a comprehend understanding on communication as a tool for development from the beginning of independence to the practice of communication in the ICT era.

UNIT I

Definition and meanings of Development – Role of Communication in Development – Concepts and Theories - Communication for Development in Third World countries – Developments in different sectors in India – Communication infrastructure and new media growth-Communication as a tool for social and economic change.

UNIT II

Communication Technologies and human development – Mass media and dissemination development news – Communication networks and movements for development – Communication for literacy and empowerment- Mass media and rural development – Community media and development - Challenges and issues.

UNIT III

Information and Communication Technology in Development – Technology transfer – strategic management in developing countries – New media for socio economic growth – access and control issues – Govt. and private agencies in development campaigns –

UNIT IV

Globalisation – international political economy – IT policies – implementation of IT projects – private participation – competition – Public information and services through IT – development projects in India – Diffusion of innovation and adoption through media – cases.

UNIT V

e-Government: Concept and functioning of e-governance – system and operational control and management of e-government – public and private participation- information and services to the rural poor – egovt. policies and programmes of e governance in India – problems of access and use and challenges for the future.

REFERENCES

1. Ashwani Saith, M Vijayabaskar (2005). ICTs and Indian Economic Development, Sage, New Delhi.
2. Richard Heeks (2006). Implementing and Managing government: An International Text. Sage. New Delhi.
3. Avik Gosh (200^). Communication Technology and Human Development: Recent Experiences in the Indian Social Sector. Sage, New Delhi.
4. Srinivas R Melkote & Leslie Steeves (2001). Communication for Development in the Third Word : Theroy and Practice for empowerment. Sage, New Delhi.
5. Sumit Roy (2005). Globalisation, ICT and Developing Nations: Challenges in the Information Age. Sage, New Delhi.
6. Arvind Singhal and Everett M Rogers (2001). India‟s Communication Revolution. Sage,
7. New Delhi.
8. Subash Bhatnagar and Robert Schware (2000). Information and Communication Technology in Development: Cases from India. Sage, New Delhi.
9. Bella Mody (1991). Designing Messages for Development Communication: An audience participation based approach. Sage, New Delhi.
10. Goel Cohen (2004). Technology Transfer: Strategic Management in Developing Countries. Sage, New Delhi.
11. Kenneth Keniston & Deepak Kumar (2004). IT Experience in India. Sage, New Delhi.

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CORE COURSE VIII

COMMUNICATION RESEARCH METHODS

Objective:

To have a knowledge on research in social sciences and in the discipline of communication from the identification of research problem, execution and report writing.

UNIT I

Development of mass media research around the world –evolution of new media and the audiences Need for media analysis - Concepts and theories in Media studies.

UNIT II

Research procedure: Steps in doing research – Media Research problems – Review of media studies – sources of secondary data - Research questions and Hypothesis – Types of hypothesis - Sampling Procedure - probability and non-probability sampling techniques – merits and demerits of each – determinants of Sample size – Sampling error.

UNIT III

Primary Data: Types of data – nominal, ordinal, interval and ratio – Data collection methods and tools: Questionnaire – Types of questions – construction of a questionnaire – administration; Interview schedule and techniques – Focus group – observation techniques; Measurement of variables: Scales – Attitude scales: Procedure and application of Thurstone, Likert, Semantic Differential scales – Methods of testing Validity and Reliability of measurements.

UNIT IV

Research Design: Experimental and Non-experimental research methods and procedures – qualitative and quantitative studies – Descriptive and Analytical research- Cross sectional and Longitudinal research designs - factorial design - Content Analysis procedure and methods - Case study approach.

UNIT V

Date Analysis: Data classification, coding and tabulation – Graphic representation of data - Basic elements of statistics – Application of Parametric and non parametric statistics in hypothesis testing: chi-square, Student „t" test, correlation techniques, Analysis of Variance; Thesis writing method – Use of SPSS – Thesis writing format and style - Ethics in conducting research.

REFERENCES :

1. Research methods in mass communication" by stempell and westley, Prentice Hall, 1981.
2. Communication Theories: origins, methods and uses" by severin and tankard, Hastings house Publishers, 1979.
3. Mass media research – an introduction" by Roger wimmer and Joseph Dominick. (3rd edn.) wadsworth Pub1991.
4. Handbook of radio and TV Broadcasting" Ed – by James Fletcher,Van Nostrand Reinhold company, London 1981.
5. Studies in Mass communication and technology" Ed, by art Thomas, ablex publishing company, 1984.
6. Qualitative methodologies for Mass communication research" Ed by Klaus Bruhn Jensen and Nicholas W.Jankowski , Routledge, London, 1991.
7. Introduction to communication studies" (2nd edn.) by John Fiske, Routledge. 1990.
8. Channels of Discourse" edited by Robert Allen, Methuen & Co.. Ltd., London, 1987
9. International Media Research – a critical survey" Ed, by John corner et al… Routledge, London,1997.
10. Case study research – design and methods" by Robert yin, sage, 1984.
11. Media Analysis techniques by Arthur Berger , sage, New Delhi. 1988.
12. Content Analysis – An introduction to its Methodology" by Klaus Krippendorff, Sage, New Delhi. 1980.

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CORE PRACTICAL III

AUDIO AND VIDEO PRODUCTION TECHNIQUES (P)

List of Practical's

1. Give examples for different methods of storytelling.
2. Give examples for different types of Script- Writing.
3. Produce a 'Signature Tune' for an imaginary TV Channel.
4. Produce one segment of a 'Talk Show' not exceeding 10 minutes.
5. Produce one segment of a 'Musical Programme' not exceeding 10 minutes.
6. Produce one segment of a 'Children's Programme' not exceeding 10 minutes.
7. Produce a 'Promo' for a new serial.
8. Create a 'Story Board' for a short film not exceeding 20 minutes.
9. Produce a Documentary / Short film not exceeding 20 minutes.
10. Edit the given footage with a specific editing technique.

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ELECTIVE III

AUDIO VISUAL MEDIA

Objective:

To have an overview of the communication media's development, structure, characteristics and functioning and policies related to the broadcasting in India.

Unit I

Development of Radio Broadcasting in India – Ownership – Control – Autonomy for Radio – Types of Radio services- Radio as a source of News – Broadcast News – Value – Radio Language – News Bulletin – News Source for Radio – Reporters, Editors and Agencies – External News Services Interviews – Features – Writing for Radio.

Unit II

Special Audience Programmes – Rural and Farm Broadcasting – Educational Programmes – Programmes for Children, Women and Youth. Women Welfare – Children Welfare – Health and Family Planning – Rural Development – Urban problems

Unit III

Spread of Nationalism and Gandhism – Communal Harmony Programme at the Time of Emergency and Mourning – Involvement of Public and Radio Programme – Radio formats – Audience Research – Committee Reports on Radio in India.

Unit IV

Cinema and Society – Influence over Society- Effects – Cinema as Main Source of Entertainment – Powerful Media to Spread Message – Cinema for Political supremacy. Film Censor – Film Censor Enquiry Committee – Documentary Film – Newsreels – National and International Film Festivals – Film Awards – Future of Indian Cinema.

Unit V

Development of Television in India – News Programmes: a) News cast b) News Review – Formats of TV Programmes – Documentary – Special Features – Interviews. TV as a powerful Audio – Visual Media – Commercial and Sponsored Programme – Educational Service (ETV) – Satellite Instructional Television Experiment (SITE) – Role of TV in Social Changes – Cultural Exchanges – Economic Uplift – Advertisement in TV – Specialist causes and consequences – TV News and Agencies.

Governments policy on AIR to inform, educate, entertain and elevate a common man – Government Control over AIR in functioning – Competition among the Audio-Visual Media – Development of Videography – Cable TV. Audio-Visual Media in Developing Countries – Future of Audio-Visual Media in India – Research in Audio-Visual Media – Implications of Press Media over Audio-Visual Media.

References:

1. Chatterji, P.C, Broadcasting in India, Sage Publications, New Delhi, 1987
2. Mehra Massani, Broadcasting and the People, National Book Trust, New Delhi, 1985
3. Luthra, H.R, Indian Broadcasting, Publications Division, New Delhi, 1986
4. Warren K. Agee, Introduction to Mass Communication, 6th Edition, Oxford &IBH, Calcutta
5. Kumar, Keval J, Mass Communication in India, Jaico Publishing House, Bombay, Delhi, Bangalore, Calcutta, Madras, 1987
6. Krisha Sondhi, Problems of Communication in Developing Countries, Vision Books, New Delhi 1980
7. Jag Mohan, Documentary Films and National Awakening, Publications Divisions, Delhi, 1990
8. John Wyver, The Moving Image: An international History or Film Television & Video. Brazil
9. Blackwell, BFI Publishing, Oxford 1989
10. Andrew Boyd, Broadcast Journalism, Techniques of Radio and TV News, Heinemann Professional Publication.
11. Ivor Yorke, The Techniques of Television News, Focal Press
12. Robert Tyrell, The Work of the Television Journalism, Sugeet Publication.
13. Ahuja B.N, Audio Visual Journalism, Sugeet Publication.
14. Shrivastava K.M., Radio and TV Journalism, Sterling publishing Pvt. Ltd., New Delhi, 1989.
15. Mankekar, D.R., One-Way Free Flow

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ELECTIVE COURSE IV

CONTEMPORARY MEDIA SYSTEMS

Objective:

To have an outline of the different media practice in various countries and understand its characteristics of its content and its audience.

UNIT I

Characteristics of the media systems in the SAARC region with particular reference to the ownership patterns, audience characteristics and content categories.

UNIT II

An overview of the Indian media system with special reference to the impact of the emergency and post-emergency periods on the content and character of media.

UNIT III

Characteristics of the media systems in the ASEAN, North Asia and Middle East regions with particular reference to the ownership patterns, audience characteristics and content categories.

UNIT IV

Characteristics of the media systems in the regions of Western Europe, Eastern Europe, North America and Latin America with particular reference to the ownership patterns, audience characteristics and content categories.

UNIT V

Workshop: Students must analyze media products from at least three different media systems of the world and two case studies (each not less than 2500 words) must be submitted as the record for internal valuation and viva.

REFERENCE BOOKS

1. Elizabeth Fox,Media and politician Latin America
2. Sita Ram Sharma, Media and world Education Volume
3. GulrsKothali Newspaper Management in India
4. ZahidHussain –Vanitha Ray Media and Communication in the Third World
5. DayaKishanThussu, International Communication
6. ArvindShingal, Everet Rogers India's Communication Revolution
7. DayakishanThussu, Des Freedmar, War and The Media
8. A.GanesanThe Press in Tamil Nadu and the Struggle for Freedom1917-1937
9. J.Natarajan History of Indian Journalism
10. J.V.Vilanilam Mass Communication in India.

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CORE COURSE IX

MEDIA MANAGEMENT

Objective:

To understand the organizational structure of various media organizations and functioning of different departments from policy making to implementations.

Unit I

Introduction to media management - Principles of media management and its significance – Media as an industry and profession – India"s major media houses and their holdings.

Unit II

Ownership patterns of mass-media in India – sole proprietorship, partnership, private limited companies, public limited companies, trusts, co-operatives, religious institutions (societies) and franchisees (Chains). Policy formulation and controls in media organization.

Unit III

Organization structure of Media and different departments – Functions - general management, finance, circulation and Sales promotion – Pricing - Advertising and marketing, personnel management, production and reference sections; apex bodies: DAVP, INS and ABC.

Unit IV

Editorial – Response system. - Economics of Visual media – management, business, legal and financial aspects of media management. Budgeting and finance, capital costs, production costs, commercial policy, advertising and sales strategy, completion and survival, evolving a strategy and plan of action, operations, production schedule and process, evaluation, budget control, costing, tax, labour laws

Unit V

Planning and execution of programme production – production terms, control practices and procedures - Administration and programme management in media – scheduling, transmitting, record keeping, quality control and cost effective techniques. Employee / employer and customer relations services; marketing strategies – brand promotion (space/time, circulation) – reach – promotion – market survey techniques – human research development for media.

References:

1. The New Media Monopoly, Ben H. Bagdikian (Beacon Press, 2004)
2. The Problem of the Media, Robert W. McChesney (Monthy Review Press, 2004)
3. Management of Electronic Media, Alan B. Albarran (2nd ed., Wadsworth, 2002)
4. The Economics & Financing of Media Companies, Robert G. Picard (Fordham University Press, 2002)
5. The Business of Media, David Croteau and William Hoynes (Pine Forge Press, 2001)
6. Who Owns the Media? Benjamin M. Compaine, et. al., (3rd ed., Knowledge Industry, 2001)
7. Balancing on the Wire: The Art of Managing Media Organizations, James Redmond and Robert Trager (2nd ed., Atomic Dog, 2004)

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CORE COURSE X

MEDIA ETHICS

Objective:

To know the ethical issues in media and to understand and practice it in a democratic set up with social responsibility.

UNIT I

Role and responsibilities of the Press – Press and Democracy – Powers and privileges of the press – Fundamental rights – Press freedom – Constitutional provisions – Reasonable restrictions – Press and the public opinion.

UNIT II

Media agenda – private and public media institutions – Media conglomeration – Commercial Vs Public interests – Media and politics – media and corporates – Ad. Revenue – Editorial policy – implications of foreign press in India.

UNIT III

News selection – News values – Journalists as gatekeepers – sources of news – maintaining confidentiality – investigative journalism – sting operations – fair practice and professionalism – cases of unfair journalism.

UNIT IV

Media and the Judiciary, Legislature and the Executive – Media Laws – violations and restrictions – media censorship – recent cases.

UNIT V

Role and powers of Press Council – Responsibilities of the Advertising Standards Council- Prasar Bharati : Responsibilities and powers and limitations – Broadcasting Council- Broadcasting codes – Film Censor Board: role and functions – other media regulatory bodies of the government

Reference:

1. Ahuja, B.N. History of Press, Press Laws and Communications. New Delhi: Surjeet Publications, 1988.
2. Aggarwal, Vir Bala. Essentials of Practical Journalism. New Delhi: Concept Pub. 2006.
3. Nalini Rajan (Ed.). Practicing Journalism. London: Sage Pub. 2005. Joseph, N.K. Freedom of the Press. New Delhi: Anmol Pub. 1997 Ahuja B.N. Audio Visual Journalism. New Delhi. Surjeet Pub. 2000.
4. Shrivastava, K.M. Radio and Television Journalism. New Delhi: Sterling Pub. 1989.

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CORE PRACTICAL IV

WEB DESIGNING PRINCIPLES AND TECHNIQUES (P)

Objective:

To understand principles of visual communication fundamentals to learn the Different perspectives on visual application, design, language and culture.

List of Practical's

1. Design a web site for (with interactive commercials) for Periyar University.
2. Design a web site for (with interactive commercials) the Department of Journalism and Mass Communication.
3. Design a web site for (with interactive commercials) any Government Department for e-governance.
4. Design a web site for (with interactive commercials) any NGO.
5. Design a web site for (with interactive commercials) an e-Business Organization.
6. Design a web site for (with interactive commercials) a Search Engine.
7. Design a web site for (with interactive commercials) Entertainment.
8. Design a web site for (with interactive commercials) a Social Networking Community.
9. Design a web site for (with interactive commercials) in Tamil with Unicode.
10. Design your own web site.

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ELECTIVE COURSE V

CULTURE AND COMMUNICATION

Objective:

To recognize and identify the cultural association of the society and application of it with to give an indigenous way of effective communication.

UNIT I

Why study media? Understanding mass media. Characteristics of mass media. Effects of mass media on individual, society and culture-basic issues. Power of mass media. Media in Indian society. Definition, nature and scope. Function of mass media.

UNIT II

Media Audience analysis (mass, segmentation, product etc, social uses). Audience making. Active Vs Passive audience: Some theories of audience-Uses and Gratification Uses and Effects etc.

UNIT III

Media as text. Approaches to media analysis Marxist, Semiotics, Sociology, Psychoanalysis. Media and realism (class, gender, race, age, minorities, children etc.)

UNIT IV

Media as consciousness Industry. Social construction of reality by media. Rhetoric of the image, narrative etc. Media myths (representation, stereotypes etc.) - Cultural Studies approach to media, audience as textual determinant, audience as readers, audience positioning, establishing critical autonomy.

UNIT V

Media and Popular culture-commodities, culture and sub-culture, popular texts, popular discrimination, politics popular culture, popular culture Vs people's culture, celebrity industry-personality as brand name, hero-worship etc. Acquisition and transformation of popular culture

REFERENCES

Potter, James W (1998) Media Literacy. Sage Publications
Grossberg, Lawrence et al (1998) Media-Making: Mass Media in a popular culture. Sage Publications
Berger, Asa Authur (1998). Media Analysis Technique. Sage Publications

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PROJECT

DISSERTATION & INTERNSHIP

DISSERTATION

To demonstrate the student's competence in a chosen area of specialization with a view of gaining a placement in the Media Industry.

Methodology

Students are expected to do a project of professional nature within the stipulated time. Criteria for selecting the topic will be based on the area of specialization by the student. Emphasis will be given to producing works that are of professional and broadcasting quality that will help students enter the media industry with an evaluated portfolio. The project presentation and viva voce will complete the process of evaluation.

INTERNSHIP

To help student get exposed to actual situations and functioning of the media industry and experience reality.

Methodology

The student will be attached to the media industry for a period of three months on an internship basis. The intern will be exposed to a particular area of specialization. The department in coordination with the industry will closely monitor the progress of the intern. A Report and a viva-voce will complete the process of evaluation.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. ZOOLOGY

Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem.	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Animal Taxonomy, Phylogeny and Biodiversity	6	4	3	25	75	100
	Core Course – II (CC)	Cell and Molecular Biology	6	4	3	25	75	100
	Core Course – III (CC)	Molecular Genetics and Evolution	5	4	3	25	75	100
	Core Course – IV (CC)	Developmental Biology	5	4	3	25	75	100
	Core Practical – I (CP)	Animal Taxonomy, Phylogeny and Biodiversity, Cell and Molecular Biology, Molecular Genetics and Evolution & Developmental Biology (P)	4+4	4	3	40	60	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Animal Physiology	6	5	3	25	75	100
	Core Course – VI (CC)	Biochemistry & Biophysics	6	5	3	25	75	100
	Core Practical – II (CP)	Animal Physiology & Biochemistry & Biophysics	4+4	4	3	40	60	100
	Elective Course – I (EC)	Applied Biotechnology / Endocrinology	5	5	3	25	75	100
	Elective Course – II (EC)	Coastal geomorphology / Poultry Farming	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
III	Core Course – VII (CC)	Microbiology	6	5	3	25	75	100
	Core Course – VIII (CC)	Biostatistics and Computer Applications	6	5	3	25	75	100
	Core Practical – III (CP)	Microbiology & Biostatistics and Computer Applications (P)	4+4	4	3	40	60	100
	Elective Course – III (EC)	Research Methodology and Biotechniques / Applied Entomology	5	5	3	25	75	100
	Elective Course – IV (EC)	Fishery biology / Bioinformatics	5	5	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – IX (CC)	Environmental Biology	5	5	3	25	75	100
	Core Course – X (CC)	Immunology	5	5	3	25	75	100
	Core Practical - IV (CP)	Environmental Biology & Immunology (P)	4+4	4	3	40	60	100
	Elective Course – V (EC)	Sericulture / Aquaculture	5	4	3	25	75	100
	Project	Project	7	4	-	-	-	100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL			**120**	**90**				**2000**

Note:

Project	:100 Marks
Dissertation	: 80 Marks
Viva Voice	: 20 Marks

Core Papers	- 10
Core Practical	- 4
Elective Papers	- 5
Project	- 1

Note:

1. Theory	**Internal**	**25 marks**	**External**	**75 marks**
2. Practical	**"**	**40 marks**	**"**	**60 marks**

3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
c) The passing minimum not less than 50% in the aggregate.

Reference/Text Books contain the following details:

Name of the Author

Title of the Book

Name of the Publisher

Year

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CORE COURSE I

ANIMAL TAXONOMY, PHYLOGENY AND BIODIVERSITY

Objectives:

Animal diversity which is an essential topic for biologists to know the distribution, taxonomy and phylogeny of animal. To enlighten the primitive forms of invertebrates and vertebrates distribution. To help our students to understand the status and mode of living of different forms of animals.

UNIT I

Introduction to Taxonomy – Stages in taxonomy – importance of taxonomy – Aims and tasks of a Taxonomist – identification using taxonomic keys. Zoological classification: kinds of classification – Phyletic lineages – Linnean Hierarchy – Concepts of species – Typological, Nominalistic, Biological, Evolutionary, Recognition species concepts – other kinds of species – polytypic species – subspecies – super species.

UNIT II

Zoological Nomenclature: History of Nomenclature – Nature of scientific names – Synonyms and Homonyms _ Meanings of Authors in Brackets – Types: Holotypes, Paratype, Lectotype, Syntype, Neotype and Allotype – Publications on Taxonomy Research – ICZN and its rules – Ethics in Taxonomy Research.

UNIT III

Phylogeny of Invertebrates: Protozoa – Phylogenetic origin and evolution of the class Metazoa. Theories and origin of metazoan. Bilateria – theories and origin. Coelomata - Coelom and its origin. Trilobites – structure and significance. Mollusca – origin and evolution. Molluscan fossils and their significance. Echinoderm fossils.

UNIT IV

Phylogeny of Vertebrates: Jawless vertebrates - characteristic features of lampreys. earliest vertebrates: Ostracoderms – characteristic features and classification. Evolutionary position of Ostracoderms. Primitive jawed vertebrates – origin of jaws. Origin of Reptiles, Dinosaurs. Amphibian and reptilian features of seymouria, mammal like reptiles, aquatic reptiles, flying reptiles, rise and fall of dinosaurs. Fossil Birds- Archeopteryx. Origin of primates – adaptive radiation of lemuroids, Tarsius – new world monkeys, old world monkeys and apes, Australopithecus.

UNIT V

Biodiversity: definition – types – genetic, species and ecosystem diversity. Values and uses of biodiversity. Biodiversity measurements, Mega diversity centres. Loss of biodiversity. Conservation of biodiversity : *in situ* (afforestation, social forestry, agro forestry, Biosphere reserves, national parks and sanctuaries), *ex situ* (Cryopreservation, gene banks, sperm banks, DNA banks, tissue culture and biotechnological strategies). Biodiversity laws of India. Wild life protection Acts.

Text Books:

1. Simpson, G.G.1987, Principles of Animal Taxonomy, Oxford IBH Publishing Co., Pvt., New Delhi.
2. Devasahayan J.K., and N. Inbamani, 1887, Animal Phylogeny, R.V. Publications, Virudhunagar.
3. Agrawal K.C. 1996 Biodiversity, Agro Botanical Publishers, New Delhi

Reference Books:

1. Barnes R. D. 1982. Invertebrates Zoology 6th endn. Toppan International Co.,
2. Barrington, E. J. W. 1969. Invertebrate Structure and functions. English Language. Book Society.
3. Borradile, L.A. 1955. The Invertebrata.2nd endn. Cambridge University Press.
4. Carter, G. S. A. (1946) General Zoology of Invertebrates 2nd endn. (Wick and Jackson Ltd., London).
5. Clark, R.B and A.L. Panchen. 1971. Synopsis of animal classification. Chapman and Hall Publications, London.
6. Gardinar, M. S. 1972. Biology of the invertebrates, Mc Graw Hill Book Co., New York.
7. Hyman L.H. 1940 - 1959. The Invertebrata, Vol. I to VI.
8. Jolie, M. 1968. Chordate Morphology. East West Press.
9. Kapoor, V.C. 2010 Theory and Practice of Animal Taxonomy, Oxford and IBH Publishing Co., Pvt., New Delhi.
10. Kapoor, V.C. 1991. Theory and Practice of Animal Taxonomy. Oxford and IBH Publishing Co., Pvt. Ltd. New Delhi.
11. Kotpal, R.L. 1982. Protozoa, Porifera, Coelenterata, Helminthes, Annelida, Arthropoda, Mollusca, Echinodermata and Minor Phyla. Rastogi Publications Mayer, E. Elements of Taxonomy.
12. Narendran, T.C. 2009. An Introduction to Taxonomy, Zoological Survey of India, Kolkatta.
13. Newman, H.H. 1987. The Phylum Chordata. Sathis book Enterprise Publishers.
14. Simpson, G.G. 1987. Principles of animal taxonomy. Oxford IBH Publishing Co.
15. Solbrig, O.T., Van Emden, H.M. and Van Oordt, P.G.W.J. 1995, Biodiversity and Global change, CAB International, Wallingford. U.K.
16. Waterman, AJ. 1971. Chordate Structure and Function. Macmillan Co. London.
17. Young, J.Z. 1950. Life of Vertebrates. Clarendon Press Oxford.

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CORE COURSE II

CELL AND MOLECULAR BIOLOGY

Objectives:

This course facilitates to understand the structure at molecular level and function of prokaryote and eukaryote cell. To enlighten our students about the cellular organelles and its functions. The knowledge in Cell communications and signaling pathways.

UNIT I

Cell Membrane : Molecular organization – molecular models – cell permeability – cell surface differentiations and cell – cell communication – membrane receptors and signal transduction pathways. Cytoskeleton and Cell Motility: Microtubules, microfilaments and intermediate filaments – role in cell organization, division and motility. Methods of Cell Study: Micrometry – cell culture methods – cell fractionation technique – cytochemical staining methods – cytophotometry – immunocytochemistry and autoradiography.

UNIT II

Mitochondria and Energy Transduction: Molecular organization of mitochondria and their role in oxidative phosphorylation. Golgi bodies, Lysosomes, Endoplasmic reticulum- structure and functions. Nucleus and Chromosomes: Nuclear envelope – Nuclear pore – Nuclear proteins – Nucleosome – Structure and function of chromatin**,** euchromatin and heterochromatin. Giant chromosomes - Polytene and Lamp brush chromosome.

UNIT III

Nucleic Acids and Their Functions: DNA and RNA – chemical composition, types and functions. Exons – introns – extra chromosomal DNA- overlapping genes - Transposable elements. Gene amplifications. Replication of DNA, DNA repair mechanism. Mechanism of RNA splicing in eukaryotes. Cell division - Mitosis and meiosis. Cell Cycle: Phases of cell cycle - Molecular organization and functional significance of mitotic apparatus.

UNIT IV

Ribosomes: Morphology, ultra structure, biochemistry and functions. Protein Synthesis**:** Mechanism of transcription – role of transcription factors – transcription regulators – Processing of mRNA – translation – post translational modifications and control mechanism. Protein sorting and targeting. Protein Transport: Intracellular compartments and protein sorting. Vesicular traffic in secretary and endocytic pathways, transport from ER through Golgi to lysosome, endosome.

UNIT V

Cell communications**:** General principles of cell communication- signaling pathways. - signaling through G-protein linked cell surface receptors - signaling through enzyme-linked cell surface receptors - Biology of Cancer Cells: Characteristics of Cancer Cells, types of tumours. Apoptosis and its relevance in cancer biology. Oncogenes – Environmental factors inducing cancer.

Text Books:

1. Powar, C.B. (1983), Cell Biology, Himalaya Publishing House, Bombay
2. David Freifelder (1998), Molecular Biology, Ii Ed., Narosa Publishing House, New Delhi.
3. De Robertis, E.D.P., and De Robertis, Jr. E.M.F. 2001. Cell and molecular biology. Williams & Wilkins, USA.

Reference Books:

1. Alberts, B., Johnson, A., Lewis, J, Raff, M., Roberts, K and Walter, P. 2002. Molecular biology of the Cell. Garland science, New York.
2. Bolsover, S.R, Hyams, J.S, Shephard, E.A, White, H.A and Wiedemann, C.G. 2004. Cell Biology. John Wiley & sons, Inc. Publication, New Jersey.
3. De Robertis, E.D.P. And De Robertis, E.M.F. (1987), Cell and Molecular Biology, Viii Ed., Lea And Febiger, Philadelphia.
4. Hartl, D.L. and Jones, E.W. 2005. Genetics analysis of genes and genomes. Jones and Barlett. UK.
5. Klug, W.S and Cummings, M.R. 2005. Concepts of Genetics. Pearson Education P (Ltd), Singapore.
6. Lewin, B. 2000. Genes VII. Oxford University Press Inc. New York.
7. Lewis, Keleinsmith And Valeris M. Kish (1988), Principles Of Cell Biology, Harper And Row Publications, New York.
8. Lewis, R. 2005. Human genetics – concepts and applications. McGraw-Hill. New Delhi.
9. Lodish, H., Berk A., Matsudaira, P., Kaiser, C.A., Krieger, M., Scott, M.P., Zipursky, S.L.And Darnell, J. 2004. Molecular Cell Biology. W.H. Freeman & Co., New York.
10. Watson Et Al., (1987), Molecular Biology Of The Gene, The Benjamin Cummings Publishing Co., Inc., California.
11. Watson, J.D, Baker, T.A, Bell, S.P., Gann, A., Levine, M and Losick, R. 2004. Molecular biology of the gene. Pearson Education P(ltd), Singapore

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CORE COURSE III

MOLECULAR GENETICS AND EVOLUTION

Objectives:

To enlighten our students about the DNA and its functions. The knowledge in the molecular biology and genetics will provide diagnosis of genetic disorders and treatment at molecular level. It provides basic information of molecular phylogenies and evolution

UNIT I

Structure and functions of genetic materials: Nuclear and mitochondrial genome organization, Structures of DNA and RNA, Stereochemistry of bases and secondary structures. Genetic structure analyses of eukaryotic genomes. Chromatin structure and nucleosome concept, Organization and function of genetic material, Gene paradox, Repetitive DNA, Satellite DNA, Overlapping genes, Split genes, Pseudogenes.

UNIT II

Identification of genetic material **-** Fine structure of gene – Cistron, muton, recon, exon, intron. Multigene families – types – simple and complex multigenes. Regulation of gene expression in prokaryotes – *Lac* and tryptophan operon of bacteria. Regulation of gene expression in eukaryotes - Gene clustering, Mechanism of positive and negative control of gene expression. Genetic code – Decoding of gene control – alphabets of the code, coding dictionary. Translational and transcriptional control of gene expression, Environmental effects on gene regulation. Epigenetics.

UNIT III

Mutation –point mutations, spontaneous and inducible mutations, reversible and suppressor mutations, lethal mutations, biochemical mutations, phenotypic effects of mutation, molecular basis of mutation, mutagens – physical, chemical and biological. Human Genetics: Inborn errors of metabolism: disorders of amino acid metabolism – PKU, alkaptonuria and albinism, Haemoglobin disorders – Sickle cell anaemia and thalassemia. Carcinogens – Genetic basis of cancer –Role of oncogenes and tumour suppressor genes – RB genes and P_{53}.

UNIT IV

Origin of life on Earth - Theory of Chemical Evolution. Primitive Earth Conditions - anoxic reductive atmosphere, relatively high temperature, volcanic eruption, radioactivity, high frequency UV radiation. Molecular evolution : Abiotic formation of sugars, amino acids, organic acids, purines, pyrimidines, glycerol and nucleotides and their polymerization to RNA on reactive surfaces, polymerization of amino acids to Polypeptides and Proteins. Ribozymes and RNA World. Formation of DNA, Formation of nucleoproteins, Prions, Natural selection of self-replicating polymers**.**

UNIT V

Molecular phylogenies and evolution: History of molecular phylogenetics - amino acid sequences, DNA sequences – DNA and its repetitive sequences. Nucleic acid phylogeny based on - DNA– DNA hybridization, restriction enzymes and nucleotide sequences.

Combined nucleic acid – amino acid phylogenies. Rate of molecular change, molecular clock, regulatory genes and evolution. Gene evolution - evolution of gene families, molecular drive, assessment of molecular variation.

Text Books:

1. Ursula Goodenough (1984), Genetics, Saunders College Publishing Co., London.
2. Kavita B. Ahluwalia 1991 'Genetics' Wiley Eastern Ltd., New Delhi. 2.
3. Monroe.W.Strickberger, Evolution Third Edition. Jones and Bartlett publishers International, London, UK.

Reference Books:

Genetics

1. Benjamin Levin (2005) Genes VIII, Oxford University Press, New York.
2. Daniel L. Hartl (1996) Genetics, III Ed., Jones Bartlett Publishers. Boston.
3. David Friefelder (1998) Microbial Genetics, Narosa Publishing House, New Delhi.
4. Gardner, E. J. et.al. (1991). Principles of Genetics. John Wiley & Sons. New York.
5. Gurbachan S.Miglani-2003 "Advanced Genetics". Narosa Publishing House, New Delhi.
6. Jenkins, J. B. (1983) Human Genetics, The Benjamin Cummings Publishing Co.,
7. John D. Hawkins (1996) Gene Structure and Expression, III Ed. Cambridge University Press.
8. Munroe.W. Also, Curt Stern, 1983 'The Principle of Human Genetics'. W.H. Freeman & Co., San. Francisco.
9. Robert H. Tamarin (1996) Principles of Genetics, WCB Publishers.
10. Robert. H Tamarin 2004 'Principles of Genetics' Tata Mc. Graw-Hill Publishing Company Ltd. New Delhi.
11. Strickberger Monnroe, W. (1996) Genetics, Prentice Hall of India Pvt. Ltd., New

Evolution

1. Moody, P.A. 1978. Introduction to Evolution. Harper International.
2. Dodson. 1990. Evolution, Reinhold, New York.
3. Barton, N. H., Briggs, D. E.G., Eisen, J. A., Goldstein, A. E., Patel, N. H., Cold. Evolution, Spring Harbor Laboratory Press, New York, USA
4. Evolution, Hall, B. K. and Hallgrimsson, B., Jones and Bartlett Publisher, Sudbury, USA.
5. Futuyma, D. J.,Evolution, Sinauer Associates, Inc., Sunderland, USA

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CORE COURSE IV

DEVELOPMENTAL BIOLOGY

Objectives:

This course provides the process of early embryonic development and review the current development in the field of embryology. The formation of embryo and embryological disorders and treatment methodology. Precaution and health care during pregnancy and gestation.

UNIT I

Introduction to developmental biology. Gametogenesis – Spermatogenesis – Cells in seminiferous tubules, spermiogenesis, structure and types of sperm. Oogenesis – origin and growth of oocyte, maturation of egg, egg envelops, vitellogenesis, and organization of egg cytoplasm. Types of eggs. Egg cortex - polarity and symmetry of egg. Fertilization : Events of fertilization- acrosome reaction in sperm – cortical reaction in egg - recognition of egg and sperm, gamete fusion, activation of egg metabolism, physiological changes in the organization of egg cytoplasm, theories of fertilization.

UNIT II

Cellular differentiation- cytodifferentiation and chemodifferentiation. Stem cells- totipotency and pleuripotency. Embryonic Stem cells and their applications. Cleavage – Patterns of cleavage – radial, spiral and bilateral; Types – meroblastic, holoblastic and superficial, factors affecting cleavage. Blastulation – Types of blastula. Fate maps. Presumptive organ forming areas in frog and chick. Morphogenetic movements and gastrulation in frog and chick.

UNIT III

Organogenesis – Ectodermal derivatives: formation of central nervous system- development of brain eye in frog. Mesodermal derivatives: heart and kidney in frog. Endodermal derivative: intestine in frog. Organogenesis in Chick – development of heart. Extra embryonic membranes in Chicks – Placentation – its types and physiology in mammals.

UNIT IV

Polarity and gradient: dorsal and ventral polarity – homeo box concept. Organiser concept - embryonic induction - mechanism of induction. Regeneration: Types of regeneration- amphibian limb regeneration- stimulus and suppression of regeneration. Metamorphosis- types- amphibian metamorphosis- events and hormonal control. Insect metamorphosis: moulting, growth and hormonal control.

UNIT V

Precaution and health care during pregnancy and gestation. Impotency: Causes of Impotency and sterility male and infertility in female – Concept of test-tube baby - Artificial Insemination in humans - In Vitro Fertilization (IVF) and Gamete-Intra-Fallopian Transfer (GIFT) – Advantages and disadvantages. Teratogenesis- Developmental mechanism of teratogenesis. Contributions of teratology to developmental biology. Teratogens and induced birth defects.

Text Books:

1. Veer balarastogi, Developmental biology, Kedarnath Ram nath publishers, meerut.
2. Arumugam.N. 1998. Developmental Biology, Saras Publications,
3. Balinsky, B.I. 1981. An Introduction to Embryology. W.B. Saunders Company. Philadelphia.

Reference Books:

1. Berry.A.K.2007. An Introduction To Embryology, Emkay Publications, New Delhi-51.
2. Beril., N.J..1986. Developmental Biology. Tata Mcgraw-Hill Publishing Ltd. New Delhi.
3. Banerjee. S , Development Biology, Dominant Publishers, New Delhi
4. Browder, L.N. (1980) Developmental Biology, Saunders College, Philadelphia.
5. Deuchar, E.M. (1976) Cellular Interaction In Animal Development, Chapman And Hall, London.
6. Verma, P.S. And Agarwal V.K. 2005. Chordate Embryology (Developmental Biology) S. Chand& Company Ltd., New Delhi.

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CORE PRACTICAL I

ANIMAL TAXONOMY, PHYLOGENY AND BIODIVERSITY, CELL AND MOLECULAR BIOLOGY, MOLECULAR GENETICS AND EVOLUTION & DEVELOPMENTAL BIOLOGY (P)

Objectives:

To obtain knowledge about the identification and classification of animals. To get the information of animal population - the phylogeny and fossil forms in the title of animal diversity. To impart the knowledge and concepts of Cell and Molecular Biology, Molecular Genetics and Evolution, Developmental Biology

ANIMAL TAXONOMY: A list of at least 50 representative animals belonging to major classes of nine invertebrate phyla and major orders of 5 classes of vertebrates can be shown as spotters to the students. A student has to identify and describe the salient features and assign them to the order, class and phylum to which they belong.

PHYLOGENY: Invertebrate larval forms - Trochophore, Nauplius, Bipinnaria, Tornaria
Fossils – Ammonoids, Belemnoids, Nautiloids , Echinoderm fossils, Dinosaurs and Archaeopteryx.

BIODIVERSITY

1. Marking of important Biodiversity regions, countries and centres in World and Indian map.
2. Collection of endemic animals photos with information from websites, journals, newspapers.

Dissections

Video clipping dissection of earthworm, cockroach, shark, frog, calotes and rat can be shown to the students. A student can make use of material available in any search web site for online dissection using Apple quick time software.

CELL AND MOLECULAR BIOLOGY

Micrometry
Human Buccal Smear
Blood Smear – Cockroach/ Man.

MOLECULAR GENETICS AND EVOLUTION

Drosophila culture – Identifications of Normal, mutants & sexes.
Blood groups ABO & Rh their genetic significance.
Pedigree analysis.

Human karyotyping & Chromosomal abnormalities.

DEVELOPMENTAL BIOLOGY

Preparation of sperm suspension in frog/bull and observation of the spermatozoa. Observation of live spermatozoa and study of rate of motility of sperm in frog /bull semen.
Developmental stages in chick embryo.
Vaginal smear preparation in rat / mouse to study the stages of oestrous cycle.

Record of Laboratory work shall be submitted at the time of practical examination.

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CORE COURSE V

ANIMAL PHYSIOLOGY

Objectives:

Animal Physiology helps the students in understanding how the body functions adapts with respect to its external and internal environment, related to nervous integration, sensation, metabolism and reproduction.

UNIT I

Definition of digestion and types of digestion – extra and intracellular. Nutrition-Food requirements, Physiology of ingestion. Digestion in mouth, cardiac stomach, pyloric stomach, small intestine. Digestive enzymes and their role in the digestion of carbohydrates, proteins and lipids. Absorption and assimilation of digested food materials. Balanced diet, BMR and BMI. Homeostatic mechanisms: Osmo-ionic regulation in crustaceans and fishes – temperature and pH regulations in animals. Light – photobiological processes – pressure – acclimatization to high altitudes – Hydrostatic pressure – Buoyancy.

UNIT II

Respiration- Structure of mammalian lungs and gaseous exchange- Transport of oxygen–formation of oxyhaemoglobin and affinity of haemoglobin for Oxygen, Oxygen dissociation curves-Transport of CO2 Chloride shift, Bohr Effect. Circulation: Open and closed circulation. Structure of mammalian heart and its working mechanism – Heartbeat and cardiac cycle. Myogenic and neurogenic hearts. Properties and Functions of blood – factors contributing to heart problems.

UNIT III

Excretion – Forms of nitrogenous waste material and their formation. Organization of mammalian excretory system-structure and function of kidney and nephron – Counter current mechanism of urine formation. Muscles – General structure and types of muscles. Sliding filament mechanism of muscle contraction. Chemical changes during muscle contraction – role of calcium, ATP utilization and its replenishment.

UNIT IV

Structure of nerve cell. Nature of nerve impulse – resting potential and action potential. Properties of nerve impulse – threshold value, refractory period, all or none response. Conduction of nerve impulse, Structure of synapse, mechanism of synaptic transmission – electrical and chemical transmissions, Neuro-transmitters. Receptors: types, Photoreceptor – structure of human eye and physiology of vision, Phonoreceptors – structure of human ear- organ of corti-

physiology of hearing. Bioluminescene – Chronobiology: Biological rhythms – rhythms in man – biological clock.

UNIT V

Endocrine glands – Relationship between hypothalamus and pituitary gland. Hormones of hypothalamus. Hormones of Adenohypophysis and Neurohypophsis. Hormones of pineal gland, thyroid gland, parathyroid, thymus, adrenal and pancreas. Endocrine control of mammalian reproduction – Male and female hormones – Hormonal control of menstrual cycle in humans. Hormones of insects.

Text Books :

1. Sambasivaiah, Kamalakararao and Augustine Chellappa 1990. A Text book of Animal Physiology and Ecology, S. Chand & Co., Ltd., New Delhi – 110 055.
2. Parameswaran, Anantakrishnan and Ananta Subramananiam, 1975. Outlines of Animal Physiology, S. Viswanathan [Printers & Publishers] Pvt. Ltd.,
3. William S. Hoar, 1976. General and Comparative Physiology, Prentice Hall of India Pvt. Ltd., New Delhi – 110 001.

Reference Books :

1. Baldwin, E. (1964) An Introduction To Comparative Biochemistry, Cup, London.
2. Beck, W.S. (1971). Human Design, Harcourt Brace Joranorich Inc.,
3. Dawson, H. (1964) General Physiology, Little Brown Co., Boston.
4. Echert, R. And Randall, D. (1987) Animal Physiology, Cbs Publishers And Distributors
5. F.N. (1971) Animal Function, Principles And Adaptation, Macmillan Co., London.
6. Giese, A.C. (1979) Cell Physiology And Biochemistry, Prentice Hall
7. Gordon, M.S., Bartholomew, G.A., Grilnell, A.D., Jorgensen, C.B., And White.
8. Prosser, C.L. Brown 1985. Comparative Animal Physiology, Satish Book Enterprise, Agra – 282 003.
9. Turner, C.D. And Bagnara, J.T. (1976) General Endocrinology, 6th edn., Wb Saunders Co., Philadelphia.
10. Wilson, J.A. (1979) Principles Of Animal Physiology
11. Wood, D.W., 1983. Principles Of Animal Physiology 3rd Ed., 5.

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CORE COURSE VI

BIOCHEMISTRY AND BIOPHYSICS

Objectives:

This paper gives information about the biochemical and biophysical aspects related to living organisms. The life supporting molecules, their metabolism, biological oxidation and its relevance. Biophysical aspects and their properties.

BIOCHEMISTRY

UNIT I

Introduction to Biochemistry: – Physical and chemical processes of living systems – Water and it functions – Dissolved gases and their properties – pH and buffer. *Proteins:* Classification - Structure and functions. *Carbohydrates:* Classification – Structure, properties and functions. *Lipids:* Classification, structure, properties and functions. *Amino Acids:* Structure and classification – Ketogenic and glucogenic amino acids – Prostaglandins – their classes, functions and Pharmacological uses. *Vitamins:* Structure of water soluble and fat soluble vitamins and Deficiency symptoms.

UNIT II

Metabolism of *Carbohydrate*: Glycolysis, TCA cycle, HMP shunt pathway, Glycogenesis and glycogenolysis. *Protein:* General pathway of amino acid metabolism – deamination, transamination and decarboxylation. Urea cycle. Catabolism of Tyrosine, Tryptophan, Glycine and phenylalanine. *Lipid*: Beta-oxidation, biosynthesis of saturated fatty acids- Palmitic acid, Nucleic acids:- metabolism of purine and pyrimidine nucleotides. High energy phosphates and their role in redox reaction. Phosphagens-ATP as an energy molecule. Synthesis of ATP.

UNIT III

Respiratory pigments: Structure of Haemoglobin and Cytochrome. *Biological Oxidation:* Nucleotides, Flavoproteins, Cytochromes – Redox potential – Oxidative phosphorylation. *Enzymes:* Classification – Properties – 3D structure of an enzyme – Enzyme kinetics – Mechanism of action of enzymes - active site, Lock and Key model, induced fit hypothesis. Mechanism of enzyme catalysis, enzyme-substrate complex formation, Allosteric enzymes. Co-enzymes and its properties. *Hormones*: Mechanism of hormone action – Peptide hormone – Adenylatecyclase – Cyclic AMP mechanism – Ca^{++} - Phosphoinositol, steroid hormone and transcriptional control. Receptors of hormones- G-protein.

BIOPHYSICS

UNIT IV

Scope of Biophysics in Biology- structure and properties of atoms and molecules- chemical bonds – types – molecular interactions- atomic and molecular orbitals – X-ray diffraction – Polymerization of organic molecules– Colloids- description, and properties. Thermodynamic principles – Membrane biophysics – diffusion, active transport. Tyndall effect, Surface tension, Brownian movement, filtration, osmosis, dialysis.

UNIT V

Properties of natural light. Photoelectric effect – Photodynamic sensitization – Effect of UV light and ionizing radiations – Detection – Disintegration – Measurement of radio activity – Gieger Muller counter – Isotopes as tracers - Free energy from electromagnetic waves - Natural radiations. Principles and application of chromatography – Paper – Thin layer – Column – Ion – exchange – filtration – Gas liquid – HPLC and Affinity. Principles and applications of electrophoresis – Agarose gel electrophoresis – PAGE – SDS-PAGE.

Text Books:

1. Lehninger L. Albert, David. L. Nelson, Michael M. Cox. (1993), Principles Of Biochemistry, Cbs Publishers And Distributors, Delhi.
2. Ramamurthy, V and S. Raveendran. 2010. Fundamentals of Biochemistry. Aruma Publications, Koradacherry.

Reference Books:

1. Frunton J.S. & S. Simmonds, G.General and R.H.Dol. 1987. Outlines of Biochemistry, John Wiley & Sons.
2. Baldwin, E. 1964. An introduction to comparative Biochemistry, CUP, London.
3. Jain, J.L. 2003. Fundamentals of Biochemistry, S. Chand & Compnay Ltd. New Delhi.
4. Freifelder, D. 1993. Physical Biochemistry. W.H. freeman and company. New york.
5. Mallikarjuna Rao. 2006. Medical biochemistry. New Age International publishers, New Delhi.
6. Voet. G. 1989. Biochemistry. John Wiely and Sons, lnc.
7. Dubay, G. 1989. Biochemistry. Mac Millan publishing company, New York.
8. STRYER, L. (1988), Biochemistry, W.H. Freeman and Company, New York.
9. COOPER, T.G. (1977), The Tools of Biochemistry, Wiley Interscience Publication, John Wiley and Sons, New York.

Text Book: **BIO PHYSICS**

1. Casey, E.J.(1962), Biophysics Concepts and Mechanisms, East West Press Pvt. Ltd., Delhi.
2. Arora, M.P. 2004. Biophysics. Himalaya Publishing House, Mumbai. P 378.
3. P.Narayanan (1999) 'Introductory Biophysics' New Age Publishing Co., Mumbai, India.

Reference Books:

1. Ackerman, E., Ellis, L.B. and Williams, L.E. 1979. Biophysical Science. Prentice hall of India, New Jerssey, USA.
2. Daniel, M. 1989. Basis biophysics for biologists. Agro – Botanical publishers, India.
3. Pattabhi, V. and Gautham, N. 2003. Biophysics. Narosa publishing House, New Delhi.
4. Skoog, A., Douglas, J and Leary, J.J. 1992. Principles of Instrumental analysis. Sauders Golden Sunberst Series. Philadelphia.
5. Zubey. 1994. Biochemistry. The International books.
6. Bose, S. (1982) Elementary Biophysics. Jyoth Books.
7. Casey, E. J. (1962) Biophysics concepts and Mechanism. Affiliated East – West Press Pvt. Ltd., New Delhi.
8. Epstein, H. T. (1963) Elementary Biophysics selected topics. Addisson – Wesley Publishing Company Inc London.
9. Vasantha Pattabhi and N.Gautham (2001) 'Biophysics' Narosa Publishing Company, New Delhi.

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CORE PRACTICAL II

ANIMAL PHYSIOLOGY & BIOCHEMISTRY AND BIOPHYSICS (P)

Objectives:

To obtain knowledge about the physiological mechanism from animal models on respiration, excretion and some blood parameters. To identify the endocrine glands and their secretions.

Animal physiology:

1. Estimation of R_Q in fish with reference to light and temperature.
2. O_2 consumption in aquatic animal (fish).
3. Blood analysis: Total WBC count, PCV, MCV.
4. Differential Counts
5. Total RBC count
6. Blood grouping and coagulation.
7. Hemoglobin estimation.
8. Estimation of blood glucose level in human (GOD kit).
9. Estimation of ammonia, uric acid and urea from samples

Spotters:

Slides **:** T.S of pineal gland, thyroid gland, parathyroid, thymus, adrenal and pancreas, T.S of Ovary, T.S of Testes, Muscles (striated, non-striated and cardiac), Nerve call. Models: Structure of mammalian eye, organ of Carti,

Biochemistry and Biophysics

1. Preparation of solution- molar, millimolar, micromolar and nanomolar; solutions of normality and percentage.
2. Determination of different pH using pH meter.
3. Preparation of standard graph using Spectrophotometer.
4. Chromatographic techniques:
   a. Paper Chromatographic technique to separate amino acids.
   b. Thin layer chromatographic technique to separate lipids.
5. Quantitative estimation of amino acid, protein, carbohydrate and lipid in animal tissues.
6. Quantitative estimation of DNA/ RNA
7. To isolate the Casein from milk.
8. To verify Beer Lambert's law
9. Fractionation of proteins using PAGE electrophoresis
10. **Spotters:** Thin layer, column, paper chromatography, Centrifuge, Kymograph, Spectrophotometer / Colorimeter, Sphygmomanometer, ECG, EEG.

Record of Laboratory work shall be submitted at the time of practical examination.

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ELECTIVE COURSE I (A)

APPLIED BIOTECHNOLOGY

Objectives:

This paper deals with the applied aspects of biotechnology in medical, agricultural, industrial, microbial and environmental fields. The uses of the recombinant techniques and its application for the betterment of mankind.

UNIT I

Medical Biotechnology – Applications of r-DNA technology in human health - Recombinant DNA proteins and their uses: i) Interferon, ii) Interleukin, iii) Factor VIII, iv) Urokinase and v) Tissue plasminogen activator – Recombinant vaccines: Hepatitis-B, Rabies and FMD Vaccine - Commercial production of penicillin – DNA finger printing and its use in Forensic science

UNIT II

Hybridoma technology: Production and Application of monoclonal and polyclonal antibodies – Gene Therapy — Cell bank – Animal bioreactor and molecular pharming. Transgenic animals – transgenic animal model development – Transgenic mouse – embryonic stem cell method and pronucleus method – Transgenic fish and sheep. Bioethics in animal genetic engineering.

UNIT III

Agricultural Biotechnology: Genetically Modified Microorganisms – Phytoremediation. Bacterial Biofertilizers –Rhizobium, Acetobacter, Azospirillum inoculants – Nitrogen, Phosphate and sulphate fixing mechanisms, Green manuring – Cyanobacterial inoculants – VAM fungi. Benefits of biofertilizers - Biopesticides in pest management.

UNIT IV

Industrial and Microbial Biotechnology – Fermentation technology: Fermentors, Selection of microbes, Fermentation medium – Production of Penicillin, Vitamin B^{12}, Amino acids and Proteases – Production of organic compounds by microbial fermentation – Ethanol and acetone production - Antibiotics – microbes used – commercial production of antibiotics – Single Cell Protein (SCP) production and their advantages.

UNIT V

Environmental Biotechnology – Bioremediation – *In-situ*, and *Ex-situ* Bioremediation – Use of genetically engineered bacterial strains – Bioremediation of dyes – Bioremediation in paper and pulp industry.

Immobilized culture – Bioremediation of heavy metals: Mechanism of metal removal – Bioremediation of coal waste through VAM fungi – Bioremediation of xenobiotics – Recycling of waste water through Microbes.

Text book :

1. Dubey, R.C. A Textbook of Biotechnology (Edition, 2006) S. Chand & Co. Ltd. Ram Nagar, New Delhi, India.
2. Gupta, P.K. Biotechnology and genomics (Edition, 2009) Rastogi Publication, Meerut, India

Reference Books:

1. Chopra, V.L and Nanin, A. 1992. Genetic Engineering and Biotechnology. Oxford and IBH Publishing Company, New Delhi.
2. Copping, G and Rodgers, P. 1986. Biotechnology. Oxford and IBH Publishing Company, New Delhi.
3. Das, H.K. Textbook of Biotechnology (Edition, 2006) Wiley Dream Tech, India Pvt. Ltd. New Delhi, India
4. Gustafon,J.P. 1984. Gene Manipulation in Plant Improvement. Plenum Press, New Yerk.
5. Ignacimuthu, S. 1996. Basic Biotechnology, Tata McGraw- Hill Publishing Company Limited, New Delhi.
6. Lewin, B. 1990. Gene IV. Oxford University Press. Oxford. Marx, J.L., 1989. Revaluation in Biotechnology. Cambridge University Press, Cambridge.
7. Old R.W. and Primrose, S.B. 1985. Principles of gene manipulation. An Introduction to Genetic Engineering. Oxford Blackwell Publishers, London.
8. Ramawat, K.G and Shaily Goyal. Comprehensive Biotechnology (Edition, 2009), S. Chand & Co. Ltd. Ram Nagar, New Delhi, India.

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ELECTIVE COURSE I (B)

ENDOCRINOLOGY

Objectives:

This paper provides knowledge about whole body control mechanism by hormones and also provides diseases caused due to hypo and hyper secretion of hormones and treatment options for imbalanced hormonal functions.

UNIT I

Scope of Endocrinology: Introduction, Objectives, aims and scope of endocrinology - Nature, function and classification of hormones – Hormones as messengers - Feedback control of hormone secretion- General principles of hormonal action – Experimental methods of hormone research.

UNIT II

Invertebrate and Crustacean Endocrinology: Concepts of neurosecretion and neuroendocrine system in invertebrate and crustacean groups – Neuroendocrine system in insects – hormonal control of reproduction, metamorphosis and moulting in insects.

UNIT III

Vertebrate Reproductive Endocrinology: Structure of mammalian testis and ovary – hormones of testis and ovary – Reproductive cycles (oestrus cycle and menstrual cycle) – Foeto-placental unit as an endocrine entry – hormonal regulation of pregnancy – parturition and lactation. Disorders of male and female reproductive systems, Assisted reproductive technology (ART) – MART – FART.

UNIT IV

Pituitary and Thyroid gland: Pituitary gland- structural organization – secretions, biosynthesis and their functions – hypothalamic control. Thyroid gland – structural organization - function and biosynthesis of thyroid hormone – metabolic effects of thyroid hormone – Effects of thyroid hormone on growth and reproduction – Parathyroid gland – structural organization – secretions, biosynthesis and Parathyroid hormone functions.

UNIT V

Pancreatic Islets and Adrenal Glands: Structure of pancreatic Islets – functions of insulin and glucagon – Diabetes. Adrenal gland – structural organization, functions of adrenal hormones. Biosynthesis and regulations.

Text Book

1. Turner, C.D. 1966. General Endocrinology. W.B. Saunders Co., London

References:

1. Barrinton, E.J.W. 1968. An introduction to general and comparative endocrinology. Academic press, New Delhi.
2. Bantley, P.J. 1985. Comparative vertebrate endocrinology. S.Chand and Co., New Delhi.
3. Mac Hadley, 1994. Endocrinology. Prentice Hall of India. New Delhi.
4. Michael, P. 1968. Endocrinology and human behavior. Oxford University press, New Delhi.

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ELECTIVE COURSE II (A)

COASTAL GEOMORPHOLOGY

Objectives:

The main aim is to prepare the students for self-employment in the opened areas like costal geomorphology in fishery biology. The relevant knowledge in costal morphology, diversity and ecosystems and their impacts.

UNIT I

Definition and scope of coastal geomorphology- Coastal ecosystems- geomorphic classification of coastal systems –Diversity of Coastal Ecosystems- unconsolidated and consolidated coastal materials-Factors influencing coastal morphology and processes.

UNIT II

Physical basis of coastal environment – tides- tidal range-tidal currents- effects of tides on tidal flats- physical basis of wave movement-effects of waves- Tsunamis.

UNIT III

Processes in coastal ecosystem- bars- beach drift - beach forms- Beach and near shore sediments and morphology- Beach rock- Abrasion Platforms and cliffs- estuaries meandering.

UNIT IV

Salt marsh and mangrove ecosystems- Conservation and management of salt marshes and Mangroves- Corals and reef formation-Impacts of disturbance on coral reefs- sea grasses- swamps-coastal islands, forms, types and processes.

UNIT V

Coastal ecosystem impacts: Greenhouse effect and sea level rise- Effects of a changing climate -Effects on cliffs and shore platforms - Effects on beaches, spits and barriers - Effects on coastal dunes -Effects on intertidal wetlands -Effects on estuaries and lagoons - Effects on deltaic coasts - Effects on coral and algal reefs- protection of Marine Biosphere resources-impacts of coastal mining.

Text Books:

1. Ahnert, F.1998 Introduction to Geomorphology Arnold Publisher, London,
2. Eric Bird, 2007.Coastal geomorphology : an introduction, Wiley Publishers, England.

Reference books :

1. Oldale, R.1980 A geologic history of carp cod, U.S. Geological Survey, Washington.
2. Reed Wicander& James S.Monroe, 1999 Essentials of Geology Wadsworth Publishing Company, Tokyo 447 pp.
3. Sent, P.K. and Prasad, N.2002 Introduction to Geomorphology of India. Allied publishers private limited Mumbai 378 pp.
4. Robin Davidson-Arnott, 2010. An Introduction to Coastal Processes and Geomorphology, United States of America by Cambridge University Press, New York.
5. Amsath. A. and Maharajan. A. 2016. Coastal Geomorphology, Hari-Krish Publication, Nagercoil

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ELECTIVE COURSE II (B)

POULTRY FARMING

Objectives:

The main aim is to give information about the poultry and its importance.. It gives an idea for the self- employment opportunities to the students. The role of different research organizations and funding agencies to promote aquaculture.

UNIT I

Introduction to poultry science –Origin and history of poultry species: Chicken, turkey, duck and quail – Important qualitative traits in poultry. Economic traits of egg-type chicken and their standardization – Economic traits of meat – type chicken and their standardization. Nomenclature of breeds of fowl, classification of fowls, selection of breeds. Housing and equipment – General principles of building poultry sheds, deep litter system, laying cages.

UNIT II

Brooding and rearing – Natural and artificial brooding - Methods of brooding brood temperature, space and duration; fed, water and space allowance, debeaking – vaccination. Management of growers, layers, broilers – lighting of chicks, growers and layers. Summer and winter management, debeaking and culling. Poultry manure – volume, composition, value and disposal.

UNIT III

Feed additives – Names, allowance and usage of Food additive – the impact on human health. Food stuffs for poultry in relation to protein, amino acids, minerals (Ca and P), vitamins and fibre content. Feed formulations for chicks, growers, phase I to phase III layers and broilers. Nutritive value of egg, factors affecting egg size, storage and preservation of egg, marketing, incubation and hatching of eggs. Annual egg production in India.

UNIT IV

Symptoms, prevention, control and treatment of viral, bacterial, fungal, protozoan and worm infection, ticks, mites and lice affecting fowl.

UNIT V

Processing, Preservation, grading, storage and marketing of eggs and meat Economics of Poultry production – problems in poultry production. Economics of poultry production units to examine first hand rearing and business operation status.

Text Book:

1. Sunil Kumar Das (1994) – Poultry production, CBC Publishers and Distributors, Delhi.
2. Babu, M. and Lurthu Reetha, T. 2011. A Handbook on Poultry farming. Tamilnadu Veterinary and Animal Sciences University and Nehru Memorial College, Tiruchy.

Reference Books:

1. Ahsan, J. and Sinha, S.P. 2003. A Hand book on Economic Zoology. S. Chand & Company Ltd., New Delhi.
2. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology. Saras Publication, Nagercoil.
3. Banerjee G.C. (1992) A textbook of animal husbandary, Oxford and IBM Publishing Co., New Delhi.
4. Crawford RD.1990. Poultry Breeding and Genetics.
5. Elsevier. Hutt FB. 2003. Genetics of Fowl. Norton Greek Press.
6. Gupta,S.B.,Indian Poultry Industry year book 1975 –C-34, New Bactak Road, New Delhi
7. Intensive Poultry Management for egg production. Bulletin NO. 152, London.
8. Shukula, G.S. and Upadhyay V.B. (1997) Economic Zoology, Rakesh Rastogi Meerut.
9. Singh RP & KumarJ. 1994. Biometrical Methods in Poultry Breeding. Kalyani.
10. Tomar, B.S. and Singh, N. 2007. A Text Book of Applied Zoology. Emkay Publications, Delhi.

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CORE COURSE VII

MICROBIOLOGY

Objectives:

This paper instruct the students the History and Scope of microbiology, Microbial Technology, Microorganisms and Environment, food microbiology, microbial diseases and treatment.

UNIT I

History and Scope of microbiology- Classification of microbes. Structure of *a bacterium.* Bacterial respiration and reproduction – economic importance of bacteria. Classification of viruses- physical and chemical structures of viruses - DNA and RNA viruses. Concept of Sterilization - Physical and Chemical methods of sterilization**.** Stains and staining techniques. Bacterial nutrition and Growth- Nutritional types. Growth factors, Types of culture - culture media- Isolation of pure culture –Colony morphology and growth- Growth curve and Growth kinetics.

UNIT II

Microbial Technology: Genetic engineering of food and additives – Single Cell Protein (SCP) production – Production of organic acids (acetic acid), ethanol – Antibiotics – Microbial toxins – Fermentation products. Microbial Genetics**:** Recombination in Bacteria – Transformation – conjugation – Sex duction; Recombination in Bacteriophage – Transduction – Lytic and Lysogenic cycle. Genetic applications of bacteria and viruses.

UNIT III

Microorganisms and Environment: Microorganism of different soils - interactions with the atmosphere. Microorganisms in Aquatic Habitats – Microbiological analysis - in fresh water and marine water. Microorganisms and pollution – Microorganisms in sewage. Microorganism in extreme environments- thermophilic, methanogenic and halophilic. Photosynthetic bacteria, Cyanobacteria. Archaea of cold regions and space.

UNIT IV

Food Microbiology: Microbes of milk and food, methods of detection, pasteurisation and food poisoning. Spoilage of food, fruits, vegetables, cereals, meat, poultry egg, seafood, caned products – Factors influencing spoilage – Food preservation. Food borne infections and intoxications - Clostridium, Salmonella, and Staphylococcus –microtoxins in food with reference to Aspergillus species- Quality assurance- microbiological quality standards of food, government regulatory practices and policies- FDA, EPA.

UNIT V

Microorganisms and Microbial Diseases**:** General Account of Pathogenic Bacteria – prognosis, diagnosis and treatment for diseases caused by viruses (Yellow fever, Dengue, Polio, HIV, Influenza), Bacteria (Pneumonia, Diphtheria, Tuberculosis, Typhoid, Gonorrhea) Fungi (Madura foot, Athlete's foot, Candidiasis) and Protozoa (Malaria, Amoebic dysentery, Trypanosomiasis, Leptospirosis).

Text Books:

1. Lansing M,Prescott, John. P.Harvey, Donold A, Klain. Microbiology second edition –WM.C. Brown Publications
2. R.C. Dubey, D.U. Maheshwari 2005. A Text book of Microbiology., S.Chand and company Ltd, New Delhi

Reference books:

1. Burden, K.L. and R.P. Williams (6th Ed.) 1968. Microbiology. The Macmillan Co., London P. 818.
2. Dawes, E.A. (Ed.) 1986. Energy conservation in bacterial photosynthesis. In: Microbial energetics. Blackie & Son Ltd., Glasgon, 133-144pp.
3. Doelle, H.W. (Ed.) 1969. Fermentation acetic acid bacteria and lactic acid bacteria. In: Bacterial metabolism. Academic Press. New York, London. 256 – 351 pp.
4. Gevaral .J, Tortora, Berdell R. Funne Christine L. Cara, 1994. Microbiology an Introduction- fifth edition,
5. Hay, J.M. (Ed.) 1986. Modern Food Microbiology. CBS publishers, Delhi. 622 pp.
6. Kumarasamy, P, A. Maharajan and V. Ganapiriya. 2012. Microbiology. HariKrish Publication, Nagercoil.
7. Reed, G. (4th Ed.) 1983. Prescott & Dunn's Industrial Microbiology. AVI Publishing Co., Inc. Connecticut, 883. pp.
8. Roberts, T.A. and F.A. Skinner (Eds.) 1983. Food Microbiology: Advances and Prospects, Academic Press, Inc. London, 393 pp.
9. Selle, A.J. (Ed.) 1967. Fundamental Principles of Bacteriology. Tata McGraw – Hill Publishing Company Ltd., New Delhi, 822 pp.

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CORE COURSE VIII

BIOSTATISTICS AND COMPUTER APPLICATIONS

Objectives:

The aim of this paper is to know the statistical problems in biological science which is useful for the students for their research works. A basic knowledge in computer and its applications for further research.

UNIT I

Data in biostatistics – Collection of data and its methods, Classification of data, Presentation of data – Diagrammatic presentation of data, graphical presentation of data and tabulation of the data. Sample – methods of sampling. Variables and its types. Frequency distribution.

UNIT II

Descriptive statistics: measures of central tendency – mean and other means, median and mode. Measures of Dispersion – Range, Standard deviation uses and calculation. Co-efficient of variations and standard error. Measures of Skewness and Kurtosis. Correlation analysis Pearson and Rank correlation. Regression analysis based on biological data.

UNIT III

Probability – Definition – Additional theorems and multiplication theorem of probability with simple problems related to this. Probability distribution binomial, Poisson and normal distribution and its properties. Testing the hypothesis t- test, chi square test and goodness of fit, F test and ANOVA one way and two way analysis.

UNIT IV

Statistical packages: SPSS-data editor-Creating, coding variables. Output viewer, Exploring data with SPSS-Graphics and diagrammatic representations with SPSS, Application of SPSS in biological Sciences. Simple statistics with statistical packages –SPSS.

UNIT V

History and generations of computer. Components of a computer. Input and output devices of a computer. Hardware and software of a computer. Languages and its uses in biology, operating systems –Windows, MS-office-Word Processor (MS Word) ; Data processor (MS Excel) ; Presentaion (MS power point). Internet and e-mail. World Wide Web (www), web designing. Modem-Wi-fi and its uses.

Text Books:

1. Daniel, W.W. 2000. Biostatistics - A foundation for analysis in the Health science. John Wiley and sons, New york.
2. Sokal, R.R. and Rohlf, F.J. 2000. Biometry. Freeman, San Francisco.
3. Zar, J.H. 2003. Biosatistical Analysis. Person Edition Asia, New Delhi.

Reference books:

1. Bailey, N.T.J (1997) Statistical methods in Biology, III Ed., Cam. University Press, N.Y.
2. Gupta S.P. Statistical Methods, Sultan Chand & Sons Publishers, New Delhi
3. Khan &Khanum 1994 Fundamental of Bostatistics, Ukaaz Publications, Hyderabed
4. Palanichamy S, and Manoharan M, Statistical Methods for Biologists, Palani Paramount Publications, Palani
5. Ramakrishnan 2007 Saras Publications, Periavilai, Nagaercoil
6. Snadecor, G.W. and W.G.Cochran (1967) – Statistical methods, Oxford & IBH Publishing, New Delhi.
7. Sokal, R and James, F (1973), Introduction to Biostatistics, W.H. Freeman and Company Ltd., Tokyo, Japan.
8. Zar, J.H. (1974) – Biostatistical analysis – Prentice Hall Inc., New Jersey, USA.

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CORE PRACTICAL III

Microbiology & Biostatistics and Computer applications (P)

Objectives:

To obtain practical knowledge about the microbial mechanism from experiments with growth and metabolism. To identify the problems related to biological sciences and biostatics. The use of computers in biological field.

Microbiology

1. General rules to be adopted in Microbiology laboratory.
2. Preparation of Non-selective and selective culture media.
3. Estimation of bacteria from soil and water using plate count method.
4. Observation of morphological characters of bacteria (temporary wet mount technique).
5. Preparation of smears for staining
6. Staining methods: - simple staining, gram negative staining, gram positive staining.
7. Bacterial growth curve

Biostatistics and Computer Applications

BIOSTATISTICS

Any **TWO** Problems related to Chi-square test, Student's t – test, Correlation and Regression
Graphical presentation of data histogram, pie diagram, bar diagram
SPSS package - univariate and multivariate analysis.

COMPUTER APPLICATIONS

1. Using windows OS – manipulating files – editing files
2. Demonstration of the Internet and its uses.

Spotters: Basic components of computers – Input – Mouse, keyboard, light pen, scanner Output (Printer, Monitor) devices. Modem.

A record of laboratory work shall be submitted at the time of practical examination.

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ELECTIVE COURSE III (A)

RESEARCH METHODOLOGY AND BIOTECHNIQUES

Objectives:

The main aim of this paper is (Unit I) to give information about how to write/publish a thesis and its basic steps. Other units are dealing with microtechniques, immunotechniques and tissue culture techniques. The Unit V gives information about cryotechniques.

UNIT I

Concept of Scientific research – selection of a research problem – Research design – sampling methods – Hypothesis and null Hypothesis – Data collection – Making observation and records. Preparation of index cards – Reference collection – Refereed journals, Impact factor, Citation index – H-factor and copyright.

UNIT II

Preparation of scientific paper' for publication in a journal. Preparation and presentation of research paper for Symposia, Seminar and Conferences. Technical papers and Monographs. Internet and e-journals. Preparation of thesis – components of thesis. Selection of animal models – Maintenance – CPCSEA regulations. Using computers in research – Computer aided techniques for data analysis, data interpretation and presentation.

UNIT III

Microtechniques : Permanent mounting: Narcotization and killing – fixing – washing – processing – staining – mounting – labelling. Histological preparation of tissues for SEM and TEM. Microphotography principles and applications. Detection of molecules in living cells, *in situ* localization by techniques such as FISH and GISH. Cryotechniques for microscopy. Freeze drying for physiologically active substances.

UNIT IV

Immunological techniques**:** Antigen and Antibody Preparation and purification, Production of monoclonal antibodies. Immunological techniques in medical diagnosis – HIV – Hepatitis A & B – cancer and pregnancy. Electrophoresis techniques – Gel electrophoresis –SDS-PAGE – Two dimensional gel electrophoresis. ELISA, Blotting Techniques, PCR, MALDI and N- terminal sequencing.

UNIT V

Animal Cell Culture Techniques: Design and functioning of tissue culture laboratory – Cell proliferation measurements – Cell viability testing – Culture media preparation. Types of culture: – Flask, Test tube, Organ and Embryo culture. Protoplast culture. Stem cell culture. Cryopreservation for cells, tissues and organisms. Germplasm storage: Cryobank – Pollen bank, sperm bank. Biosensors and biochips – Applications.

Text books:

1. Guramani. N. (2009). Research methodology for biological sciences. MJP publishers, Chennai.
2. Kothari CR, 2009. Second edition. Research Methodology – Methods and Techniques. Wiley Eastern,Ltd., New Delhi.

Reference Books:

1. Case C.L and Johnson TR, 1984. Laboratory Experiments in Microbiology. The Benjamin Cummings Pub. Co., London.
2. Fritschen LJ and Gay LW, 1979. Environmental Instrumentation. Springer Verlag, New York.
3. Humason GL, 1979, Freeman WH and Co.,Animal Tissue Techniques. IV Edition, San Francisco.
4. Oser BL, 1965Hawk's Physiological Chemistry, 14 th Edition, , Tata McGraw Hill Co.,
5. Osterman A, 1984Methods of Protein and Nucleic acid Research. Springer Verlag, New York.
6. Plumber D.T. 1971, An Introduction to Practical Biochemistry. Tata McGraw Hill Co.,
7. Sharma BAV, Ravindra Prasad D and Sathyanarayana P, 1989,Research Methods in Social Sciences, Sterling Pub. Pvt. Ltd.
8. Panneerselvam, R., Research methodology, prentice hall of India, New Delhi.

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ELECTIVE COURSE III (B)

APPLIED ENTOMOLOGY

Objectives:

To enlighten the students on harmful insects and their biology, nature of damage and management measures. To teach our students about various invertebrate pests which attack our crops and belongings and their management measures. To know information about useful insects.

UNIT I

Insect Pests: Definition - Classification of insect pests based on magnitude of damage, occurrence on crops – Types of damage caused by Insects on crop plants -The biological Success of Insects – Reasons for the Success of Insects – Pest Outbreak – Pest Resurgence – Insects as Phyto-pathogenic vectors.

UNIT II

Bionomics and Management of selected Insect Pests of Crops – Pests of Paddy, Cotton, Pulses, Vegetables (Brinjal and Tomato) , (Any Three to Four Major Pests for each crop) Economic Threshold Levels - Pests of stored products – External and Internal feeders (Any Three to Four Major Pests for each category) – Basic requirements for storage of food grains in Godowns -Polyphagous Insects.

UNIT III

Methods of Insect Pest Management: Types – Natural and Artificial methods – Cultural, Mechanical, Physical, Biological and Chemical methods. Pesticides – Classification, Types of formulations, mode of action, Toxicity, insecticide resistance, environmental safety.

UNIT IV

Management with Natural Enemies and other Biological Agents: Parasites and Parasitoids, Predators, Microbial agents. Conservation of Natural Enemies – Botanical Pesticides. Non-Conventional methods – Uses of IGRs, Repellents, Anti-feedants, Pheromones, Chemo-sterilants, Irradiation and Quarantine for managing insect pests.

UNIT V

Managing Insects with Resistant Plants: Insect and Host-Plant relationship – Mechanisms of Resistance – Genetic Nature of Resistance – Factors Mediating the Expression of Resistance. Integrated Pest Management: Basis for Integration - Potential components - Need for IPM and its application - Pest – Predator complex and Ecological balance. Pest resistant crops.

Text books :

1. Tembhare, D.B. 1984. Modern Entomology. Himalaya Publishing House, Mumbai.
2. Vasantharaj David, B. 2001. Elements of Economic Entomology. Popular Book Depot, Chennai, India.

Reference Books:

1. Ambrose, D.P. 2004.General Entomology. Kalyan Publishers, West Bengal.
2. Metcalf, C. V and Flint, W.P. 1979. Destructive and Useful Insects: Their Habitats and Control. Tata McGraw Hill Publications, New Delhi, India.
3. Pedigo, L.P. 2003. Entomology and Pest Management (Fourth Edition). Pearson Education (Singapore) Pte. Ltd., Delhi.
4. Vasantharaj David, B. and T. Kumaraswamy. 2002. Elements of Economic Entomology. Popular Book Depot, Chennai, India.
5. Verma, D.K. 1999. Applied Entomology. Mittal Publications, New Delhi.
6. Fenemore, P.G and A. Prakash. 2006 (Second Edition). Applied Entomology. New Age International Publishers, New Delhi.

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ELECTIVE COURSE IV (A)

FISHERY BIOLOGY

Objectives:

The main aim is to give information about the culture of fishes and crabs. It gives an idea for the self- employment opportunities to the students. The role of different research organizations and funding agencies to promote aquaculture.

UNIT I

History of Ichthyology – World and Indian fisheries. Fishes and their evolutionary history. Fish migration – Types of migratory fishes: Diadromous fishes - Anadromous, Catadramous and Amphidromous - Potomodromous and Oceanodromous fishes. Methods of migration - Factors influencing migration. Ponds and its management. Crustacean fisheries, molluscan fisheries and its economic importance.

UNIT II

Marine fisheries – Sardines, Mackerals, Sciaenids, Silver bellies, Pomfrets, Carangids and Sharks. Inland fisheries – Freshwater, riverine, reservoir, pond and cold water fisheries. Estuarine and brackish water fisheries and their economics. Deep sea fishes- Fish fauna of deep sea and their adaptive modifications.

UNIT III

Fish population studies – Assessment of fish stocks: marking and recapture method, area sampling method. Age and growth studies- length-frequency methods, scale method, otolith methods and other skeletal parts as age indicators. Length –weight relationship- condition factor.

UNIT IV

Culture fisheries – Integrated fish farming technology – rice cum common carp culture, fish cum duck culture- sewage fed fisheries- monosex culture, polyculture, ornamental fishes.

UNIT V

Fish processing and preservation- fish products and by products. Induced breeding techniques with examples. Fishing gears and crafts used in Indian fisheries. Brief account on transport and marketing. Effect of pollution of fishes. Fish pathology: Parasites – Protozoan, Fungal, Bacterial, Worms and Arthropods.

Text Books :

1. Biswas, S.P., (1993) Manual Of Methods In Fish Biology, International Book Co. Absecon Highlands, New Jersey.
2. Jhingran, V.G., (1991) Fish And Fisheries Of India. Hindustan Publishing Copr., New Delhi.

Reference Books :

1. Bose, A.N., Yang, C.T., And Misra, A. (1991) Coastal Aquaculture Engineering. Oxford And Ibh Publishing Co., Pvt. Ltd., New Delhi.
2. Chakrabarti, N.M., (1994) Diseases Of Cultivable Freshwater Fishes And Their Control. International Books And Periodicals Supply Service, New Delhi.
3. Day, F., (1986) The Fishes Of India, Vols., I & Ii. Today And Tomorrow's Book Agency, New Delhi.
4. Govindan, T.K. (1992) Fish Processing Technology, Oxford And Ibh Publishing Co., Pvt. Ltd., New Delhi.
5. Mpeda Hand Book of Aquafarming (1992) Freshwater Fishes, Marine Products Export Development Agency, Kochi.
6. New, M.B., Tacon., A.G.J., And Csavas., I. (1993) Farm – Made – Aqua Feeds. Food And Agrilculture Organization Of United Nations, Rome.
7. Santhanam, R., (1990) Fisheries Science, Daya Publishing House, New Delhi.
8. Seghal, K.K. (1992) Recent Researches In Cold Water Fisheries, Today And Tomorrow's Pbulishers And Printers, New Delhi.
9. Sinha, V.R.P. (1993) A Compendium Of Aquaculture Technologies For Developing Countries. Center For Science And Technology And Oxford And Ibh Publishing Co., Pvt., Ltd., New Delhi.
10. Pillai, T.V.R. (1993) Aquaculture : Principles And Practices. Fishing News Agency, London.
11. S. Raveendran, K. Muthukumaravel, O. Sathick And V. Ramamurthy. 2011. Estuarine Biology. Aruma Publications, Koradacherr

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ELECTIVE COURSE IV (B)

BIOINFORMATICS

Objectives:

The aim of this paper is to know the bioinformatics and its applications in biological science which is useful for the students for their research works. Through bioinformatics the various bio techniques may be obtained for further research.

UNIT I

Bioinformatics and its relation with Molecular Biology – Historical overview and Definition of Bioinformatics – Data generation through Genome sequencing, Protein sequencing, Gel electrophoresis, NMR Spectroscopy, X-Ray Diffraction, and microarray - Applications of Bioinformatics.

UNIT II

Biological Databases; Nucleic acid databases (NCBI, DDBJ, and EMBL) - Protein databases (Primary, Composite, and Secondary) - Specialized Genome databases: (SGD, TIGR, and ACeDB) - Structural databases (PDB, MMDB, CATH, SCOP) - Structural features of RNA: Primary, Secondary, Tertiary. Introduction to RNA Secondary structure prediction - Methods for RNA Secondary structure prediction, Limitations of RNA Secondary structure prediction.

UNIT III

Protein Structures: Primary, Secondary, Super Secondary, Domains, Tertiary, Quaternary, Ramachandran plot - Protein secondary structure prediction methods: GOR, Chou-Fasman - Protein Tertiary structure prediction methods: Homology Modeling, Protein folding, Molecular Dynamics of Protein, Molecular Docking of Protein - Motif databases and analysis tools. Domain databases (CDD, SMART, ProDom) and Analysis tools - Hidden Markov Model (HMM).

UNIT IV

Pairwise Sequence alignment (BLAST and FASTA Algorithm) and multiple sequence alignment (Clustal W algorithm) - Methods for presenting large quantities of biological data: sequence viewers (Artemis, SeqVISTA) - 3D structure viewers (Rasmol, SPDBv, Chime, Cn3D, PyMol), Anatomical visualization. Quantitative Structure Activity Relationship (2D & 3D). Combinatorial libraries & their design. High throughput screening, virtual screening, Lipinski's rule of five.

UNIT V

Genomics: Genome Annotation, Genome Assembly, Structural and Functional Genomics. System biology - Interactomics (PPI), Fluxomics, Biomics. Metagenomics - Metabolic pathway database (KEGG pathway database) - Concept of metabolome and metabolomics – Computer Aided Drug Design (CADD) – Drug Design Approaches – Target based, Structure based and *De novo* Approaches –ADME –Tox Property Prediction and Models.

Text Books:

1. Lesk, A.M. 2007. Introduction to Bioinformatics (Second edition). Oxford University press, New Delhi.
2. Murthy.C.S.V. 2004. Bioinformatics. Himalaya Publishing House. Delhi.

Reference Books:

1. Attwood, T.K., Parry-Smith, D.J. Phukan, S. 2014 (Ninth Impression). Introduction to Bioinformatics. Pearson Education, Delhi.
2. Bal, H.P. 2007. Bioinformatics Principle and applications. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Campbell, A.M and Heyer, L.J. 2004. Discovering Genomics, Proteomics and Bioinformatics. Pearson Education, Delhi.
4. Gladis HelenHepsyba, S. and Hemalatha, C.R. 2009. Basic Bioinformatics, MJP Publishers, Chennai.
5. Krane, D.E and Raymer, M.L. 2006. Fundamental Concepts of Bioinformatics. Pearson Education, USA.
6. Kumerasan, V. 2009. Biotechnology (Revised Edition), Saras Publications, Kanyakumari.U
7. Lohar, P.S. 2009. Bioinformatics, MJP Publishers, Chennai.
8. Ramawat, K.G. and Goyal, S. 2009. (Fourth Revised Edition). Comprehensive Biotechnology, S.Chand and Company Ltd, New Delhi.
9. Rastogi, S.C., Mendiratta, N. and Rastogi, P. 2011 (Third Edition). Bioinformatics Methods and Applications: Genomics, Proteomics and Drug Discovery. PHI Learning Private Limited, New Delhi.
10. Sharma, V., Munjal, A. and Shanker, A. 2011-2012. A Text Book of Bioinformatics. Rastogi Publications, Meerut, India.
11. Smith H, J, Smith & William. 1988. Introduction to the Principles of Drug Design, 2nd ed, Wright London.
12. Sundaralingam, R. and V.Kumaresan. 2008. Bioinformatics. Saras Publication. Nagercoil.
13. Sundararajan, S and Balaji, R. 2003. Introduction to Bioinformatics. Himalaya Publishing House, Delhi.
14. Thiagarajan, B. and Rajalakshmi, P.A. 2009. Computational Biology, MJP Publishers, Chennai.
15. Westhead, D.R., Parish, J.H and Twyman, R.M. 2003. Bioinformatics. Viva Books Private Ltd., New Delhi.
16. Xiong, J. 2013 (Reprint). Essential Bioinformatics. Cambridge University Press, New York, USA.

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CORE COURSE IX

ENVIRONMENTAL BIOLOGY

Objectives:

The main aim of this paper is to give information about the environment of biotic and abiotic factors, bio-geo chemical cycles, Habitat, population ecology,pollution and their control measures. The toxicant related with environment, the toxic effects in different fields and to find out the environmental pollutants.

UNIT I

Abiotic factors: Water, soil, light. Biotic factors; Intra (Aggregation, colony formation, social organizarion) and inter specific associations (Neutralism, symbiosis and antagonism). Structure and function of an ecosystem: - Autotrophic and heterotrophic producers, consumers - pyramids – primary and secondary productivity - methods of measurements -different trophic level - energy flow in an ecosystem - food chain - food web -.characteristics of different biomes. Interaction between environment and biota, Energy and nutrient flow

UNIT II

Nutrient cycles – Nitrogen, phosphorus, Carbon and sulphur in nature – role of microbes in environment. .Biotic community – Concepts – Stratification – ecological niches – ecotone and ecological succession. Population ecology and biological control. Population growth – Biotic potential Regulation of population size –Population interaction – Human population and urbanization.

UNIT III

Habitat Ecology-fresh water, marine, estuary, terrestrial, forest and desert. Biodiversity-basic concepts, types, hot spots of bio diversity. Wildlife conservations and management – International / National policies and conservation strategies of Biodiversity management. Remote sensing, Satellite images – Aerial photography – Thermal and infrared images, radar in ecological applications. Instrumentation – GPS, radio telemetry and satellite telemetry techniques used in ecological research. GIS techniques in ecological research.

UNIT IV

Environmental Pollution: Effects and control measures of Air, Water, Soil, Marine pollution. Acid rain, Ozone layer depletion. Bio accumulation – Bio magnification, BOD, COD, TDS, TSS. EIA – Steps in EIA – Methods of EIA. Acute toxicity – Chronic toxicity – Assessment of safety/risk. Natural resources - sustainable development – survey. Energy resources - environmental quality standards – soil conservation.

UNIT V

Toxicology: types of toxins - Pesticide toxicity: Pesticides and their types – Insecticides – Herbicides – fungicides – rodenticides – nematicides – fumigants. Properties and effects of pesticides on organisms – acute and chronic effects, biological monitoring and regulation. Toxicological methods: Acute, sub-acute chronic and special tests. Statistical concept of toxicity - Concentrations. Response relationship – Margin of safety, Toxicity curve, Cumulative toxicity, and toxicity of chemical mixture. Lc_{50} and L_{D50} - bioremediation of toxic substances.

Text Books:

1. Chapman, B.C and Reigs. M.J. 1997. Ecology principles and application. Cambridge University Press, U.K.
2. Clark, G.C. 1963. Elements of ecology. John Wiley and Sons Inc., New York.
3. Odum, E.P. 1996. Fundamentals of Ecology (III Ed.). Nataraj Publishers, Dehradun. P 574.

Reference Books:

1. Ahmad, Y.J and Sammy, G.K. 1985. Guidelines to Environment Impact Assessment in developing countries. Hodder and Stoughton Ltd., Londan.
2. Asthana, D.K and Asthana, M. 2001. Environment problems and solutions. S. Chand and Co., New Delhi.
3. Bhatia, H.S. 1998: A Text Book On Environmental Pollution And Control, Galgotia, New Delhi.
4. Kumar, H.D. 1997. Modern concepts of ecology. Modern Printers, New Delhi. P 478.
5. Paul Colinvaux, 1986: Ecology. John Wiley And Sons, N.Y.
6. Srivastava, R.P. and Saxena, R.C.1989. Textbook of Insect toxicity. Himansha publications, Rajasthan.
7. Trivedi, P.R and Gurdeepraj, K. 1992. Environmental biology. Akashdeep Publishing House, New Delhi.
8. Williams.R.T 1959. Detoxification mechanisms. Wiley. New York.

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CORE COURSE X

IMMUNOLOGY

Objectives:

The main aim of this paper is to obtain knowledge about immune systems, cells of immunity and its role in protection of our body .Antigen, antibody concepts, hypersensitivity, MHC and complement pathways. Different immunological techniques used in the clinical testing.

UNIT I

Introduction to immune system. Innate and Adaptive immunity – Lymphoid system: Primary and secondary lymphoid organs, tissues. Cells of immune system: lymphoid lineage, myeloid lineage. Molecules- complement, acute phase proteins, interferon, lymphokines and cytokines.

UNIT II

Antigens: Types of antigens – factors of antigenicity. T cell and B cell epitopes, haptens, adjuvants and carriers. Antibodies: Ultra structure of immunoglobulin, types, paratopes, characteristics and functions. Monoclonal and polyclonal antibodies. Antibody receptors- T cell receptors (TCR), Genes for TCR, TCR diversity. Immune response- Humoral and cell mediated immune response.

UNIT III

Hypersensitivity: Definition and classification; Types- I, II, III, IV and V. Major Histocompatibility Complex (MHC): Genomic organization, MHC molecules, peptide binding. Complement activation: Classical and Alternate pathway. Transplantation immunology: Types of grafts- Allograft rejection- Prevention of allograft rejection.

UNIT IV

Vaccination: Principle, antigen as vaccines, subunit vaccines, recombinant vaccines, anti idiotypic antibodies as vaccines, Vaccination schedule for humans. Tumour immunology: Tumour antigens- Immune response to tumours- Immunotherapy to tumours- Tumour vaccines. Autoimmune diseases. Immunodeficiency- inherited and acquired.

UNIT V

Immunotechnology: Clinical methods for detection of antigens and antibodies: Immunodiffusion: Ouchterlony analysis-Double immunodiffusion. Immunoelectrophoresis. Binder- Ligand assays: RIA, ELISA, EMIT. Histocompatibility testing: HLA typing- RFLP method, PCR method.

Autoimmune disease detection: Rheumatoid arthritis, Hepatitis – B virus test. Immune complex detection: Rossette Forming Array, Plaque Forming Array.

Text books:

1. Janis Kuby.1997.Immunology.W.H.Freeman & company, New York.

Reference Books:

1. Arumugam, N.*et al.*, 2005. Immunology and Microbiology, Saras Publications, Kanyakumari.
2. Kannan, I. 2007 Immunology, MJP Publishers, Chennai.
3. Rao,C.V.2006.Immunology. Narosa Publishing House, New Delhi.
4. Ivan M. Roitt *et al.*, Essential Immunology. XII Edition, Wiley- Blackwell Publishers.UK.
5. Shetty, N. 2006. Immunology. New Age International (P) Limited, Publishers. New Delhi.

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CORE PRACTICAL IV

ENVIRONMENTAL BIOLOGY & IMMUNOLOGY (P)

Environmental Biology

1. Report on ecological collection representing different habitats and their adaptations – sandy, muddy, rocky shores fauna
2. Animal Association: Parasitism, Symbiosis, Mutualism and Commensalism
3. Hydrological studies of water samples with special reference - Chlorides, silicates, calcium, total hardness, phosphates and nitrates – pH, dissolved oxygen and BOD, CO_2, Carbonates and Bicarbonates.
4. Quantitative and qualitative estimation of marine & freshwater plankton.
5. Estimation of primary productivity
6. Determination of LC_{50}

Immunology

1. Histology of lymphoid organs in Mouse
2. Preparation of antigen and raising of antibody – RBC and sperm proteins.
3. WIDAL test for typhoid detection
4. RPR test for Syphilis detection
5. Mancini's Single Radial immunodiffusion
6. Ouchterlony's Double immunodiffusion
7. Demonstration of Ig G by precipitation ring test
8. Demonstration for haemagglutination
9. Immuno- electrophoresis of human serum and anti-human serum (Demonstration)

Spotters:

Lymph node, Lymphocytes, Vaccine, ELISA, RIA.

A record of laboratory work shall be submitted at the time of practical examination

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ELECTIVE COURSE V (A)

SERICULTURE

Objectives:

The main aim is to give information about the culture of silkworm. It gives an idea for the self- employment opportunities to the students. The role of different research organizations and funding agencies to promote Sericulture.

UNIT I

Sericulture: Definition, history and present status; silk route. Mulberry and types of non-mulberry sericulture. Commercial varieties of mulberry plants used in Sericulture in India. Requirement for Mulberry Cultivation - Soil - Climatic conditions: Temperature, photoperiod, humidity and rainfall. Mulberry management: Land preparation- Irrigation- Manuring - Propagation of mulberry plant- Plantation methods. Profitable cultivation and Harvesting. Diseases of mulberry – fungal, bacterial, viral and Nematode diseases, Deficiency diseases and their remedial measures

UNIT II

Silkworm taxonomy and distribution. Univoltine, Bivoltine and Multivoltine races. Exotic and indigenous races in India. Life cycle of Mulberry Silkworm: Egg, larva, pupa and adult, life span. Morphology: Egg, Larvae: Mouth parts, legs, prolegs, spiracles, eyes, claspers and integumentary hair and sexual markings. Pupa: Sexual dimorphism. Adult: Mouth parts, antenna, wings and external genitalia - Silk glands: Structure, development and mechanism of silk synthesis - Hormonal control on metamorphosis, diapause, silk synthesis and reproduction.

UNIT III

Silkworm rearing: Rearing house -CSB model. Early age and late age rearing. Rearing appliances- Mountages- types of mountages and disinfectants. Seed: Collection of disease-free layings (DFLs), incubation, Hatching and Brushing- Feeding and rearing, spacing, cleaning and dusting. Mounting and cocoon production: spinning of cocoons. Harvesting, preservation, assessment, storage. Transportation: Cocoons, record maintenance, cost of cocoon production, leaf cocoon ratio.

UNIT IV

Silkworm diseases : Etiology, Structure, Symptoms, Preventive measures and control of viral diseases - Nuclear polyhydrosis virus (NPV) and Cytoplasmic, polyhydrosis virus (CPV) Infectious flacherie virus (FV) and Densonucleosis virus (DNV) Noesma bombycis (Pebrine disease). Bacterial diseases- Bacterial septicemia Bacterial gastroenteric disease Bacterial toxicosis . Fungal Diseases

-White muscardine, Green muscardine, Yellow muscardine. Silkworm pests—Tachinid Fly (Uzifly) Trycholgza bombycis, Dermistid beetles, Dermestes cadniverinus—Vertebrate and other silkworm pests and their control.

UNIT V

SILK TECHNOLOGY: Selection of Cocoon for reeling - Quality of cocoon - Physical and chemical properties of silk fibre. Raw materials for silk reeling - Cocoon processing - Cocoon drying- stifling, Cocoon sorting and preservation: deflossing. Marketing organization for Cocoon and Yarn - Raw silk manufacture - Silk by-products: Reeling waste and its utility in spun silk industry utility of pupae. Role of Central Silk Board and Directorate of Sericulture in extension programmes - Sericulture organization at state and national levels.

Text Books:

1. Ganga, G. and Sulochana Chetty, J. 2003. An Introduction to Sericulture (2nd Edition). Oxford and IBH Publishing co. Pvt-Ltd., New Delhi.
2. Ullal, S.R. and Narasimhanna, M.N. 1979. Hand book of Practical Sericulture. Central Silk Board, Bombay.
3. Taxima, Y. 1972. Hand Book of Silkworm Rearing. Fuji Publication, Tokyo.

Reference Book:

1. Handbook of silkworm Rearing: Agriculture and technical manual-1, Fuzi pub. Co. ltd., Tokyo, Japan 1972
2. Jolly,M.S. Director, CSR & TI, mysore Appropriate sericultural Techniques: Ed.
3. Krishnaswamy S.1986. Improved method of rearing young age silkworm: reprinted CSB, Bangalore.

NarasimhannaN M.N. 1988. Manual of silkworm egg production, CSB, Bangalore

4. Sengupta,K. Director , 1989.A guide for bivoltine sericulture: CSR & TI, Mysore
5. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications, Meerut.
6. Tomar, B.S and N.Singh. A Text Book of Applied Zoology. 2007. Emkay publications. Delhi.
7. Wupang-chun and da-chung 1988. Silkworm rearing:, FAO, Rome.

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ELECTIVE COURSE V (B)

AQUACULTURE

Objectives:

The main aim is to give information about the culture of fishes and crabs. It gives an idea for the self- employment opportunities to the students. The role of different research organizations and funding agencies to promote aquaculture.

UNIT I

Definition- Scope of aquaculture- Aquaculture in India, Role of aquaculture on economic development, constraints in aquaculture, organization related to aquaculture and fisheries, types of aquaculture- Freshwater aquaculture, coastal aquaculture and marine aquaculture. Fresh water culturable fishes, marine water culturable fishes.

UNIT II

Fish ponds-Definition, breeding ponds, nursery ponds, rearing ponds, culture ponds (stocking ponds). Preparation of pond for fish culture, management of fish ponds, water quality management of fish ponds. Importance and composition of feeds; types of feed, wet and dry feeds, Artificial and live feeds- Artemia, Diatoms, Daphnia and Spirulina cultures.

UNIT III

Types of cultures – Extensive culture, Intensive culture and semi-intensive culture, monosex culture, monoculture, polyculture, cage culture and pen culture. Integrated fish farming – paddy cum fish culture, Animal husbandry cum fish culture, sewage fed fish culture. Culture practices : Major carps, Prawns, Lobster, Pearl Oyster, Edible Oyster Mussels and seaweeds.

UNIT IV

Fish disease management: Common bacterial, viral, fungal, protozoans and crustaceans diseases, their symptoms and treatment. Aquatic pollution – Definition, causes, ecological effects and control of water pollution. Hypophysation- Definition, principle and procedure of hypophysation – collection, preparation and injection of pituitary extract, selection of breeders, mechanism of pituitary action and advantages of hypophysation.

UNIT V

Genomic manipulation- Hybridization, Androgenesis, Gynandrogenesis and Polyploidy. Harvesting and transport of fish and its products. Fish preservation and fish processing technology – By products of fish and its uses. Marketing of

fishery products, Government organizations in Aquaculture. ICAR, CMFRI, CIFRI, CICFRI, CIFA, CIBA, CIFT & MPEDA.

Text Book :

1. Pillay, T.V.R. 1995. Aquaculture principles and practices. Fishing New Books, Blackwell Science Ltd., Oxford.
2. Shanmugam, K. 1990. Fishery biology and Aquaculture. Leo Pathipagam, Madras.
3. Santhanam, Sugumaran and Natarajan, P. 1997. A Manual of freshwater aquaculture. Oxford and IBH Pub. Co. Ltd., New Delhi.

Reference Books:

1. Arumugam.N. 2008. Aquaculture Saras Publications, Nagercoil.
2. Baradach, JE, JH Ryther and WO McLarney (1972) Aquaculture. The farming and Husbandry of Freshwater and Marine Organisms. Wiley Interscience, New York.
3. Chadar, S.L. 1980. Hypophysation of Indian major carps. Satish Book Enterprise, Agra, PP.146
4. Exporters manual and Documentation. 1999. Jain Book Agency. New Delhi.
5. Jhingran.V.C. 1991. Fish and fisheries of India, Hindustan Pub. Cord. New Delhi.
6. Kurian,C.V and Sebastin. 1992. Prawn and prawn fisheries of India, Hindustan Pub. Cord. New Delhi.
7. Rath, R.K. (2000) Freshwater Aquaculture. Scientific Publishers, (India), PO.Box.91, Jodhpur.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.A. Applied Economics Syllabus under CBCS

(Applicable to the candidates admitted from the academic year 2016-2017 onwards)

Sem ester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	**Ext.**	
I	Core Course – I (CC)	Micro Economics Analysis – I	6	4	3	25	75	100
	Core Course – II (CC)	Macro and Monetary Economics I	6	4	3	25	75	100
	Core Course – III (CC)	Mathematical Methods for Economic Analysis	6	4	3	25	75	100
	Core Course – IV (CC)	Public Economics	6	4	3	25	75	100
	Elective Course – I (EC)	* Computer Applications in Economics **(updated on 16-11-2016) (2017-18 onwards)**	6	4	3	25	75	100
		Total	**30**	**20**	**--**	**--**	**--**	**500**
II	Core Course – V (CC)	Statistical Methods for Economic Analysis	6	5	3	25	75	100
	Core Course – VI (CC)	Micro Economic Analysis - II	6	5	3	25	75	100
	Core Course – VII (CC)	Macro and Monetary Economics II	6	5	3	25	75	100
	Core Course – VIII (CC)	International Economics	6	5	3	25	75	100
	Elective Course – II (EC)	Econometrics	6	4	3	25	75	100
		Total	**30**	**24**	**--**	**--**	**--**	**500**
III	Core Course – IX (CC)	Agricultural Economics	6	5	3	25	75	100
	Core Course – X (CC)	Economics of Growth and Development	6	5	3	25	75	100
	Core Course – XI (CC)	Environmental Economics	6	5	3	25	75	100
	Core Course – XII (CC)	Industrial Economics	6	5	3	25	75	100
	Elective Course – III (EC)	Indian Economic Development	6	4	3	25	75	100
		Total	**30**	**24**	**--**	**--**	**--**	**500**
IV	Core Course – XIII (CC)	Research Methodology	5	5	3	25	75	100
	Core Course – XIV (CC)	Economics for Competitive Examination	5	5	3	25	75	100
	Elective Course - IV(EC)	Personnel Management	5	4	3	25	75	100
	Elective Course - V (EC)	Advertising Management	5	4	3	25	75	100
	Project		10	4	--	--	--	100
		Total	**30**	**22**	**--**	**--**	**--**	**500**
		TOTAL	**120**	**90**				**2000**

Note:

Project	:100 Marks
Dissertation	: 80 Marks
Viva Voice	: 20 Marks

Core Papers	-	14
Elective Papers	-	5
Project	-	1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate Passing Minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

References / Text Books contain the following details :

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

CORE COURSE I
MICRO ECONOMIC ANALYSIS I

Objective: To enable the students to understand the fundamental concepts of Microeconomics.

Module 1 : Demand Analysis

Utility theory - Ordinal approach - Indifference curve (income and substitution effects, Slutsky theorem, compensated demand curve) and their applications; Revealed preference theory; Revision of demand theory by Hicks; Characteristics of goods approach (Lancaster); Consumer's choice involving risk (N-M hypothesis) - Friedman-Savage, Markowitz hypotheses; indirect utility functions (duality theory); Recent developments in demand analysis (pragmatic approach and linear expenditure systems); Inter-temporal consumption; Recent developments in demand; Elementary theory of price formation – demand and supply equilibrium; Cobweb theorem; lagged adjustment in interrelated markets.

Module 2 : Theory of Production and Costs

Production function - short period and long period; law of variable proportions and returns to scale; Isoquants - Least cost combination of inputs; Returns to factors; Economies of scale; Multi-product firm; Elasticity of substitution; Euler's theorem; Technical progress and production function; Cobb-Douglas and CES, production functions and their properties; Empirical work on production functions; Traditional and modern theories of costs – Empirical evidence; Derivation of cost functions from production functions; derived demand for factors.

Module 3 : Price and Output Determination - Perfect competition and Monopoly

Marginal analysis as an approach to price and output determination: perfect competition - short run and long run equilibrium of the firm and industry, price and output determination, supply curve; Monopoly - short run and long run equilibrium, price discrimination, welfare aspects, monopoly control and regulation.

Module 4 : Monopolistic Competition and Oligopoly Models

Monopolistic competition - general and Chamberline approaches to equilibrium, equilibrium of the firm and the group with product differentiation and selling costs, excess capacity under monopolistic and imperfect competition, criticism of monopolistic competition; Oligopoly - Non-collusive (Cournot, Bertrand, Edgeworth, Chamberlin, kinked demand curve and Stackelberg's solution) and collusive (Cartels and mergers, price leadership and basing point price system) models; Price and output determination under monopsony and bilateral monopoly; Workable competition - Structure, conduct and performance norms - Concept of Contestable Market and global competition (Baumol).

Module 5 : Alternative Theories of the Firm

Critical evaluation of marginal analysis; Baumol's sales revenue maximization model; Williamson's model of managerial discretion; Marris model of managerial enterprise; Full cost pricing rule; Bain's limit pricing theory and its recent developments including Sylos-Labini's model; Behavioural model of the firm; Game theoretic models.

References:

1. Kreps, David M. (1990), A Course in Microeconomic Theory, Princeton University Press, Princeton.
2. Koutsoyiannis, A. (1979), Modern Microeconomics, (2nd Edition), Macmillan Press, London.
3. Layard, P.R.G. and A.W. Walters (1978), Microeconomic Theory, McGraw Hill, New York.
4. Sen, A. (1999), Microeconomics : Theory and Applications, Oxford University Press, New Delhi.
5. Stigler, G. (1996), Theory of Price, (4th Edition), Prentice Hall of India, New Delhi.
6. Varian, H. (2000), Microeconomic Analysis, W.W. Norton, New York.
7. Baumol, W.J. (1982), Economic Theory and Operations Analysis, Prentice Hall of India, New Delhi.
8. Hirshleifer, J. and A. Glazer (1997), Price Theory and Applications, Prentice Hall of India, New Delhi.
9. Da Costa, G.C. (1980), Production, Prices and Distribution, Tata McGraw Hill, New Delhi.
10. Salvatore, Dominick (1991), Micro Economic Theory, 3rd Edition, McGraw Hill, New Delhi.

CORE COURSE II
MACRO AND MONETARY ECONOMICS I

Objective: To help the students to understand the fundamental concepts of macro and monetary economics.

Module 1 : National Income and Accounts

Circular Flow of Income in two- three-and four-sector economy; different forms of national income accounting-social accounting, input-output accounting, flow of funds accounting and balance of payments accounting.

Module 2 : Consumption Function

Keyne's psychological law of consumption-implications of the law; short-run and long-run consumption function; Empirical evidence on consumption function; Income-consumption relationship-absolute income, relative income, life cycle and permanent income hypotheses.

Module 3 : Investment function

Marginal efficiency of investment and level of investment; Marginal efficiency of capital and investment-long run and short run; The Multiplier - accelerator and investment behaviour-impact of inflation; Influence of policy measures on investment-empirical evidence.

Module 4 : Supply of Money

Financial intermediation-a mechanistic model of bank deposit determination; A behavioural model of money supply determination, a demand determined money supply process- Inside and outside money (Gurley and Shaw)- RBI approach to money supply; High powered money and money multiplier; Budget deficits and money supply; money supply and open economy; control of money supply – Instruments of credit control.

Module 5 : Demand for Money

Classical approach to demand for money-Quantity theory approach, Fisher's equation, Cambridge quantity theory-Neutrality of money, Classical dichotomy-Keynes's liquidity preference approach, transaction, precautionary and speculative demand for money-aggregate demand for money; derivation of LM curve.

References:

1. Ackley, G. (1978), Macroeconomics : Theory and Policy, Macmillan, New York.
2. Blackhouse, R. and A. Salansi (Eds.) (2000), Macroeconomics and the Real World (2 Vols.), Oxford University Press, London.
3. Branson, W.A. (1989), Macroeconomic Theory and Policy, (3rd Edition), Harper and Row, New York.
4. Bornbusch, R. and F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York.
5. Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W. Norton, New York.
6. Heijdra, B.J. and V.P. Fredericck (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi.
7. Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd., New Delhi.
8. Romer, D.L. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd., New York.
9. Scarfe, B.L. (1977), Cycles, Growth and Inflation, McGraw Hill, New York.
10. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi.
11. Surrey, M.J.C. (Ed.) (1976), Macroeconomic Themes, Oxford University Press, Oxford.

CORE COURSE III
MATHEMATICAL METHODS FOR ECONOMIC ANALYSIS

Objective: To enable the students to understand the fundamental concepts of mathematics and their applications in Economics.

Module 1 : Terminology, Concepts and tools

Constants, variables, parameters, intercepts Coefficients-Functions-inverse, general and specific functions-Equations-Applications-Demand and supply functions-Cost and revenue functions-Consumption function-IS & LM functions-Multivariable functions-Market equilibria.

Module 2 : Differential Calculus

Rules of differentiation-slopes-linear and non linear functions-partial derivatives-higher order derivatives-Young's Theorem- Constrained & unconstrained optimization- Lagrangian Multiplier-Interpretation-Use of derivatives in economics –Maximization, minimization, elastic ties – Utility function – production function – revenue, cost and profit functions (simple problems).

Module 3 : Integration

Concept-simple rules of integration-application to Consumer's surplus & producer's surplus-Costs & revenues.

Module 4 : Matrices

Fundamentals of linear algebra-martix, solving equations- Crammer's rule-Uses-Input-output analysis.

Module 5 : Linear Programming

Basic Concepts, formulation of an LP problem-feasible, basic and optimal solution-graphic and simplex methods-formulation of the dual of a programme and its interpretation-Applications of LP technique.

References:

1. Allen, R.G.D. (1974), Mathematical Analysis of Economists, Macmillan Press and ELBS, London.
2. Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics, McGraw Hill, New York.
3. Yamane, Taro (1975), Mathematics for Economists, Prentice Hall of India, New Delhi.
4. Baumol, W.J. (1984), Economic Theory and Operations Analysis, Prentice Hall, Englewood Cliffs, New Jersey.
5. Monga, G.S. (1972), Mathematics and Statistics for Economists, Vikas Publishing House, New Delhi.
6. Salvatore, Dominick (1992), Mathematics for Economists, Schaum Series.

CORE COURSE IV
PUBLIC ECONOMICS

Objective: To help the students to understand the tools of public finance and their relevance to the economy.

Module 1 : Theory of public Goods and Public Choice

The economic role of government - Allocation, Growth and Stabilisation - Private goods, public goods, and merit goods; Market failure-imperfections, decreasing costs, externalities, public goods; Uncertainty and non-existence of futures markets; Informational asymmetry-Theory of second best- Private and public mechanism for allocating resources; Problems of allocating resources; Problems of preference revelation and aggregation of preferences; Voting systems; Arrow impossibility theorem; An economic theory of democracy; Politico-eco-bureaucracy; Rent seeking and directly unproductive profit seeking (DUP) activities.

Module 2 : Public Expenditure

Wagner's law of increasing state activities; Wiesman-Peacock hypothesis; Pure theory of public expenditure; Structure and growth of public expenditure; Criteria for public investment; Social cost-benefit analysis-Project evaluation, estimation of costs, discount rate; Reforms in expenditure budgeting; Programme budgeting and zero base budgeting.

Module 3 : Taxation and Public Debt

Theory of incidence; Alternative concepts on incidence - Allocative and equity aspects of individual taxes; Benefit and ability to pay approaches; theory of optimal taxation; Excess burden of taxes Trade off between equity and efficiency-Laffer curve - Theory of measurement of dead weight losses; the problem of double taxation-The rationale behind VAT – Indian tax structure and trends.

Public debt-Classical view of public debt; Compensatory aspect of debt policy; Burden of public debt; Sources of public debt; Debt through created money; Public borrowings and price level; Crowding out of private investment and activity; principles of debt management and repayment.

Module 4 : Fiscal Policy

Objectives of fiscal policy-full employment, anti-inflation, economic growth, redistribution of income and wealth; interdependence of fiscal and monetary policies; Budgetary deficit and its implications; fiscal policy for stabilization-automatic vs. discretionary stabilization; Alternative measures of resource mobilization and their impact on growth, distribution and prices; Balanced budget multiplier-Meaning and significance of budgetary terms: revenue account, capital account, fiscal deficit and other types of deficit; Budget Estimate, and Revised Estimate – Plan and non-plan expenditures.

Module 5 : Fiscal Federalism

Principles of multi-unit finance; Fiscal federalism in India; Vertical and horizontal imbalance; Assignment of function and sources of revenue; Constitutional provisions; finance Commission and Planning Commission; Devolution of resources and grants; Theory of grants; resource transfer from Union to States-Criteria for transfer of resources; Centre-State financial relations in India; Problems of state's resources and indebtedness; Transfer of resources from union and State to local bodies.

References:

1. Atkinson, A.B. and J.E. Siglitz (1980), Lectures on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A.J. and M. Feldstern (Eds.) (1985), Handbook of Public Economics, Vol.1, North Holland, Amsterdam.
3. Buchanan, J.M. (1970), The Public Finances, Richard D. Irwin, Homewood.
4. Goode, R. (1986), Government Finance in Developing Countries, Tata McGraw Hill, New Delhi.
5. Houghton, J.M. (1970), The Public Finance: Selected Readings, Penguin, Harmondsworth.
6. Jha, R. (1998), Modern Public Economics, Routledge, London.
7. Menutt, P. (1996), The Economics of Public Choice, Edward Elgar, U.K.
8. Musgrave, R.A. (1959), The Theory of Public Finance, McGraw Hill, Kogakhusa, Tokyo.
9. Musgrave, R.A. and P.B. Musgrave (1976), Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo.
10. Shoup, C.S. (1970), Public Finance, Aldine, Chicago.
11. Shome, P. (Ed.) (1995), Tax Policy : Handbook, Tax Division, Fiscal Affairs Department, International Monetary Fund, Washington D.C.
12. Srivastava, D.K. (Ed.) (2000), Fiscal Federalism in India, Har Anand Publishers, New Delhi.
13. Reports of various Finance Commissions.

ELECTIVE COURSE I
* COMPUTER APPLICATIONS IN ECONOMICS
(Applicable to the Candidate admitted in 2016-2017 only)

Objective: To enable the students to understand the perspectives of computer applications in Economics.

Module 1 : Introduction to Computers

Evolution, Generations and classification of computers - Hardware and Software - CPU and its functions - Input and Output devices - Application of computers in Economics and Business.

Module 2 : Operating Systems

Simple DOS commands - fundamentals of window operating.

Module 3 : Word Processing

Word basics - formatting text and document - working with headers, footers and footnotes - Tabs, tables and sorting - working with graphics - Templates and wizards - creating macros and menus - mail merge.

Module 4 : Spreadsheets and Statistical Packages

Excel basic - Arranging worksheets - functions - chart and its features - graphics - command macros - worksheet as database - SPSS - operation - regressions - ANOVA.

Module 5 : World Wide WEB

Internet basics - Browsing Internet-using search engines - opening E-mail ID, sending and checking E-mail - downloading text from Internet.

References:

1. Sanders, D.H. (1988), Computers Today, McGraw Hill (3rd Edition), New York.
2. Sinha, (1992), Computer Fundamentals, BPB Publications, New Delhi.
3. Rajaraman, V. (1996), Fundamentals of Computers, (Prentice Hall of India, New Delhi).
4. Lipschutz, M.M. and S. Lipschultz (1982), Theory and Problems of Data Processing, Schaum's Outline Series, McGraw Hill, New Delhi.
5. Leon and Leon, Internet Basics.

ELECTIVE COURSE I

* COMPUTER APPLICATIONS IN ECONOMICS ((updated on 16-11-2016)

(Applicable to the Candidate admitted from 2017-18 onwards)

(THEORY ONLY)

Objectives:

1. To enable the students to understand the fundamentals of computers, the MS Word, MS Excel, MS Power Point and Internet.
2. To motive the students to learn the application of most up-to-date technology in the discipline (Economics).

Module I : Fundamentals of Computer

Basic concepts and components of a computer – CPU, input – output devices –bit, byte, data storage, retrieval, hard disk – computer networking and resources sharing – hardware & software.

Module II: Operating System

Disk Operating System, Windows & LINUX [Basic ideas only] – operating systems.

Module III: MS Word & MS Power Point

Introduction : overview, basic terminology – tool bars, scrolling, word processing, formatting text and document – tabs and sorting – working with graphics, templates – creating a slide show – opening and closing presentations.

Module IV: MS Excel and Software Packages

Working with date – managing Excel workbooks 7& worksheets – formulas and functions – formatting data – creating charts – uses of SPSS for univariate & multivariate analyses.

Module V: World Wide Web

Internet basics – search engines – opening e-mail id – downloading text from internet – uses of internet for business and commercial activities.

References:

1. Sanders, D.H (1988) Computers Today, McGraw Hill (3rd Edition) New York
2. Sinha, (1992), Computer Fundamentals, BPB Publications, New Delhi.
3. Rajaraman V (1996), Fundamentals of Computers, (Prentice Hall of India, New Delhi)
4. Lipschultz M.M and S. Lipschultz (1982) Theory and Problems and Data Processing, Schaum Outline Series, McGraw Hill, New Delhi.
5. Leon and Leon, Internet Basics.
6. Dhanasekaran K, Computer Application in Economics [2010] Vrinda Publications, New Delhi.

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CORE COURSE - V

STATISTICAL METHODS FOR ECONOMIC ANALYSIS

Objective: To make the students community to understand the applications of statistics to economic analysis.

Module 1 : Univariate Analysis

Measures of central tendency, dispersion - standard deviation, coefficient of variation, Lorenz curve, Gini concentration ratio - Skewness (simple problems).

Module 2 : Regression Analysis

Correlation, regression, simple, multiple, linear (simple problems) - OLS-assumptions-violation of assumptions - heteroscedasticity, autocorrelation and multicollinearity (concepts only). Interpretation of Co-efficients-Introduction to non-linear regression.

Module 3 : Probability and distributions

Elementary probability theory, concepts, binomial, Poisson and normal distribution.

Module 4 : Sampling Distributions

Sampling distribution, standard error-testing of hypothesis: $\chi 2$, F- ANOVA, testing correlation and regression coefficients.

Module 5 : Index numbers and Time Series

Uses, selection of number of items, base year price relatives-Fisher's ideal index-Factor reversal test-Time reversal test- Chain index-Base shifting –conversion of current price data into constant price data- price index numbers in India – Components of time series - Moving averages-Straight line trend-Deseasonalisation of data – Seasonal Index.

References:

1. Gupta, S.C. (1993), Fundamentals of Applied Statistics, S. Chand & Sons, New Delhi.
2. Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book Co., London.
3. Chou, Y. (1975), Statistics Analysis, Holt, Reinhart and Winston, New York.
4. Croxton, Crowden and Klein (1971), Applied General Statistics, Prentice Hall of India, New Delhi.
5. Nagar, A.L. and R.K. Das (1993), Basic Statistics, Oxford University Press, New Delhi.
6. Salvatore, Dominick (1982), Statistics and Econometrics, McGraw Hill, New Delhi.

CORE COURSE VI
MICRO ECONOMIC ANALYSIS II

Objective: To enlighten the students on the various aspects of microeconomic concepts and theories.

Module 1 : Distribution

Neo-classical approach – Marginal productivity theory; Product exhaustion theorem; Elasticity of technical substitution, technical progress and factor shares; Theory of distribution in imperfect product and factor markets; Macro theories of distribution – Ricardian, Marxian, Kalecki and Kaldor's.

Module 2 : Welfare Economics

Pigovian welfare economics; Pareto optimal conditions; Value judgment; Social welfare function; Compensation principle; Inability to obtain optimum welfare - Imperfections, market failure, decreasing costs, uncertainty and non-existent and incomplete markets; Theory of Second Best - Arrow's impossibility theorem; Rawl's theory of justice, Equity-efficiency trade off.

Module 3 : General Equilibrium

Partial and general equilibrium, Walrasian excess demand and input-output approaches to general equilibrium, existence, stability and uniqueness of equilibrium and general equilibrium, coalitions and monopolies; Production without consumption – one sector model, homogeneous functions, income distribution; Production without consumption – two sector model, relationship between relative commodity and factor prices (Stolper-Samuelson theorem), relationship between output mix and real factor prices, effect of changes in factor supply in closed economy (Rybczynski theorem), production and consumption – Introduction of contributions of Arrow and Debreu to General equilibrium analysis.

Module 4 : Economics of Uncertainty

Individual behaviour towards risk, expected utility and certainty equivalence approaches, risk and risk aversion – sensitivity analysis, gambling and insurance, the economics of insurance, cost and risk, risk pooling and risk spreading, mean-variance analysis and portfolio selection, optimal consumption under uncertainty.

Module 5 : Competitive Firm under Uncertainty

Factor demand under price uncertainty, the economics of search – different models, the efficient market hypothesis, stochastic models of inventory demand; Market with incomplete information, search and transaction costs, the economics of information.

References:

1. Kreps, David M. (1990), A Course in Microeconomic Theory, Princeton University Press, Princeton.
2. Koutsoyiannis, A. (1979), Modern Microeconomics, (2nd Edition), Macmillan Press, London.
3. Layard, P.R.G. and A.W. Walters (1978), Microeconomic Theory, McGraw Hill, New York.
4. Sen, A. (1999), Microeconomics : Theory and Applications, Oxford University Press, New Delhi.
5. Stigler, G. (1996), Theory of Price, (4th Edition), Prentice Hall of India, New Delhi.
6. Varian, H. (2000), Microeconomic Analysis, W.W. Norton, New York.
7. Baumol, W.J. (1982), Economic Theory and Operations Analysis, Prentice Hall of India, New Delhi.
8. Hirshleifer, J. and A. Glazer (1997), Price Theory and Applications, Prentice Hall of India, New Delhi.
9. Da Costa, G.C. (1980), Production, Prices and Distribution, Tata McGraw Hill, New Delhi.
10. Salvatore, Dominick (1991), Micro Economic Theory, 3rd Edition, McGraw Hill, New Delhi.

CORE COURSE VII
MACRO AND MONETARY ECONOMICS II

Objective: To enable the students to understand and apply the tools of macro and monetary economics to real life situations.

Module 1 : Neo-Classical and Keynesian Synthesis

Neo - Classical and Keynesian views on interest; the IS - LM model; Extension of IS-LM model with government sector; Relative effectiveness of monetary and fiscal policies; extension of IS-LM models with labour market and flexible prices.

Module 2 : Post - Keynesian Demand for Money

Post-Keynesian approaches to demand for money - Patinkin and the Real Balance Effect, Approaches of Baumol; and Tobin: Friedman and the modern quantity theory; Crisis in Keynesian economics and the revival of monetarism.

Module 3 : Macroeconomics in an Open economy

Mundell - Fleming model-Asset markets, expectations and exchange rates; Monetary approach to balance of payments.

Module 4 : Theory of Inflation

Classical, Keynesian and Monetarist approaches to inflation; Structuralist theory of inflation; Philips curve analysis-Short run and long run Philips curve; Samuelson and Solow- the natural rate of unemployment hypothesis; Tobin's modified Philips curve; Adaptive expectations and rational expectations; policies to control inflation.

Module 5 : New Classical macro economics

The new classical critique of micro foundations, the new classical approach; Policy implications of new classical approach-empirical evidence.

References:

1. Ackley, G. (1978), Macroeconomics : Theory and Policy, Macmillan, New York.
2. Blackhouse, R. and A. Salansi (Eds.) (2000), Macroeconomics and the Real World (2 Vols.), Oxford University Press, London.
3. Branson, W.A. (1989), Macroeconomic Theory and Policy, (3rd Edition), Harper and Row, New York.
4. Bornbusch, R. and F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York.
5. Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W. Norton, New York.
6. Heijdra, B.J. and V.P. Fredericck (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi.
7. Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd., New Delhi.
8. Romer, D.L. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd., New York.
9. Scarfe, B.L. (1977), Cycles, Growth and Inflation, McGraw Hill, New York.
10. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi.
11. Surrey, M.J.C. (Ed.) (1976), Macroeconomic Themes, Oxford University Press, Oxford.

CORE COURSE VIII

INTERNATIONAL ECONOMICS

Objective: To enable the students to understand the working and implications of open economic system.

Module 1 : Theory of International Trade

The pure theory of international trade - Theories of absolute advantage, comparative advantage and opportunity costs, modern theory of international trade; Theorem of factor price equalization; Empirical testing of theory of absolute cost and comparative cost - Leontief Paradox - Heckscher-Ohlin theory of trade. Kravis and Linder theory of trade, Role of dynamic factors, i.e., changes in tastes, technology and factor endowments in explaining the emergence of trade; The Rybczynski theorem - concept and policy implications of immiserizing growth; Causes of emergence and measurement of intra-industry trade and its impact on developing economies.

Module 2 : Measurement of Gains and Theory of Interventions

Measurement of gains from trade and their distribution; Concepts of terms of trade, their uses and limitations; Hypothesis of secular deterioration of terms of trade, its empirical relevance and policy implications for less developed countries; Trade as an engine of economic growth; Welfare implications – Empirical evidence and policy issues; The Theory of Interventions (Tariffs, Quotas and non-tariff barriers); Economic effects of tariffs and quotas on national income, output, employment, terms of trade, income distribution; Balance of payments on trading partners both in partial and general equilibrium analysis. The political economy of non-tariff barriers and their implications; nominal, effective and optimum rates of tariffs – their measurement, impact and welfare implications; Trade under imperfectly competitive market.

Module 3 : Balance of Payments

Meaning and components of balance of payments; Equilibrium and disequilibrium in the balance of payments; The process of adjustment under systems of gold standard, fixed exchange rates and flexible exchange rates; Expenditure-reducing and expenditure-switching policies and direct controls for adjustment; Policies for achieving internal and external equilibrium simultaneously under alternative exchange rate regimes; Foreign trade multiplier with and without foreign repercussions and determination of national income and output; Relative merits and demerits of fixed and flexible exchange rates in the context of growth and development in developing countries.

Module 4 : Globalisation : Trends and Implications

Rise and fall of gold standard and Bretton-woods system; Need, adequacy and determinants of international reserves; Conditionality clause of IMF; Emerging International Monetary System with special reference to developing countries; Reform of the International Monetary System, India and developing countries.

Theory of short-term capital movements (FDI and FII) and East-Asian Crisis and lessons for developing countries; International trade and financial institutions – Role of GATT/WTO (TRIPS, TRIMS), UNCTAD, IMF, World Bank and Asian Development Bank – Their achievements and failures; WTO and World Bank from the point of view of India.

Module 5 : Trade Policies in India

Trade problems and trade policies in India during the last five decades; Recent changes in the direction and composition of trade and their implications; Rationale and impact of trade reforms since 1991 on balance of payments, employment and growth. Problems of India's international debt; Working and regulations of MNCs in India; Instruments of export promotion and recent import and export policies and agenda for future.

References:

1. Bhagwati, J. (Ed.) (1981), International Trade, Selected Readings, Cambridge University Press, Massachusetts.
2. Carbough, R.J. (1999), International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990), International Trade : Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, M.S. (2000), International Economics : Study, Guide and Work Book, (5th Edition), Routledge Publishers, London.
5. Dunn, R.M. and J.H. Mutti (2000), International Economics, Routledge, London.
6. Kenen, P.B. (1994), The International Economy, Cambridge University Press, London.
7. Kindleberger, C.P. (1973), International Economics, R.D. Irwin, Homewood.
8. King, P.G. (1995), International Economics and International Economic Policy : A Reader, McGraw Hill International, Singapore.
9. Krugman, P.R. and M. Obstfeld (1994), International Economics : Theory and Policy, Glenview, Foresman.
10. Salvatore, D. (1997), International Economics, Prentice Hall, Upper Saddle River, N.J., New York.
11. Soderston, Bo (1991), International Economics, The Macmillan Press Ltd., London.
12. Joshi, V. and I.M.D. Little (1998), India's Economic Reforms, 1991-2000, OUP, New Delhi.

ELECTIVE COURSE II
ECONOMETRICS

Objective: To enable the students to understand the theoretical and practical applications of Econometrics.

Module – 1 : Introduction

Econometrics – definition – objectives, characteristics and scope of Econometrics – Limitations – Tools and methods of study-economic and econometric models – Time series and cross section models.

Module - 2 : Statistical Inferences

Properties of estimators – methods of estimation-least squares estimation – Maximum likelihood estimation – Testing of Hypothesis.

Module - 3 : Single Equation Models

Simple Regression-least squares estimation-standard error-Hypothesis testing – confidence interval – two variable non-linear relationship – multiple regression – Gauss Markov Theorem – Testing of Hypothesis and Confidence intervals - problems.

Module - 4 : Problems in OLS Estimation

Autocorrelation – multi co linearity – heteroscedasticity – specification problem and bias – errors in variables – dummy variables – lag models – problems.

Module - 5 : Simultaneous Equations

Simultaneous equation model – reduced form – final form – methods of identification – estimation: Indirect least squares method – two stage least squares estimation – maximum likelihood estimation.

References:

1. Damodar Gujarati, Basic Econometrics, McGraw Hill, New Delhi, 1984.
2. Singh, S.P., Parashar, K and Singh, H.P., Econometrics, S.Chand & Co, New Delhi, 1981.
3. William H. Greene, Econometric Analysis, Prentice Hall, New Hersey, 1993.
4. Koutsyiannis, A (1989), Theory of Econometrics, Macmillan, New Delhi.
5. Salvatore, Dominick, Statistics and Econometrics, Schaum Series.

CORE COURSE IX
AGRICULTURAL ECONOMICS

Objective: To enable the students to understand the problems and prospects of agricultural sector in Indian economy.

Module 1: Nature and Scope of Economics

Agricultural development - A prelude to industrialization - Role of agriculture in Indian Economy - Agricultural development under Five Year Plans - Productivity in agriculture - Causes for low productivity and suggestive measures.

Module 2 : Structural and Institutional changes in agriculture

New agriculture strategy - New Economic policy and agriculture - Mechanisation - Advantages and Limitations - Farm size and efficiency - Land Reforms - Measures - Progress - Suggestions for improvement.

Module 3 : Agricultural Finance and Agencies

Capital formation in agriculture - Sources of Agricultural Finance - Rural indebtedness - causes - Debt relief activities - Role of Rural credit institutions.

Module 4: Agricultural Marketing

Present state of agricultural Marketing - Role and Functions of efficient marketing system - Marketable surplus - Agricultural price policy - Regulated Markets - Co-operative marketing - Procurement and Public distribution.

Module 5:

Problem of Agricultural Labour - causes for poor conditions of agricultural labour - Problem of Unemployment and under employment - Government measures.

References:

1. Bishop & Toussanit - Introduction to Agr. Eco. Analysis Toppan Com., Ltd.,
2. Dhingra I.C. - Indian Economy S.Chand & Com.
3. Mellor J.W. - The Eco Agricultural Eco Analysis Toppan Com.,Ltd.,
4. Memoria - Agricultural problem of India Kitab mabul
5. Sadhu & Singh - Fundamentals in Agriculture

CORE COURSE X

ECONOMICS OF GROWTH AND DEVELOPMENT

Objective: To familiarise the students to understand the various growth and development models.

Module 1 : Economic Growth I

Economic Growth and development- Factors affecting economic growth: Growth models-Harrod and Domar, Neoclassical growth models- Solow and Meade, Mrs. Joan Robinson's growth model; criticism of Neo-classical analysis of growth, the capital controversy.

Module 2 : Economic Growth II

Technical Progress-embodied and disembodied technical progress; Hicks, Harrod; learning by doing, production function approach to the economic growth; Growth models of Kaldor and Pasinetti, optimal savings and Ramsay's rule, golden rule accumulation, Tobin, Patinkin and Jhonson endogenous growth; Intellectual capital of learning, education and research;

Module 3 : Social and Institutional Aspects of development

Development and underdevelopment- Poverty-Absolute and relative measure development and development gap - inequality of income, human development index and other indices of development and quality of life –Food security, education, health and nutrition; Human resource development; Theory of demographic transition; Population as limits to growth and as ultimate source-Population, poverty and environment; economic development and institutions.

Module 4 : Theories of Development

Classical theory of development-contributions of Adam Smith, Ricardo, Malthus and James Mill; Karl Marx and development of capitalist economy-theory of social change, surplus value and profit; immutable laws of capitalist development; crisis in capitalism – Schumpeter and capitalist development; innovation-role of credit, profit and degeneration of capitalism.

Module 5 : Approaches to development

Partial theories of growth and development-vicious circle of poverty, circular causation, unlimited supply of labour, big push, balanced growth, unbalanced growth, critical minimum effort thesis, low income equilibrium trap; Dualism-technical, behavioural and social; Ranis and Fei model;

References:

1. Adelman, I. (1961), Theories of Economic Growth and Development, Stanford University Press, Stanford.
2. Behrman, S. and T.N. Srinivasan (1995), Handbook of Development Economics, Vol.3, Elsevier, Amsterdam.
3. Chenery, H. and T.N. Srinivasan (Eds.) (1989), Handbook of Development Economics, Vols. 1 & 2, Elsevier, Amsterdam.
4. Ghatak, S. (1986), An Introduction of Development Economics, Allen and Unwin, London.
5. Gimmell, N. (1987), Surveys in Development Economics, Blackwell, Oxford.
6. Kindleberger, C.P. (1977), Economic Development, (3rd Edition), McGraw Hill, New York.
7. Meier, G.M. (1995), Leading Issues in Economic Development, (6th Edition), Oxford University Press, New Delhi.
8. Myint, Hla (1965), The Economics of Underdeveloped Countries, Preager, New York.
9. Todaro, M.P. (1996), (6th Edition), Economic Development, Longman, London.
10. Thirwal, A.P. (1999), (6th Edition), Growth and Development, Macmillan, U.K.

CORE COURSE XI
ENVIRONMENTAL ECONOMICS

Objective: To enable the students to understand the environmental issues, impact and solution.

Module 1 : Nexus between Economics and Environment

Material balance principle- resilience and carrying capacity- Externalities and market inefficiency - externalities as missing markets; Property rights and externalities, non-convexities and externalities; Pareto optimal provision of public goods - Lindahl's equilibrium, preference revelation problem and impure and mixed public goods, common property resources.

Module 2 : The Theory of Environmental Policy

Environmental externalities - Pigouvian taxes and subsidies, marketable pollution permits and mixed instruments (the charges and standards approach), Coase's bargaining solution and collective action; Informal regulation and the new model of pollution control, Monitoring and enforcement of environmental regulation, Environmental institutions and grass root movements; Global environmental externalities and climatic change - Tradable pollution permits and international carbon tax, Trade and environment in WTO regime.

Module 3 : Natural Resource Management and Sustainable Development

Theories of optimal use of exhaustible and renewable resources; Issues in biodiversity- Environmental and development trade off and the concept of sustainable development; Integrated environmental and economic accounting and the measurement of environmentally corrected GDP; Macroeconomic policies and environment.

Module 4 : Measurement of Environmental Values

User values; Option values and non-use values; Valuation methods - Methods based on observed market behaviour; Hedonic property values and household production models (travel cost methods and household health production function), Methods based on response to hypothetical markets contingent valuation methods.

Module 5 : Environmental and Natural Resource Problems in India

Mechanism for environment regulation in India; Environmental laws and their implementation; Policy instruments for controlling water and air pollution and forestry policy; People's participation in the management of common and forest lands; The institutions of joint forest management and the joint protected area management; Social forestry – rationale and benefits.

References:

1. Baumol, W.J. and W. E. Oates (1988), The Theory of Environmental Policy, (2nd Edition) Cambridge University Press, Cambridge.
2. Bromely, D.W. (Ed.) (1995), Handbook of Environmental Economics, Cambridge University Press, Cambridge.
3. Fisher, A.C. (1981), Resource and Environmental Economics, Cambridge University Press, Cambridge.
4. Hanley, N. J. F. Shogern and B White (1997), Environmental Economics in Theory practice Macmillan.
5. Hussen, A.M. (1999), Principles of Environmental Economics, Routledge, London.
6. Jeroen, C.J.M Van Den Bergh (1999), Handbook of Environmental and Resource Economics, Edward Elgar Publication Ltd., U. K.
7. Kolstad, C.D. (1999), Environmental Economics, Oxford University Pearce, D.W. and R. Turner (1991), Economics of Natural Resource Use and Environment, John Hopkinns University Press, Baltimore.
8. Perman, R. Ma and J. McMivary (1996), Natural Resource and Environmental Economics, Longman, London.
9. Sankar, U. (Ed.) (2001), Environmental Economics Oxford University Press, New Delhi.
10. Adiseshaiah, Malcolm. S (Ed.) (1987), Economics of Environment, Lancer International, New Delhi.

CORE COURSE XII
INDUSTRIAL ECONOMICS

Objective: To enrich the student community on the various aspects of Industrial Economics.

Module 1 : Patterns and Structure

Process and pattern of industrialisation – Industrial structure and change – Alternate patterns – Hoffman's Hypothesis of Market Economies – Simon Kuznets' Interpretation of secular changes in industrial development – Industrialisation in Planned Economies – Key Role of Capital Goods Sector – HB Chenery's pattern of industrial change.

Module 2 : Market Structure

Sellers' concentration; Production differentiation; Entry conditions; Economies of scale; Market structure and profitability; Market structure and innovation; Theories of industrial location – Weber, Losch and Sargent Florence; Factors affecting location.

Module 3 : Industrial Finance

Owned, external and other components of funds; Role, nature, volume and types of institutional finance – IDBI, IFCI, SFCs, SIDC, commercial banks, etc.; Financial statement – Balance Sheet, Profit and loss account; assessment of financial soundness, ratio analysis.

Module 4 : Industrial Labour

Structure of industrial labour; employment dimensions of Indian industry; industrial legislation; industrial relations; Exit policy and Social security; Wages and problems of bonus – labour market reforms.

Module 5 : Project Planning and Appraisal

Cost-benefit analysis – Net Present Value (NPV) and internal rate of return (IRR) criteria – balancing private and social returns.

References:

1. Barthwal, R.R. (1985), Industrial Economics, Wiley Eastern Ltd., New Delhi.
2. Cherunilam, F. (1994), Industrial Economics : Indian Perspective (3rd Edition), Himalaya Publishing House, Mumbai.
3. Divine, P.J. and R.M. Jones et.al. (1976), An Introduction to Industrial Economics, George Allen and Unwin Ltd., London.
4. Hay, D. and D.J. Morris (1979), Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi.
5. Kuchhal, S.C. (1980), Industrial Economy of India (5th Edition), Chaitanya Publishing House, Allahabad.
6. Singh, A. and A.N. Sadhu (1988), Industrial Economics, Himalaya Publishing House, Bombay.
7. Mamoria and Mamoria (2000), Dynamics of Industrial Relations in India (15th Edition), Himalaya Pub. House, Mumbai.

ELECTIVE COURSE III
INDIAN ECONOMIC DEVELOPMENT

Objective: To make the students to know and enrich on the emerging trends and issues in Indian economy.

Module – 1 Natural Resources and Population

Natural Resources – Meaning and Importance – Forest resources – Energy resources – Mineral resources – water resources – Environmental degradation – Indian population size, density and distribution – problem of urbanization – National population policy – the concept of Human capital and its development.

Module – 2 Poverty and Unemployment

Poverty – its dimensions, nature and causes – Poverty alleviation programmes – Unemployment and its types – New Employment Policy in X Plan – inequalities in distribution programmes and measures – causes of income inequalities – suggested measures to redress inequalities – parallel economy : meaning, magnitude and consequences – causes and remedies.

Module – 3 Foreign Trade and WTO

Direction of foreign Trade – Balance of payments – The New Economic Reforms – India's foreign Trade Policy – WTO – Features and assessment – Globalization: Features and problems.

Module – 4 Agricultural and Industrial Sectors

Technological change in Agriculture – pricing of agricultural inputs and outputs – Agricultural marketing – New agricultural policy – issues in food security – policies for sustainable irrigation – new industrial policy – Problem of sick units – privatization and disinvestments – Labour market reform.

Module – 5 Planning in India

Objectives – achievements and shortcomings – agriculture, industry and social sectors – Plan performance to tackle poverty, inequality and unemployment.

References:

1. Agrawal, A.N. (2004) Indian Economy, Wishwa Prakashan, New Delhi

2. Ahluwalia, I.J. and I.M.D. Little (Eds.) (1999), India's Economic Reforms and Development (Essays in honour of Manmohan Singh), Oxford University Press, New Delhi.

3. Bardhan, P.K. (9th Edition) (1999), The Political Economy of Development in India, Oxford University Press, New Delhi.

4. Bawa, R.S. and P.S. Raikhy (Ed.) (1997), Structural Changes in India Economy, Guru Nanak Dev University Press, Amritsar.

5. Brahmananda, P.R. and V.R. Panchmukhi (Eds.) (2001), Development Experience in the Indian Economy : Inter-State Perspectives, Bookwell, Delhi.

6. Chakravarty, S. (1987), Development Planning : The Indian Experience, Oxford University Press, New Delhi.

7. Dantwala, M.L. (1996), Dilemmas of Growth : The Indian Experience, Saga Publications, New Delhi.

8. Datt and Sundaram (2002), Indian Economy, S. Chand & Co., New Delhi.

9. Dhigra C. (2003), The Indian Economy, Sultan Chand & Sons, New Delhi

10. Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi.

11. Jalan, B. (1992), The Indian Economy – Problems and Prospects, Viking, New Delhi.

12. Parkh, K.S. (1999), India Development Report (Annual), Oxford University Press, New Delhi.

13. Reserve Bank of India, Report of Currency and Finance, (Annual).

14. Dreze, Jean and Amarta Sen (1999), India : Economic Development and Social Opportunity, OUP, New Delhi.

15. Datt Ruddan and K.P.M. Sundaram (2001), Indian Economy, S. Chand & Co., New Delhi.

16. Alagh, Y.K. (1995), Indian Development Planning and Policy, Vikas, New Delhi.

CORE COURSE XIII
RESEARCH METHODOLOGY

Objective: To enable the students to apply the research tools in social science research.

Module -1

Science – its meaning and characteristics – The meaning of 'research' – Specific features of research in Social Sciences as opposed to Physical and Natural Sciences – Objectivity in research – Basic categories in scientific method – Facts – Concepts – Causality – Uncertainty – Probability – Dialectical and Historical Materialism.

Module -2

Methods of Research – Falsification and verification criterion (Karl Popper) - Paradigm Shift (Kuhn) - Deductive and inductive Reasoning – Steps of Scientific Method – Historical Method – Case study – Scaling Techniques – Sample surveys – Various sampling methods – Importance of proper sampling design.

Module -3

Steps in Research – Formulation of a Research problem – Guiding principles in the choice of a research topic – Role of Review of Literature – Formulation of Research Design – Model building – Hypothesis: concept, definition, formulation and testing.

Module -4

Secondary data – some important sources: NSSO, CSO, Economic Survey, Season & Crop Report, Agricultural Census, Livestock Census, Annual survey of Industries, RBI Reports, WDR, HDR, IDR; Primary Data collection – Tools – observation, schedule, questionnaire, projective techniques – Principles underlying construction of a questionnaire – Preparation of master table – Data processing – Analytical Tables.

Module - 5

Report writing – Structure and General format – Style – Use of footnotes – citations – Presentation of tables, diagrams, charts and maps – Bibliography.

References:

1. Ghose, B.N., Scientific Method and Social Research, New Delhi, Sterling Publishers, 1982.
2. Goode, W.J. & Hatt, P.K., Methods in Social Research, New York, McGraw Hill, 1952.
3. Kate Turabina, Manual of style for writing dissertations, thesis and reports, University of Chicago Press, Chicago.
4. Myrdal, G. Objectivity in Social Research.
5. C.T. Kurien (Ed.), A Guide to Research in Economics (Sangam Publishers).
6. Wilson Gee, Social Science Research Methods, (N.Y. Appleton Century Croft, 1950).
7. Pauline V. Young, Scientific Social Surveys and Research.
8. Parson, C.J., Thesis and Project Work.
9. Karl Popper, The Logic of Scientific Discovery, (Lond. Hutchinson, 1934).
10. T.S. Kuhn, The Structure of Scientific Revolutions, (Chicago, 1962).

CORE COURSE XIV
ECONOMICS FOR COMPETITIVE EXAMINATIONS

Objective: To make the students to prepare for the various competitive examinations.

Module I: Micro and Macro Economics

Consumer behavior - Marshallian Analysis - Indifference Curve Analysis - Revealed preference Approach - Theory of Product Pricing - Production and Cost - Pure competition, Monopoly and Oligopoly - Monopolistic competition - National Income Accounting – Basic concepts Demand and Supply of Money – Price and Inflation.

Module II: Banking, Public Finance and Industrial Economics

Public, Private and Joint Sectors – Cottage and Small Scale Industry – Sources of Industrial Finance – Industrial Policy and Location – RBI, Commercial and Co-operative Banks – Specialized and Financial and Investment Institutions – Union – State Financial relationship.

Module III: Agriculture, Co-operation and Rural Economics

Land Reforms – Technology in agriculture – Co-operative movement in India – Role of NABARD and RRB, Economic and Social Infrastructure, Transport – Power – Education. Drinking water – Health – Sanitation – Rural Housing – Environmental Issues.

Module IV: Planning, Development and demography

Techniques and methods of Indian Five year plans – Indian population problem and policy – Urbanisation and problem of slums – Role of Women in Economic Activity – Basic Economic Indicators in India – Unemployment and Role of Trade Unions poverty analysis and alleviation schemes.

Module V:

International Economic Co-operation – Export promotion and Import substitutions – New Economic Policy – Foreign Trade and Balance of Payments – Role of Multi national in India.

Study Materials:

1. I.C. Dhingra – The Indian Economy
2. Human Development Report
3. John W. Mellor – The New economics of growth
4. A strategy for India and Developing Report
5. India Year Book
6. Manorama Year Book
7. Sankaran S – Indian Economy
8. Alak Ghosh – Indian Economy

ELECTIVE COURSE IV
PERSONNEL MANAGEMENT

Objective: To enable the students to understand the personnel management concepts and their implications.

Module I :

Personnel Management – Meaning – Scope – Importance - Characteristics - Objectives – Pre-requisites – Tools and Techniques – Functions - Classifications – Functional areas – Personnel policy – Procedures and Programmes – Organisational Structure – Personnel records – Reports – Audit and Research

Module II:

Human Resource Planning – Recruitment and selection procedures – Psychological testing – Interviews – Placement and induction – Promotion – Demotion – Transfer – Separation – Absenteeism – Turnover – Training – On the job – Off the job techniques.

Module III:

Job Evaluation – Objectives – Principles – Basic procedure – Advantages – Limitations – Job evaluation methods – Salary Administration purpose – Rules – Influencing factors – Wage and Salary – Good wage plan – Wage differentiates – Rewards and Incentives – Types and features – Employee Benefits and Services.

Module IV:

Functions of Group dynamics – Types of groups – Characteristics – Functions and goals – Meaning and types of human needs – Objectives of motivation – Job security – Job loading – Job achievement – Quality of work – Guidelines for motivating employees and managers – Objectives of communication – Functions and responsibility of a leader – Need for grievance procedure – Aims of disciplinary action – Guidelines of a disciplinary action.

Module V:

Causes and procedure for dispute settlement objectives of industrial relations – Role and objectives of Trade union – Essentials of a successful Trade union – Industrial accidents – Industrial Health – ILO'S model of Employees safety.

STUDY MATERIALS

1. Mamoria CB and Utai Pareek – Personnel Management
2. Pavar – Personnel Management
3. Agarwal R.D. – Dynamics of Personnel Management of India
4. Dale – Personnel Management

ELECTIVE COURSE V
ADVERTISING MANAGEMENT

Objective: To help the students to apply the various issues relating to Advertising management to real life situations.

Module I: **Introductory aspects of Advertisement**

Meaning of advertising – Purpose and functions – Objectives and role – Advertising in Marketing Mix – Advertisings process – Economic and Social implications of Advertisement

Module II: Creativity and its role

Creativity – Meaning and sources – Development of creative strategy – Trend in creative communication – Contemporary advertising – Government Regulation – Restrictions.

Module III:

Advertising strategy & Planning and Organisation – Contribution of advertising – Strategy – Level of decision making – Factors influencing organizational features – organizational approach.

Module IV: Advertising Budget and Research

Advertising budget – Advertisement as Investment – Advertisement Budget Making process – Advertisement Appropriation practices – advertising Research – Fundamentals of Qualitative and Quantitative Research

Module V: Future Trend in Advertisement

Future trend of Advertisement – Role of Advertising Agents – Competition among Agencies – Ethics and Morale of advertisement – Role of technology in advertising. Global marketing and Advertising.

References:

1. Bastia, G.R. & N.R. Sharma, (1996) Effecting Advertising Marketing and Sales Management, Mangal Deep Publication, Jaipur
2. Kumar, K.J., K.C. Sethia, G.V. Subramnian and V.G. Suchank (1999), Advertising Theory and Practice, Himalaya Publishing House, Mumbai
3. Mathur, U.C. (2002) Advertising Management, New Age International Publishers, New Delhi
4. Patel, J.S.K (1988) Salesmanship & Publicity, Sultan Chand & sons, New Delhi
5. Sontakki, C.N., (1989)Advertising, Kalyani Publishers, Ludhiana

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.A. Economics Syllabus under CBCS

(Applicable to the candidate admitted from the academic year 2016-2017 onwards)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Micro Economics – I	6	4	3	25	75	100
	Core Course – II (CC)	Macro Economics I	6	4	3	25	75	100
	Core Course – III (CC)	Monetary Economics	6	4	3	25	75	100
	Core Course – IV (CC)	Mathematical methods for Economic Analysis	6	4	3	25	75	100
	Elective Course – I (EC)	Environmental Economics	6	4	3	25	75	100
		Total	**30**	**20**	--	--	--	**500**
II	Core Course – V (CC)	Financial Economics	6	5	3	25	75	100
	Core Course – VI (CC)	Micro Economics II	6	5	3	25	75	100
	Core Course – VII (CC)	Macro Economics II	6	5	3	25	75	100
	Core Course – VIII (CC)	Statistics	6	5	3	25	75	100
	Elective Course – II (EC)	Research Methodology	6	4	3	25	75	100
		Total	**30**	**24**	--	--	--	**500**
III	Core Course – IX (CC)	Indian Economy	6	5	3	25	75	100
	Core Course – X (CC)	International Business	6	5	3	25	75	100
	Core Course – XI (CC)	Industrial Economics	6	5	3	25	75	100
	Core Course – XII (CC)	Fiscal Economics	6	5	3	25	75	100
	Elective Course – III (EC)	Project Appraisal	6	4	3	25	75	100
		Total	**30**	**24**	--	--	--	**500**
IV	Core Course – XIII (CC)	Economics of Growth and Development	5	5	3	25	75	100
	Core Course – XIV (CC)	Economics of Natural Resources	5	5	3	25	75	100
	Elective Course - IV (EC)	Management Information Systems	5	4	3	25	75	100
	Elective Course - V (EC)	Computer Applications in Economics **(updated on 16-11-2016)**	5	4	3	25	75	100
	Project Work Viva voce 20 marks Dissertation 80 marks		10	4	---	---	---	100
		Total	**30**	**22**	--	--	--	**500**
			120	**90**	--	--	--	**2000**

Note:

Project	:100 Marks
Dissertation	: 80 Marks
Viva Voice	: 20 Marks

Core Papers	-	14
Elective Papers	-	5
Project	-	1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate Passing Minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

References / Text Books contain the following details :

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

CORE COURSE I
MICRO ECONOMICS I

Objective: To make the students understand the fundamental theories of Microeconomics and their applications.

Module I: Demand Analysis

Utility theory – Ordinal approach – Indifference curve (income and substitution effects, Slutsky theorem, compensated demand curve) and their applications, Revealed preference theory, Revision of demand theory by Hicks; Characteristics of goods approach (Lancaster), consumer's choice involving risk (N-M hypothesis) – Friedman-Savage, Markowitz hypotheses; indirect utility functions (duality theory); Recent developments in demand analysis (pragmatic approach and linear expenditure systems); Inter-temporal consumption; Recent developments in demand; Elementary theory of price formation – demand and supply equilibrium; Cobweb theorem; lagged adjustment in interrelated markets.

Module II: Theory of Production and Costs

Production function – short period and long period; law of variable proportions and returns to scale; Isoquants – Least cost combination of inputs; Returns to factors: Economies of Scale; Multi-product firm; Elasticity of substitution; Euler's theorem; Technical programme and production function; Cobb – Douglas and CES Production functions and their properties; Empirical work on production functions; Traditional and modern theories of costs – Empirical evidence; Derivation of cost functions from production functions; derived demand for factors.

Module III: Price and Output Determination – Perfect competition and Monopoly

Marginal analysis as an approach to price and output determination: perfect competition – short run and long run equilibrium of the firm and industry, price and output determination, supply curve; Monopoly – short run and long run equilibrium, price discrimination, welfare aspects, monopoly control and regulation.

Module IV: Monopolistic Competition and Oligopoly Models

Monopolistic competition – general and Chamberlin approaches to equilibrium, equilibrium of the firm and the group with product differentiation and selling costs, excess capacity under monopolistic and imperfect competition, criticism of monopolistic competition; Oligopoly – Non-collusive (Cournot, Bertrand, Edgeworth, Chamberlin, kinked demand curve and Stackelberg's solution) and collusive (Cartels and mergers, price leadership models); Price and output determination under monopsony and bilateral monopoly; Workable competition – Structure, conduct and performance norms – Concept of Contestable Market.

Module V: Alternative Theories of the Firm

Critical evaluation of marginal analysis; Baumol's sales revenue maximization model; Williamson's model of managerial discretion; Marris model of managerial enterprise, Full cost pricing rule; Bain's limit pricing theory and its recent developments including Sylos-Labini's model; Behaviours model of the firm; Game theoretic models.

References:

1. Kreps, David M (1990) A Course in Microeconomic Theory, Princeton University Press, Princeton
2. Koutsoyiannis, A (1979), Modern Microeconomics (2nd Edition) Macmillan Press, London.
3. Layard P.R.G and A.W. Walters (1978) Microeconomic Theory, McGraw Hill, New York
4. Sen A. (1999) Microeconomics: Theory and Applications, Oxford University Press, New Delhi
5. Stigler, G (1996), Theory of Price, (4th Edition), Prentice Hall of India, New Delhi
6. Varian,H. (2000) Microeconomic Analysis, W.W. Norton, New York
7. Baumol, W.J. (1982) Economic Theory and Operations Analysis, Prentice Hall of India, New Delhi
8. Hirshleifer, J. and A Glazer (1997), Price Theory and Applications, Prentice Hall of India, New Delhi
9. Da Costa, G.C. (1980), Production, Prices and Distribution, Tata McGraw Hill, New Delhi
10. Salvatore, Domnick (1991), Micro Economic Theory, 3rd Edition, McGraw Hill, New Delhi

CORE COURSE II
MACRO ECONOMICS I

Objective: To make the students to understand the macro economic concepts and their relevance to the economy.

Module I: Basic Concepts

Macro Economics – meaning and scope – macro static and dynamics – macro economic goals – national income – employment and unemployment - price – inflation – GDP and GNP concepts and measurements – aggregate demand and supply.

Module II: National Income and Accounts

Circular Flow of Income in two – three and four – sector economy; different forms of national income accounting –social accounting, input – output accounting, flow of funds accounting and balance of payments accounting.

Module III: Consumption Function

Keynes psychological law of consumption-implications of the law; short-run and long- run consumption function; Empirical evidence on consumption function; Income-consumption relationship-absolute income, relative income, life cycle and permanent income hypotheses

Module IV: Investment function

Marginal efficiency of capital and investment – long run and short run; The Multiplier – accelerator and investment behaviour –impact of inflation; Influence of policy measure on investment – empirical evidence.

Module V: Neo – Classical, Keynesian Synthesis and Post-Keynesian Syntheses

Neo – Classical and Keynesian views on interest; the IS – LM model; Slopes of IS and LM; Extension of IS-LM model with government sector; Relative effectiveness of monetary and fiscal policies; extension of IS-LM models with labour market and flexible prices.

References:

1. Ackley, G (1978) Macroeconomics: Theory and Policy, Macmillan, New York
2. Blackhouse, R. and A Salansi (Eds.) (2000), Macroeconomics and the Real World (2 Vols.), Oxford University Press, London
3. Branson, W.A. (1989) Macroeconomics Theory and Policy (3rd Edition), Harper and Row, New York
4. Bornbusch, R. and F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York
5. Hall, R.E. and J.B. Taylor (1986) Macroeconomics W.W. Norton, New York
6. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi
7. Jha, R. (1991) Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd., New Delhi.
8. Romer, D.L. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd, New York
9. Scarfe, B.L. (1977) Cycles, Growth and Inflation, McGraw Hill, New York
10. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi
11. Surrey, M.J.C. (Ed.) (1976), Macroeconomic Theories, Oxford University Press, Oxford.

CORE COURSE III
MONETARY ECONOMICS

Objective: To understand the concepts relating to Monetary Economics and their practical applicability.

Module I: Supply of Money

Financial intermediation a mechanistic model of bank deposit determination; A behavioural model of money supply determination, a demand determined money supply process – Inside and outside money (Gurley and Shaw) – RBI approach to money supply; High powered money and money multiplier; Budget deficits and money supply; money supply and open economy; control of money supply – Instruments of credit control.

Module II: Demand for Money

Classical approach to demand for money-Quantity theory approach, Fisher's equation, Cambridge quantity theory – Neutrality of money, Classical dichotomy –Keynes's liquidity preference approach, transaction, precautionary and speculative demand for money-aggregate demand for money, derivation of LM curve

Module III: Theory of Inflation

Classical, Keynesian and Monetarist approaches to inflation; Structuralist theory of inflation; Philips curve analysis-Short run and long run Philips curve; Samuelson and Solow – the natural rate of unemployment hypothesis; Tobin's modified Philips curve, Adaptive expectations and rational expectations; policies to control inflation

Module IV: Post-Keynesian Demand for Money

Post – Keynesian approaches to demand for money-Patinkin and the Real Balance Effect, Approaches of Baumol and Tobin; Friedman and the modern quantity theory; Crisis in Keynesian economics and the revival of monetarism; Mundell – Fleming model-Asset markets, expectations and exchange rates; Monetary approach to balance of payments

Module V: Financial Market

Nature and functions of financial market – Money market – Meaning, Characteristics and constituents, functions, structure and institutions of money market – Bankers – Weakness of Indian money market – measures for improvement – recent concepts and instruments of financial market – capital market – Sensex and Nifty – SEBI and its role

References:

1. Ackley, G (1978) Macroeconomics: Theory and Policy, Macmillan, New York
2. Blackhouse, R. and A Salansi (Eds.) (2000), Macroeconomics and the Real World (2 Vols.), Oxford University Press, London
3. Branson, W.A. (1989) Macroeconomics Theory and Policy (3rd Edition), Harper and Row, New York
4. Bornbusch, R. and F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York
5. Hall, R.E. and J.B. Taylor (1986) Macroeconomics W.W. Norton, New York
6. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi
7. Jha, R. (1991) Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd., New Delhi.
8. Romer, D.L. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd, New York
9. Scarfe, B.L. (1977) Cycles, Growth and Inflation, McGraw Hill, New York
10. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi
11. Surrey, M.J.C. (Ed.) (1976), Macroeconomic Theories, Oxford University Press, Oxford.

CORE COURSE IV
MATHEMATICAL METHODS FOR ECONOMIC ANALYSIS

Objective: To familiarize the mathematical concepts relating to Economics and their applications.

Module I: Terminology, Concepts and tools

Addition, subtraction, multiplication and division of fractions and decimals – Constants, variables, parameters, intercepts Coefficients – Functions – inverse, general and specific functions – Equations – Applications – Demand and supply functions – Cost and revenue functions – Consumption function –IS & LM functions – Multivariable functions –Market equilibria.

Module II: Differential Calculus

Rules of differentiation – slopes – linear and non linear functions – partial derivatives – higher order derivatives – Young's Theorem – Constrained & unconstrained optimization – Lagrangian Multiplier – Interpretation – Use of derivatives in economics – Maximization, minimization, elasticities - Utility function – production function – revenue, cost and profit functions (simple problems)

Module III: Integration

Concept-simple rules of integration-application to Consumer's surplus & producer's surplus-Costs & revenues

Module IV: Matrix and Determinants

Matrices and Determinants: Rules and applications – Crammer's rule-Input-Output analysis: Uses.

Module V: Linear Programming

Basic Concepts - formulation of LP problem-feasible, basic and optimal solution – Graphic and Simplex method (Concept only) – Duality Problem – Applications of LP technique.

References:

1. Allen, R.G.D. (1974) Mathematical Analysis of Economists, Macmillan Pressand ELBS, London
2. Chiang, A.C. (1986) Fundamental Methods of Mathematical Economics, McGraw Hill, New York
3. Yamane, Taro (1975) Mathematics of Economists, Prentice Hall of India, New Delhi
4. Baumol, W.J. (1984) Economic Theory and Operations Analysis, Prentice Hall. Englewood Cliffs, New Jersey
5. Monga, G.S. (1972), Mathematics and Statistics for Economists, Vikas Publishing House, New Delhi
6. Salvatore Dominick (1992) Mathematics for Economists, Schaum Series

ELECTIVE COURSE I
ENVIRONMENTAL ECONOMICS

Objective: To help students to understand current issues and policies relating to physical environment.

Module I: Concepts

Environment – Eco-system – Nexus between Economics and Environment – The principle of material balance – Private versus Social Cost – Entropy – Ecological balance – Sustainable development – Externalities.

Module II: Environmental Issues

Environmental quality – Non-marketed goods – Regulatory – Command and Control Method – Environmentalism – Trade off between Environmental Protection and Economic Growth – Institutional Approach to Environmental Problems – Environmental Education.

Module III: Measurement of Environmental Values

User values: Option values and non-use values; Valuation methods – Methods based on observed market behaviour; Hedonic property values and household production models (travel cost methods and household health production function), Methods based on response to hypothetical markets contingent valuation methods.

Module IV: Environment and Society

Pollution and Environment – Impact of population growth (Trends, Sex ratio, Rural and Urban) on environment – Urbanisation and environment – Poverty and Environment – Culture and Environment – People Participation in Environmental movement.

Module V: Environmental Policy

Ministry of Environment and Forest – Water Pollution (Prevention and Control) Act 1974 – Air Pollution (Prevention and Control) Act 1981 – Comprehensive Environment Bill 1986 –Recent Policy – WTO and Environment

References:

1. Agarwal S.K. (1997) "Environmental Issues and Themes", APH Publishing Corporation, 5 – Ansari Road, New Delhi
2. Pravin Sheth (1997), Environmentalism Policies, Ecology and Development", Rawat Publications, Jaipur and New Delhi
3. Neela Mukaherjee (1997) "Participatory appraisal of Natural Resources",Concept Publications, company New Delhi.
4. Pashupathi Nath and Siddha Nath (1990), Environmental Pollution Conservation and Planning" Chugu Publication, Alahabad, India.
5. Sumi Krishna (1996), "Environmental Politics People's lives and Development Choices" Saga Publications, New Delhi.
6. Ajit Kumar Singh (1997), "Land use Environment and Economic Growth in India", MD Publications PVT, LTD, New Delhi
7. Baumol, W.J. and W.E. Oates (1988), "The Theory of Environmental Policy" (2nd Edition) Cambridge University Press, Cambridge
8. Bromley, D.W. (Ed.,) (1995)"Handbook of Environmental Economics" Cambridge University Press Cambridge
9. Fisher, AC (1981), "Resource and Environmental Economics" Cambridge University Press Cambridge
10. Hanley, N.J.F., Shorgen and B. White (197), "Environmental Economics in Theory and Practice", Macmillan
11. Hussen, A.M. (1999), "Principles of Environmental Economics", Routledge, London.
12. Jeroen, C.J.M. Van Den Bergh (1999), "Handbook of Environmental and Resource Economics", Edward Elgar Publication Ltd, UK.
13. Kolstad, C.D. (1999), "Environmental Economics", Oxford University Press, New Delhi
14. D.W. and R.Turner (1991), "Economics of Natural Resource use and Environment", John Hopkins University Press, Baltimore
15. Perman, R. Ma and J.Mc. Mivary (1996), "Natural Resource and Environmental Economics", Longman, London.
16. Sankar,U. (Ed.) (2001), "Environmental Economics", Oxford University Press, New Delhi
17. Rabindra N. Battacharya (2001), "Environmental Economics", (Ed.), Oxford University Press, New Delhi.

CORE COURSE V
FINANCIAL ECONOMICS

Objective: To gain knowledge about the linkage among financial sub markets.

Module I : Introduction to Financial Economics

Objectives – Functions – Scope – Evolution – Interface of financial economics with other areas – Corporate finance

Module II: Time Value of Money

Future value of single cash flow, Multiple cash flow, annuity, sinking fund factor – Present value of single cash flow – Multiple cash flow, annuity, annuity dues, perpetuities, comparison rates.

Module III: Sources of Long –term Finance

Equity capital, retained earnings, preference capital, term loans, debentures, pattern of corporate financing in India.

Module IV: Financial Statement Analysis

Introduction, meaning of financial analysis – Types and devices of financial analysis – Understanding financial statements: Balance sheet, Income statement. Common size analysis, trend analysis and ratio analysis - Financial ratios as perceived by commercial banks, corporate controllers, forecasting financial failure.

Module V: Fund Flow and Cash Flow Analysis

Working capital – Basics of working capital – Working capital finance – Sources of working capital

References:

1. Rose et.al, 1999, Fundamentals of Corporate Finance, Tata McGrawHill, New Delhi
2. Prasanna Chandra, 2001, Financial Management: Theory and Practice, Tata McGraw-Hill, New Delhi
3. Charles H. Gibson, 2001, Financial Reporting and Analysis, South Western College, Publication
4. Wild et al, 2001, Financial Statement Analysis, McGraw-Hill International.

CORE COURSE VI
MICRO ECONOMICS II

Objective: To make the students understand the fundamental theories of Microeconomics and their applications.

Module I: Distribution

Neo-classical approach – Marginal productivity theory, Product exhaustion theorem, Elasticity of technical substitution, technical progress and factor shares: Theory of distribution in imperfect product and factor markets; Macro theories of distribution – Ricardo, Marx, Kalecki and Kaldor.

Module II: Welfare Economics

Pigovian welfare economics: Pareto optional conditions; Value judgement; Social welfare function; Compensation principle, Inability to obtain optimum welfare – Imperfections, market failure, decreasing costs, uncertainty and non-existent and incomplete markets; Theory of Second Best – Arrow's impossibility theorem; Rawl's theory of justice - Equity – efficiency trade off.

Module III: General Equilibrium

Partial and general equilibrium - Walrasian excess demand and input-output approaches to general equilibrium, existence, stability and uniqueness of equilibrium and general equilibrium, coalitions and monopolies; Production without consumption – one sector model, homogeneous functions, income distribution; Production without consumption – two sector model, relationship between relative commodity and factor prices (Stopler-Samuelson theorem), relationship between output mix and real factor prices, effect of changes in factor supply in closed economy (Rybczynski theorem), production and consumption – Contributions of Arrow and Debreu to general equilibrium analysis.

Module IV: Economics of Uncertainty

Individual behaviour towards risk, expected utility and certainty equivalence approaches, risk and risk aversion – sensitivity analysis, gambling and insurance, the economics of insurance, cost and risk, risk pooling and risk spreading, mean-variance analysis and portfolio selection, optional consumption under uncertainty.

Module V: Competitive Firm under Uncertainty

Factor demand under price uncertainty, the economics of search – different models, the efficient market hypothesis, stochastic models of inventory demand; Market with incomplete information, search and transaction costs, the economics of information.

References:

1. Kreps, David M (1990) A Course in Microeconomic Theory, Princeton University Press, Princeton
2. Koutsoyiannis, A (1979), Modern Microeconomics (2nd Edition) Macmillan Press, London.
3. Layard P.R.G and A.W. Walters (1978) Microeconomic Theory, McGraw Hill, New York
4. Sen A. (1999) Microeconomics: Theory and Applications, Oxford University Press, New Delhi
5. Stigler, G (1996), Theory of Price, (4th Edition), Prentice Hall of India, New Delhi
6. Varian,H. (2000) Microeconomic Analysis, W.W. Norton, New York
7. Baumol, W.J. (1982) Economic Theory and Operations Analysis, Prentice Hall of India, New Delhi
8. Hirshleifer, J. and A Glazer (1997), Price Theory and Applications, Prentice Hall of India, New Delhi
9. Da Costa, G.C. (1980), Production, Prices and Distribution, Tata McGraw Hill, New Delhi
10. Salvatore, Domonick (1991), Micro Economic Theory, 3rd Edition, McGraw Hill, New Delhi

CORE COURSE VII
MACRO ECONOMICS II

Objective: To make the students to understand the macro economic concepts and their relevance to the economy.

Module I: New Classical macro economics

The new classical critique of micro foundations, micro foundations of macro economics – the new classical approach - Policy implications of new classical approach - Empirical evidence.

Module II: Stabilization policy - I

Lags in the effects of policy – role of expectations –uncertainty and economic policy – rules versus discretion – Phillips curve and the aggregate supply curve – expectations and short run Phillips curves – Friedman – Phelps argument – shifting short-run Phillips curve – trade off between inflation and employment – natural rate of unemployment.

Module III: Stabilization policy - II

Okun's law –budget deficit and inflation – mechanics of financing the budget – income policies –monetarists and Keynesian models – portfolio approach – crowding out – government budget constraint – Rational expectations and short run ineffectiveness of stabilization policy – Criticisms of the rational expectations hypothesis

Module IV: Equilibrium and disequilibrium analysis

Walrasian general equilibrium models – problem of consistency and invalid dichotomy – real balance effect – assessment of the significance of real balance effect – effective demand, notional demand and involuntary unemployment – price and quality flexibility – source of non instantaneous price adjustment – new Keynesianism and the theory of unemployment.

Module V: Macro economics in the open economy

Application of fiscal and monetary policies in an open economy – fiscal policy and monetary policy with fixed exchange rates and flexible exchange rates – global co-operation and coordination in macro economic policy – internal and external balances – monetary approach to the balance of payment.

References:

1. Ackley, G (1978) Macroeconomics: Theory and Policy, Macmillan, New York
2. Blackhouse, R. and A Salansi (Eds.) (2000), Macroeconomics and the Real World (2 Vols.), Oxford University Press, London
3. Branson, W.A. (1989) Macroeconomics Theory and Policy (3rd Edition), Harper and Row, New York
4. Bornbusch, R. and F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York
5. Hall, R.E. and J.B. Taylor (1986) Macroeconomics W.W. Norton, New York
6. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi
7. Jha, R. (1991) Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd., New Delhi.
8. Leijonhufvud, A (1968) On Keynesian Economics of Keynes, OUP, Oxford
9. Romer, D.L. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd, New York
10. Scarfe, B.L. (1977) Cycles, Growth and Inflation, McGraw Hill, New York
11. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi
12. Surrey, M.J.C. (Ed.) (1976), Macroeconomic Theories, Oxford University Press, Oxford.

CORE COURSE VIII
STATISTICS

Objective: To help the students understand and apply statistical tools for research

Module I: Univariate Analysis

Measures of central tendency, dispersion – standard deviation co-efficient of variation, Lorenz curve, Gini concentration ratio – Skewness (simple problems)

Module II: Bivariate Analysis

Correlation, regression, simple, multiple, l (simple problems) – OLS – assumptions – violation of assumptions – heteroscedasticity, autocorrelation and multicollinearity (concepts only) Interpretation of Co-efficients – Introduction to multiple and non-linear regression – relation between regression and correlation coefficients – relation between b_{yx} and b_{xy} –relation between intercept and slope.

Module III: Probability and distributions

Elementary probability theory, concepts, binomial – expansion, coefficient – Poisson and normal distribution – application in economics.

Module IV: Sampling Distribution

Sampling distribution, standard error-testing of hypothesis – one tailed and two tailed tests – testing of means, proportions, standard deviations : $x^{2,}$ F- ANOVA testing correlation and regression coefficients.

Module 5: Index numbers and Time Series

Uses, selection of number of items, base year price relatives-Fisher's ideal index-Factor reversal test-Time reversal test-Chain index-Bas shifting –conversion of current price data into constant price data – price index numbers in India – WPI & CPI – applications – Components of time series – Moving averages-Straight line trend – Deseasonalisation of data – Seasonal Index

References:

1. Gupta, S.C. (1993), Fundamentals of Applied Statistics, S.Chand & Sons, New Delhi.
2. Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book Co., London
3. Chou, Y. (1975), Statistics Analysis, Holt, Reinhart and Winston, New York
4. Croxton, Crowden and Klein (1971), Applied General Statistics, Prentice Hall of India, New Delhi.
5. Nagar, A.L. and R.K. Das (1993), Basic Statistics, Oxford University Press, New Delhi
6. Salvatore, Dominick (1982), Statistics and Econometrics, McGraw Hill, New Delhi

ELECTIVE COURSE II
RESEARCH METHODOLOGY

Objective: To make the students understand the methods and steps of doing research in social sciences.

Module I: Basic concepts of research

Science –its meaning and characteristics – The meaning of 'research' – Specific features of research in Social Sciences as opposed to Physical and Natural Sciences – Objectivity in research Sources of bias – Good evidence and true evidence – Basic categories in scientific method –Facts –Concepts – Causality – Uncertainty - Probability – Dialectical and Historical Materialism.

Module II: Research methods

Methods of Research – Falsification and verification criteria (Karl Popper) – Paradigm Shift (Kuhn) – Deductive and inductive Reasoning –Steps of Scientific Method – Historical Method – Case study – Scaling Techniques – Sample surveys – Various sampling methods – Importance of proper sampling design.

Module III: Stages in research

Steps in Research - Formulation of a Research problem – Guiding principles in the choice of a research topic – Role of Review of Literature – Formulation of Research Design –Model building – Hypothesis: concept, definition, formulation and testing

Module IV: Sources and methods of data collection

Secondary data – some important sources: NSSO, CSO, Economic Survey, Season & Crop Report, Agricultural Census, Livestock Census, Annual survey of Industries, RBI Reports, WDR, HDR, IDR; Primary Data collection – Tools – observation, schedule, questionnaire, projective techniques – Principles underlying construction of a questionnaire – Preparation of master table – Data processing – Analytical Tables.

Module V: Report writing

Report writing – Structure and General format – Style – Language punctuation, grammar, symbols – Use of footnotes, references –citations – Presentation of tables, diagrams, charts and maps – Bibliography.

References:

1. Ghose, B.N. Scientific Method and Social Research, New Delhi, Sterling Publishers, 1982
2. Goode, W.J. & Hatt,P.K. Methods in Social Research, New York, McGraw Hill, 1952
3. Kate Turabina, Manual of style for writing dissertations, thesis and reports, University of Chicago Press, Chicago
4. Myrdal,G. Objectivity in Social Research
5. C.T. Kurien (Ed.) A Guide to Research in Economics (Sangam Publishers)
6. Wilson Gee, Social Science Research Methods (N.Y. Appleton Century Croft 1950)
7. Pauline V, Young, Scientific Social Surveys and Research
8. Parson,C.J., Thesis and Project Work
9. Karl Popper, The Logic of Scientific Discovery, (Lond, Hutchinson, 1934)
10. T.S.Kuhn, The Structure of Scientific Revolutions, (Chicago 1962)

CORE COURSE IX
INDIAN ECONOMY

Objective: To make the students understand the structure and functioning of Indian economy

Module I: Natural Resource s and Population

Natural Resource – Meaning and Importance - Forest resources – Energy resources – Mineral resources – Water resources – Environmental degradation – Indian population size, density and distribution – urbanization – National population policy – Human capital and its development.

Module II: Poverty and Unemployment

Poverty – its dimensions, nature and causes – Poverty line: definition – Poverty alleviation programmes – Unemployment and its types – New Employment Policy in XI Plan – RLEGP – inequalities in distribution – programmes and measures – causes of income inequalities – suggested measures to redress inequalities – parallel economy: meaning, magnitude and consequences – causes and remedies.

Module III: Foreign Trade and WTO

Direction and composition of foreign Trade – Balance of trade and payments – The New Economic Reforms – Partial convertibility – Foreign Direct Investment – Foreign exchange rate – Foreign exchange reserve – India's foreign Trade Policy – WTO – Features and assessment – Globalization: Features and problems – Sectoral contribution.

Module IV: Agricultural and Industrial Sectors

Technological change in agriculture – Pricing of agricultural inputs and outputs – Agricultural marketing – New agricultural policy – Issues in food security, availability – Farmers suicide – Policies for sustainable irrigation – Government's investment on irrigation – Disincentive to agricultural sector – New industrial policy – Problems of corporate sector – Subsidies to corporate sector – Privatization and disinvestments – Labour market reform

Module V: Planning in India

Objectives – Achievements since 1950 – Agriculture, industry and social sectors – X Plan performance to tackle poverty, inequality and unemployment – XII Plan :Overview.

References:

1. Agrawal, A.N. (2004) Indian Economy, Wishwa Prakashan, New Delhi
2. Ahluwalia, J.J. and I.M.D. Little (Eds.) (1999), India's Economic Reforms and Development (Essays I honour of Manmohan Singh), Oxford University Press, New Delhi.
3. Bardhan, P.K. (9th Edition) (1999), The Political Economy of Development in India, Oxford University Press, New Delhi
4. Bawa, R.S. and P.S. RAikhy (Ed.) (1997), Structural Changes in India Economy, Guru Nanak Dev University Press, Amritsar
5. Brahmananda P.R. and V.R. Panchmukhi (Eds.) (2001), Development Experience in the Indian Economy: Inter – State Perspectives, Bookwell, Delhi
6. Chakravarrty, S. (1987), Development Planning: The Indian Experience, Oxford University Press, New Delhi
7. Dantwala, M.L. (1996), Dilemmas of Growth : The Indian Experience, Saga Publications, New Delhi
8. Datt and Sundaram (2002), Indian Economy, S. Chand & Co, New Delhi
9. Dhingra C. (2003), The Indian Economy, Sultan Chand & Sons, New Delhi
10. Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi
11. Jalan,B. (1992) The Indian Economy – Problems and Prospects, Viking, New Delhi
12. Parkh, K.S. (1999), India Development Report (Annual), Oxford University Press, New Delhi
13. Reserve Bank of India, Report of Currency and Fiance (Annual)
14. Dreze, Jean and Amarta Sen (1999), India: Economic Development and Social Opportunity, OUP, New Delhi
15. Datt Ruddar and K.P.M. Sundaram (2001), Indian Economy, S.Chand & Co., New Delhi
16. Alagh, Y.K. (1995), Indian Development Planning and Policy, Vikas, New Delhi

CORE COURSE X
INTERNATIONAL BUSINESS

Objective: To make the students understand the consequences of international business on income, employment and social standards.

Module I: General Concepts

Special features of international business – reasons for IB – Difference in endowments, cultures, currencies, technologies, wages, tastes, language – understanding world map – location of countries, their capital, currencies.

Module II: Concepts and Institutions

Free trade versus protection – arguments for and against Laissez faire – Terms of trade – tariffs – quotas – non-tariff barriers – phyto-sanitary measures – dumping – exchange rate –foreign exchange reserves – IMF –WB –GATT-WTO – UNCTAD – SAARC – SAAPTA – ASSFTA – NAFTA – ASEAN – MNCs – BOP – BOT – FDI.

Module III: Foreign Trade Documents

Need, rationale and type of documents – export & import licenses – processing of export order – pre-shipment inspection and quality control – foreign exchange formalities – excise and customs clearance – port procedures

Module IV: Foreign Trade Procedure

Claiming duty drawbacks and other benefits – determination of freight – containerization – booking of cargo space – packing and marking for exports – forwarding and clearing agents and their operations – cargo insurance

Module V: Exports

Role of export – selection of export products – selection of export markets – role of export houses – appointment of agents – payment of agency commission - promotion abroad – participation in trade fairs – export contracts – arbitration and dispute settlements – pre-shipment and post-shipment finance – letters of credit – EXIM bank – international capital markets foreign exchange rates.

References:

1. T.A.S. Balgopal, Export Management
2. Handbook of export and import procedure
3. S.R. Ullal, Export Management
4. Paras Ram, Export, what, where and how
5. Keshkamat, Finance of foreign trade
6. G.S. Lall, Finance of foreign trade
7. Ministry of Commerce, Government of India, India's trade agreement, latest number
8. R.S. Rathore, Export Marketing
9. Economic Survey, Ministry of Finance, Government of India, latest issue

CORE COURSE XI
INDUSTRIAL ECONOMICS

Objectives: To help the students understand the basic aspects of industrial structure, finance and Labour

Module I: Patterns and Structure

Process and pattern of industrialization – Industrial structure and change – Alternate patterns – Hoffman's Hypothesis of Market Economics –Simon Kuznets' Interpretation of secular changes in industrial development – Industrialization in Planned Economics – Key Role of Capital Goods Sector – HB Chenery's pattern of industrial change

Module II: Market Structure

Sellers' concentration; Production differentiation; Entry conditions; Economics of scale; Market structure and profitability; Market structure and innovation; Theories of industrial location – Weber, Losch and Sargent Florence; Factors affecting location.

Module III: Industrial Finance

Owned, external and other components of funds; Role, nature, volume and types of institutional finance – IDBI, IFCI, SFCs, SIDC, commercial banks, etc., Financial statement – Balance Sheet, Profit and loss account; assessment of financial soundness, ration analysis

Module IV: Industrial Labour

Structure of industrial labour; employment dimensions of Indian industry; industrial legislations; industrial relations; Exit policy and Social security; Wages and problems of bonus – labour market reforms.

Module V: Project Planning and Appraisal

Cost-benefit analysis – Net Present Value (NPV) and internal rate of return (IRR) criteria – balancing private and social returns.

References:

1. Barthwal, R.R. (1985), Industrial Economics, Wiley Eastern Ltd, New Delhi
2. Cherunilam, F (1994), Industrial Economics; Indian Perspective (3rd Edition) Himalaya Publishing House, Mumbai
3. Divine, P.J. and R.M.. Jones et.al. (1976), An Introduction to Industrial Economics, George Allen and Unwin Ltd, London.
4. Hay, D. and D.J. Morris (1979), Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi
5. Kuchhal, S.C. (1980), Industrial Economy of India (5th Edition), Chaitanya Publishing House, Allahabad
6. Singh, A. and A.N. Sadhu (1988), Industrial Economics, Himalaya Publishing Home, Bombay
7. Mamoria and Mamoria (2000) Dynamics of Industrial Relations in India (15th Edition), Himalaya Pub. House, Mumbai

CORE COURSE XII
FISCAL ECONOMICS

Objective: To help the students to understand the fiscal economic theories and practices.

Module I: Theory of Public Goods and Public Choice

The economic role of government – Allocation, Growth and Stabilisation – Private goods, public goods and merit goods, Market failure-imperfections, decreasing costs, externalities, public goods; Uncertainty and non-existence of futures markets; Informational asymmetry – Theory of second best – Private and public mechanism for allocating resources; Problems of allocating resources; Problems of preference revelation and aggregation of preferences; Voting systems; Arrow impossibility theorem; An economic theory of democracy, Politico-eco-bureaucracy; Rent seeking and directly unproductive profit seeking (DUP) activities.

Module II: Public Expenditure

Wagner's law of increasing state activities,; Wiesman-Peacock hypothesis, Pure theory of public expenditure; Structure and growth of public expenditures; Criteria for public investment; Social cost-benefit analysis-Project evaluation, estimation of costs, discount rate; Reforms in expenditure budgeting; Programme budgeting and zero base budgeting.

Module III: Taxation and Public Debt

Theory of incidence; Alternative concepts on incidence – Allocate and equity aspects of individual taxes; Benefit and ability to pay approaches; theory of optional taxations; Excess burden of taxes Trade off between equity and efficiency – Laffer curve – Theory of measurement of dead weight losses; the problem of double taxation – The rationale behind VAT – Indian tax structure and trends

Public debt – Classical view of public debt; Compensatory aspect of debt policy; Burden of public debt; Sources of public debt; Debt through created money; Public borrowings and price level; Crowding out of private investment and activity; principles of debt management and repayment

Module IV: Fiscal Policy

Objectives of fiscal policy - Budgetary procedure - Budgetary deficit and its implication; fiscal policy for stabilization-automatic vs. discretionary stabilization; Alternative measures of resource mobilization and their impact on growth, distribution and prices; Balanced budget multiplier-Meaning and significance of budgetary terms; revenue account, capital account, fiscal deficit and other types of deficit – recent Budget.

Module V: Fiscal Federalism

Principles of multi-unit finance; Fiscal federalism in India; Vertical and horizontal imbalance; Assignment of function and sources of revenue; Constitutional provisions; finance Commission and Planning Commission; Devolution of resources and grants; Theory of grants; resource transfer from Union to States – Criteria for transfer of resources; Centre-State financial relations in India; Problems of state's resources and indebtedness; Transfer of resources from union and State to local bodies.

References:

1. Atkinson, A.B. and J.E. Siglitz (1980), Lectures on Public Economics, Tata McGraw Hill, New York
2. Auerbach, A.J. and M. Feldstern (Edn.) (1985), Handbook of Public Economics, Vol. I, North Holland, Amsterdam.
3. Buchanan, J.M. (1970), The Public Finances, Richard D, Irwin, Homewood
4. Goode,R. (1986), Government Finance in Developing Countries, Tata McGraw Hill, New Delhi
5. Houghton, J.M. (1970), The Public Finance; Selected Readings, Penguin, Harmondsworth
6. Jha,R. (1998), Modern Public Economics, Routledge, London
7. Menutt,P. (1996), The Economics of Public Choice, Edward Elgar, U.K.
8. Musgrave, R.A. (1959), The Theory of Public Finance, McGraw Hill, Kogakusha, Tokyo
9. Musgrave, R.A. and P.B. Musgrave (1976), Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo
10. Shoup, C.S. (1970), Public Finance, Aldine, Chicago
11. Shome,P. (Ed.) (1995), Tax Policy; Handbook, Tax Division, Fiscal Affairs Department, International Monetary Fund, Washington D.C.
12. Srivastava, D.K. (Ed.) (2000), Fiscal Federalismin India, Har Anand Publishers, New Delhi
13. Reports of various Finance Commissions

ELECTIVE COURSE III
PROJECT APPRAISAL

Objective: To help the students to understand the steps and methods of project appraisal.

Module I: Introduction

Capital expenditure – importance and difficulties – objectives, resource allocation – Criteria – Investment strategic– Generation and screening of investment ideas.

Module II: Project Analysis

Market and demand analysis – Technical analysis – Financial analysis – Economic viability – Technical feasibility – Social acceptability.

Module III: Selection of Project

Project cash flows – Appraisal criteria – Pay back period – Rate of Return – Discount cash flow methods – NPV, IRR – Calculation of IRR for two years and more – Risk analysis – Types and measures of risk – Sensitivity analysis – Scenario analysis – Decision tree analysis – Uncertainty – Stochastic dominance

Module IV: Special Decision Situations

Choice between mutually exclusive projects of unequal life – Optional timing – determination of economic life – Interrelationship between investment and financing aspects – Price index numbers and capital budgeting comparison of time series data – Deflating.

Module V: Implementation

Project organization – Project planning – Project control – Pre-requisites for successful project implementation – Network techniques – Development of Project net work – Time estimation – Scheduling – PERT –CPM – Network cost system – Project evaluation – Accounting, Economic and Social costs and benefits – Abandonment analysis – Administrative aspects in capital budgeting.

References:

1. Prasanna Chandra, Projects; Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill.
2. Clark J.C. et al., Capital Budgeting: Planning and Control of Capital Expenditure, Prentice Hall.
3. Little I M D and S A Mirlees, Project Appraisal and Planning for Developing Countries, Heimann, London
4. Marghin E. and A.K. Sen, Guideline for Project Evaluation, UNIDO, New York
5. Bhavesh M Patel, Project Management, Vikas Publishing House New Delhi

CORE COURSE XIII
ECONOMICS OF GROWTH AND DEVELOPMENT

Objective: To make the students to understand the concepts of growth and development and their implications on the economy.

Module I: Economic Growth and Development

Economic Growth and development – Factors affecting economic growth and development – Basic social and economic structure - Sustainable development – social and economic environmental balances.

Module II: Economic Growth Models

Growth models-Harrod and Domar, Neoclassical growth models – Solow and Meade, Mrs. Joan Robinson's growth model; criticism of Neo-classical analysis of growth, the capital controversy - Technical Progress – embodied and disembodied technical progress; Kaldor and Pasinetti models.

Module III: Social and Institutional Aspects of development

Development and underdevelopment – Poverty – Absolute and relative measure development and development gap – inequality of income, human development index and other indices of development and quality of life – Food security, education, health and nutrition; Human resource development; Theory of demographic transition, Population as limits to growth and as ultimate source – Population, poverty and environment; economic development and institutions

Module IV: Theories of Development

Classical theory of development – contributions of Adam smith, Ricardo, Malthus and James Mill Karl Marx and development of capitalist economy – theory of social change, surplus value and profit; immutable laws of capitalist development; crisis in capitalism – Schumpeter and capitalist development; innovation-role of credit, profit and degeneration of capitalism

Module V: Approaches to Development

Partial theories of growth and development –vicious circle of poverty, circular causation, unlimited supply of labour, big push, balanced growth, unbalanced growth, critical minimum effort thesis, low income equilibrium trap; Dualism-technical, behavioural and social; Ranis and Fei model

References:

1. Adelman, I. (1961), Theories of Economic Growth and Development, Stanford University Press, Stanford
2. Behrman, S. and T.N. Srinivasan (1995), Handbook of Development Economics Vol.3, Elsevier, Amsterdam
3. Chenery, H. and T.N. Srinivasan (Eds.) (1989) Handbook of Development Economics, Vols. 1 & 2, Elsevier, Amsterdam
4. Ghatak, S. (1986), An Introduction of Development Economics, Allen and Unwin, London
5. Gimmell, N. (1987), Surveys in Development Economics, Blackwell, Oxford
6. Kindleberger, C.P. (1977), Economic Development, (3rd Edition), Mc Graw Hill, New York
7. Meier, G.M. (1995), Leading Issues in Economic Development, (6th Edition), Oxford University Press, New Delhi
8. Myint, Hla (1965), The Economics of Underdeveloped Countries, Preager, New York
9. Todaro, M.P. (1996) (6th Edition), Economic Development, Longman, London
10. Thirwal, A.P. (1999), (6th Edition), Growth and Development, Macmillan, U.K.

CORE COURSE XIV
ECONOMICS OF NATURAL RESOURCES

Objective: To enable the students to understand the different types of natural resources and their uses for economic development.

Module I: Natural Resources: Uses and misuses

Land, Water, Air – Mining, petroleum extraction, fishing, forestry – Energy – Pollution: Meaning and forms: Domestic, Solid Waste, Health and Sanitation and Unsafe Drinking Water, Industrial: Air Pollution, Water Pollution, Soil Pollution, Noise Pollution - Soil erosion– Deforestation.

Module II: Nexus between Economics and Natural Resources

Material balance principle – Externalities and market inefficiency - Pareto optimal provision of public goods – Lindahl's equilibrium - Common property resources.

Module III: Natural Resource Management and Sustainable Development

Theories of optimal use of exhaustible and renewable resources; Issues in biodiversity – Environment and development trade off - Sustainable development: Concept, Significance and Indicators - Macroeconomic policies on natural resources – water, air, land, copper, gold, silver, diamond, iron, lead, limestone, oil, salt, tin and uranium.

Module IV: Natural Resource Problems in India

Mechanism for environment regulation in India; Environmental laws and their implementation - Policy instruments for controlling water and air pollution and forestry policy - People's participation in the management of common and forest lands - Social forestry – Rationale and benefits

Module V: Environmental Policy and Environmental Education

Environmental externalities – Pigouvian taxes and subsidies - marketable pollution permits and mixed instruments - Coase's bargaining solution and collective action- Environmental institutions and movements – Environmental Education: Concept and Significance.

References:

1. Baumol, W.J. and W.E. Oates (1988), "The Theory of Environmental Policy" (2nd Edition) Cambridge University Press, Cambridge
2. Bromley, D.W. (Ed.,) (1995)"Handbook of Environmental Economics" Cambridge University Press Cambridge
3. Fisher, AC (1981), "Resource and Environmental Economics" Cambridge University Press Cambridge
4. Hanley, N.J.F., Shorgen and B. White (197), "Environmental Economics in Theory and Practice", Macmillan
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9. Sankar,U. (Ed.) (2001), "Environmental Economics", Oxford University Press, New Delhi
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12. Joseph Pearce (2001), Small is still Beautiful, Harper Collins, London

ELECTIVE COURSE IV
MANAGEMENT INFORMATION SYSTEMS

Objective: To help the students understand the uses of Information Technology for Business.

Module I: Foundation Concepts

Information system (IS) and technologies – Importance of IS – System concepts – Feedback and control – Components of an IS – IS resources: people, hardware, software, data, network – IS activities: processing, storage, control – Role of IS application – Trends in IS – Types of IS – Managerial challenges – Real world cases.

Module II: Competing with Information Technologies

Strategic IT – Strategic links in the supply chain – Competitive strategy concepts – Strategic uses of IT – Value chain and strategic IS – Using IT for strategic advantage – improving business quality – Real world cases.

Module III: Information Technologies

Managing data resources – Types of data bases :operational, distributed, external, hypermedia db – data warehouses – data mining – db management software – db interrogation – db maintenance – data resource management – challenges – db structures – hierarchical, network, relational, multidimensional, object oriented – Telecommunication and networks – Trends; industry, technology, business application – Internet applications – Business use of interest Real world cases.

Module IV: Business Applications

Functional business systems – Target marketing – IT in business – Marketing systems: interactive marketing, targeted marketing – sales for automation – Manufacturing systems: integrated manufacturing, process control, machine control – Human Resource Systems: HRM and internet, HRM and corporate sector – staffing and training – Real world cases.

Module V: Management Challenges

Security and ethical challenges – ethical responsibility of business professionals: business ethics technology ethics, ethical guidelines – computer crime: hacking, cyber theft, unauthorized use at work, software privacy, piracy of intellectual property, viruses and worms – privacy issues – Other challenges: employment, monitoring, working conditions – Health issues.

References:

1. James A.O'brien, 2006, Management Information Systems, Tata McGraw Hill Edition, New Delhi
2. Gerald V. Post & David L. Anderson, 1999, Management Information Systems, Tata McGraw Hill Edition, New Delhi
3. C.S.V. Murthy, 2000, Management Information Systems, Himalaya Publication, Mumbai
4. D.P. Goyal 2000, Management Information Systems, Macmillan Delhi

ELECTIVE COURSE V
COMPUTER APPLICATIONS IN ECONOMICS (updated on 16-11-2016)
(THEORY ONLY)

Objectives:

1. To enable the students to understand the fundamentals of computers, the MS Word, MS Excel, MS Power Point and Internet.
2. To motive the students to learn the application of most up-to-date technology in the discipline (Economics).

Module I : Fundamentals of Computer

Basic concepts and components of a computer – CPU, input – output devices –bit, byte, data storage, retrieval, hard disk – computer networking and resources sharing – hardware & software.

Module II: Operating System

Disk Operating System, Windows & LINUX [Basic ideas only] – operating systems.

Module III: MS Word & MS Power Point

Introduction : overview, basic terminology – tool bars, scrolling, word processing, formatting text and document – tabs and sorting – working with graphics, templates – creating a slide show – opening and closing presentations.

Module IV: MS Excel and Software Packages

Working with date – managing Excel workbooks 7& worksheets – formulas and functions – formatting data – creating charts – uses of SPSS for univariate & multivariate analyses.

Module V: World Wide Web

Internet basics – search engines – opening e-mail id – downloading text from internet – uses of internet for business and commercial activities.

References:

1. Sanders, D.H (1988) Computers Today, McGraw Hill (3rd Edition) New York
2. Sinha, (1992), Computer Fundamentals, BPB Publications, New Delhi.
3. Rajaraman V (1996), Fundamentals of Computers, (Prentice Hall of India, New Delhi)
4. Lipschultz M.M and S. Lipschultz (1982) Theory and Problems and Data Processing, Schaum Outline Series, McGraw Hill, New Delhi.
5. Leon and Leon, Internet Basics.
6. Dhanasekaran K, Computer Application in Economics [2010] Vrinda Publications, New Delhi.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.A. HISTORY PROGRAMME Syllabus UNDER CBCS

(Applicable to the candidates admitted from the academic year 2016-17 onwards)

Sem	Course	Ins. Hours	Credit	Exam Hours	Marks		Total
					Int.	Ext.	
I	**Core Course – I (CC)** Indian Civilization and Culture from Pre history to 1206 A.D	6	4	3	25	75	100
	Core Course – II (CC) Indian Civilization and Culture from1206 A.D. to 1707 A.D.	6	4	3	25	75	100
	Core Course – III (CC) Socio - Cultural History of Tamilnadu from the Sangam Age to 1800 A.D	6	4	3	25	75	100
	Core Course – IV (CC) History of World Civilizations upto 1453 A.D. (Excluding India)	6	4	3	25	75	100
	Elective Course – I (EC) Human Rights / Archives Keeping	6	4	3	25	75	100
	Total	**30**	**20**				**500**
II	**Core Course – V (CC)** Socio - Cultural History of India from 1707 A.D. to 1857 A.D.	6	5	3	25	75	100
	Core Course – VI (CC) Socio - Cultural History of Tamilnadu from 1800 A.D to 1967 A.D.	6	5	3	25	75	100
	Core Course – VII (CC) History of Europe from 1453 A.D. to 1789 A.D.	6	5	3	25	75	100
	Core Course – VIII (CC) History of Science and Technology	6	5	3	25	75	100
	Elective Course – II (EC) India and Her Neighbours / Principles and Methods of Archaeology	6	4	3	25	75	100
	Total	**30**	**24**				**500**

III	**Core Course – IX (CC)** Freedom Movement in India	6	5	3	25	75	100
	Core Course – X (CC) History of Europe from 1789 A.D. to 1945 A.D.	6	5	3	25	75	100
	Core Course – XI (CC) International Relations Since 1945 A.D.	6	5	3	25	75	100
	Core Course – XII (CC) Historiography	6	5	3	25	75	100
	Elective Course – III (EC) Environmental History (with reference to India) / Ideas in History	6	4	3	25	75	100
	Total	**30**	**24**				**500**
IV	**Core Course – XIII (CC)** India since 1947 A.D.	5	5	3	25	75	100
	Core Course – XIV (CC) Constitutional History of India	5	5	3	25	75	100
	Elective Course – IV (EC) Tourism and Travel Management / Journalism	5	4	3	25	75	100
	Elective Course – V (EC) Women Studies / General Knowledge and Current Affairs	5	4	3	25	75	100
	Project	10	4	--	--	--	100
	Total	**30**	**24**				**500**
Grand Total		**120**	**90**				**2000**

CORE COURSE I

INDIAN CIVILIZATION AND CULTURE FROM PREHISTORY TO 1206 A.D

Objectives

1. To understand the scope of the study of ancient history of India.
2. To understand the political ideas.
3. To study the origin of the religion.
4. To understand the study of Antiquities.

UNIT I : PRE-HISTORY AND PROTO-HISTORY OF INDIA:

Introducing Prehistory and Proto history--Pre-historic and Proto-historic archaeological sources - Other sources of the Ancient Indian History –Beginning of Food production – Early domestication- Mehrgarh and its significance -Indus Valley - Beginning of Iron and the Transition to history.

UNIT II : POLITICAL IDEAS AND INSTITUTIONS:

Approaches to the study of Polity - Origin of the State -Vedic Assemblies –Oligarchies – Republic - Councillors and officials - Post Vedic & Pre Mauryan - The Saptanga theory of Kautilya – Nandas - Mauryas; Paternal despotism-Asoka's welfare state: Kingship – Army - Judiciary, Interstate relations - Post Mauryan period; Satavahanas, Kushans and Guptas – Harsha - their Political Institutions.

UNIT III : DEVELOPMENT OF INDIAN RELIGIONS:

Approaches to the Study of religions-Pre-historic religions: Religion of the Harappans - Development of religious thought in Vedic and epic literature -Religious ideas and practices in the 6th century B.C. Rise of Buddhism and Jainism –Bhagavathism - Growth of Saivism - Vaishnavism in Gupta period.

UNIT IV : SOCIO-ECONOMIC LIFE:

Primitive man-Agriculture and animal husbandry - Urban Harappa - trade relations - Society and Economy in the Early Vedic Period - Formation of Caste and classes in the Post Vedic Period - Mauryan Economy – Post-Mauryan economy-Land system, Trade.- Position of women-Guilds and social change. Feudalism in the post Gupta period.

UNIT V : ART AND EDUCATION

Primitive art – Terracottas – Minor arts - Mauryan art - Kushans, Gandhara, Mathura, Sarnath, Amravati and other schools - Gupta art - Vedic education and Educational Centres. Nalanda, Vikramashila University - Vallabi-Kanchipuram - Literature in Gupta period.

References

1. A.L. Basham, The wonder that was India, Grow Press, New York, 1954.
2. "----------", Aspects of Ancient Indian Culture. Asia Publishing House, Delhi, 1970.
3. "----------", Studies in Indian History and Culture , Sambodi , Culcutta, 1914.
4. D.D. Koasambi, The Culture and Civilization of Ancient India: In Historical Outline Vikas, New Delhi, 1971.
5. R.S. Sharma, Material Culture and Social Formation in Ancient India, MacMillan, New Delhi, 1983.
6. "----------" Indian Feudalism, Orient Longman, New Delhi, 1978.
7. R.C. Majumdar (ed) History and Culture of Indian People. Bharatiya Vidya Bhavan Bombay, 1960.
8. R.C. Majumdar and Srivastva, History of India (from the earliest times to 320 A.D.) Surjeet Book Depot, New Delhi, 1996.
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11. V. Shinde, Early Settlements in the Central Tapi Basin, Munshiram Manoharlal, New Delhi, 1998.
12. J.SE. Swain, A History of World Civilization, Eurasia Publishing House Pvt. Ltd, New Delhi, 1994.
13. Kalpana, Rajaram and R. Vidhya, Facet of Indian Culture, spectrum Books, New Delhi, 2013.

CORE COURSE II
INDIAN CIVILIZATION AND CULTURE FROM 1206 A.D. TO 1707 A.D.

Objectives

1. To understand the scope of the study of medieval history of India.
2. To understand the political ideas.
3. To study the religious policy of the Muhamadians.

UNIT I : Sources-documentary and Non-documentary, trends in medieval Indian historiography- Barani's ideas of the ruling class-Abul Fazl and Badaoni - The ahl-i-qalam (people of the pen) - The concept of sovereignty: the growth of centralized state polity; the political views of the Khaljis and the Tughluqs, Afghans-state and religion, the Ulema, influence of Ulema - Rise of independent regional kingdoms in the Deccan (A.D. 1400-1526) relations with the Delhi - Sultanate-the emergence of the Rajputs as a political force-Administration, Judiciary and military organization - India of the first half of the sixteenth century assessment of Babur's Memoirs, polity, society, economy - Political problems of Humayun: Afghan resistance, the role of Humayun's brothers in politics.

UNIT II : The Second Afgan Empire, nature of the State, composition of the governing class, the Sur Administrative system - Re-establishment and consolidation of the Mughal Empire - Akbar's theory of Kingship: emancipation of the state from theological tutelage emergence of a non-sectarian state - Akbar's relations with the Rajputs, the main determinants of his Rajput policy, its nature and results - Akbar's religious concepts-Evolution of Din-illa-hi - Akbar and the Justice - The Mughals and the North West Frontier, Mughal objectives and policy in relations to the Persians; conquest and integration of Sindh, Baluchistan, Kashmir and Kabul (Afghanistan)in the Mughal Empire - The Mughal Empire and the Deccan; Main issues in the North-South relationship, Mughal, Objectives-their expansion into the Deccan - Assessment of Akbar's Deccan policy - Mughal Administration: central structure provincial and local administration, army organization - Mansabdari system.

UNIT III : Religion and state: Orthodox Muslim opposition to Akbar's policies, revivalist movements. (specially the role of Mujaddid alf-I-sani) its impact on the reins of Jahangir and Shahjahan. Contest for the throne, issues involved, success of Aurangzeb and the failure of Mughal Deccan Policy - Mughal-Maratha relations : The Maratha Administration nature of the state, social base of the Maratha State Administrative structure - Revolts of the Jats Satnamis, Sikhs and the Bundelas, nature of their challenge to the central authority - The decline of the Mughal Empire.

UNIT IV : The growth of population - The rural class structure and nature of land rights, village organization, Iqtadars, the chieftains Zamindars and Jagirdars - The land systems; social distribution of landed property, agrarian relations, the revenue and the tax structure - The growth of the cities and towns; centers of large scale production, important ports. Inland and sea trade route - Urban life, social and economic base, stratification within the Urban society, regional shifts - The debate on the nature of economy in medieval India.

UNIT V : Religion and social dissent in Historical Perspective - Rise and Growth of non-conformist movements; Siddhas and Nathpanthis; social and religious practices - Continuity and intensification of socio-religious movement : Kabir, Dadu, Raidas, Nanak, Namdev, Tulsidas, Mira, Surdas - Sufisim and the Development of languages, literature and popular culture. Interaction between Bhakti, Sufi and Yogic traditions.

References

1. S.M. Edwards, The History of India as Told by its Own Historians, 8Vols, Trubner, London, 1877.
2. Irfan Habib, (ed), Researches in the History of India 1200-1750, Oxford University Press, Delhi, 1992.
3. Lane-pool. Babur, Oxford University Press, London, 1899.
4. W.H. Moreland, From Akbar to Aurangzeb, Macmillan, London, 1923.
5. H.K. Naqui, History of Mughal Government and Administration, Kanishka, Delhi, 1990.
6. H.C. Ray, The Dynastic History of Northern India, Vol. II, Munshiram Manoharlal, New Delhi, 1973.
7. S.R. Sharma, Mughal Empire in India Lakshmi Narain Agarwal, Agra.
8. N,D. Srivastava, The Sultanate of Delhi [711-1526 A.D.], Shiva Lal Agarwala, Agra, 1976.
9. R.C. Majumdar,(ed), History and Culture of Indian People. Bharatiya Vidya Bhavan, Bombay, 1960.
10. " ----------" , The Mughal Empire [1526-1803 A.D.] Shiva Lal Agarwala, Agra, 1976.
11. R.C. Majumbdar and Srivastva, History of India (from 1206 to 1526 A.D.) Surjeet Book Depot, New Delhi, 1996.
12. "----------", History of India (from 1526 to 1707 A.D.) Surjeet Book Depot, New Delhi, 1996.
13. B.N. Luniya, Evolution of Indian Culture, Laxshmi Narain Agarwal, Agra, 2001.
14. S. Abid Husain, The National Culture of India, National Book Trust- India, New Delhi, 2000.
15. Jawaharlal Nehru, Discovery of India, Oxford University Press, New Delhi, 2012.

CORE COURSE III

SOCIO-CULTURAL HISTORY OF TAMIL NADU FROM THE SANGAM AGE TO 1800 A.D.

Objectives

1. To understand the scope of the study of ancient history of tamilnadu
2. To understand the political ideas.
3. To study the origin of the religion.
4. To understand the study of Antiquities.
5. To know the ethnology of the Tamils.

UNIT I : **Sources:** Archaeology, Epigraphy, Literature and Numismatics [for the entire period] - Sangam and Post Sangam: Social institutions-customs and practice - Pallavas: Society, religion and Bhakthi Movement - Cholas and Pandyas: Society, Religion and the role of temples - Nayaks: Society and religion.

UNIT II : **Pre-Sangam:** Neolithic and Megalithic Economy - Agriculture and Trade - Sangam Age: Agriculture and Trade - Roman Trade – Industries - Labour-Revenue – Coinage - Urbanization

UNIT III : **Pallavas and Pandyas:** Land Classification - Ownership of Land - Agriculture and Crops - Irrigation - Trade and Industries - Revenue System - Features of Feudalism - Coinage and Urbanization.

UNIT IV : **Cholas:** Land System - Trade: Inland and Foreign - Trade Guilds – Markets - Monetary System – Coinage - Features of Feudalism - Urbanisation.

UNIT V : Nayaks: Land System - Agriculture and Trade.

References:

1. Kenneth. R. Hall, Trade and Statecraft in the Age of the Cholas. New Delhi, 1980.
2. T.V. Mahalingam, Economic Life in the Vijayanagar Empire. Madras University, Madras, 1951.
3. "----------" , South Indian Polity, Madras University, Madras, 1967.
4. "----------", Kanchipuram in Early south Indian History, Asia Publication, Madras, 1969.
5. C. Meenakshi, Administration and Social Life Under the Pallavas Madras University, Madras, 1977.
6. K.A, Nilakanta Sastri, Social History of South India, Oxford University Press, Madras, 1980.
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11. P.T. Srinivasa Iyengar, History of Tamils. C. Coomaraswamy and Sons, Madras, 1929.
12. K.R. Srinivasan, Temples of South India. NBT, New Delhi: 1995.
13. Y. Subbarayalu, Political Geography of the Chola Country, Tamil Nadu State Department of Archaeology, Madras, 1973.
14. N. Subramanian, Sangam Polity. Asia Publishing House, Madras, 1966.
15. Burton Stein, Peasant State and Society in Medieval South India, Oxford University Press, Delhi, 1994.
16. Kamil.Zvelebil, The Smile of Murugan. E.J.Brill, Leiden, 1973.

CORE COURSE IV

HISTORY OF WORLD CIVILIZATIONS UPTO 1453 A.D. (Excluding India)

Objectives

1. To understand the scope of the study of ancient civilizations
2. To understand the political ideas.
3. To study the origin of the religion.
4. To understand the study of Antiquities.

UNIT I : Meaning and Definition–Rise and growth of civilizations – River Valley Civilization – Nile- Mesopotamia – Hwang – Ho – their legacies – Development of arts, writings – Economy, Society and religious belief – Technology.

UNIT II : Greece – City States – Political experiments – Age of Pericles – legacy of Greece.

UNIT III : Roman Civilization – Augustan Age – Legacy – Charlemagne – Contributions of Roman empire to the world.

UNIT IV : Rise and growth of Major Religions – Confusionism – Christianity – Zoroastrianism – Islam.

UNIT V : Middle Ages in Europe – The Church – Monastic Orders – The Crusades – Feudalism – Guild system - Universities.

References

1. H.A.L. Fisher, A History of Europe, Vol.I
2. V.G. Gordan Childe, What happened in History?
3. M.I. Finely, Studies in Ancient Societies
4. W. Watsom, Early Civilization in China
5. Allen Gardinal, Egypt at pharaoh
6. J.E. Swain, The world Civilization
7. Wall Bank Taylor, History of World Civilization
8. H.G. Wells A Short History of the World

ELECTIVE COURSE I

A) HUMAN RIGHTS

Objectives

1. To understand the value of human rights
2. To study various theories of human rights
3. To know various laws and acts pertaining to human rights

UNIT I : Definition of Human Rights- Theories on Human Rights- Historical Development of Human Rights- Nation Law and Nation Rights in ancient, medieval and modern periods

UNIT II : The emergence of Human Rights on to the world stage- Human Rights and the U.N.O- Universal Declaration of Human Rights- International Covenant on Civil and Political Right-, International Covenant on Economic, social and cultural Rights- U.N. Human Rights Commission.

UNIT III : India and Human Rights: Constitutional provisions- Evolution of Fundamental Rights during Freedom Struggle-Nature of Fundamental Rights-Directive Principles of State Policy-National Human Rights Commission- Main recommendations of the National Human Rights Commission — State Human Rights Commission

UNIT IV : Right against Discrimination-Right to Affirmative Action- Right to Life: Livelihood, Health, Education, Privacy, Legal aid, Speedy trial, -Prevention of Sexual harassment at workplace

UNIT V : Contemporary Human Rights Issues: Women's rights- children's rights- bonded labour- refugees- capital punishment-Status of Dalits and Tribals in Contemporary Indian Society-

References

1. J.A. Andrews, and W.D. Hines, International Protection of Human Rights. Mansell Publishing Ltd. London, 1987.
2. Maurice Carnston, What are Human Rights?, The Bodlay Head Ltd, London,1973.
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7. V.R. Krishna Iyer, Human Rights And Law. Vedpal Law House, Indore, 1984.
8. "----------" , Human Rights - A Judge's Miscellany, B.R.Publication, Delhi,1995.
9. C.J. Nimal, (ed.), Human Rights in India : Historical, Social and Political Perspectives, Oxford University Press, New Delhi, 1999.
10. R.S. Pathak, (ed.), Human Rights in the Changing World, International Law Association, New Delhi, 1988.
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12. Amartya Sen,. Development As Freedom, Oxford University Press, New Delhi, 1999.
13. Edward James Schuster, Human Rights Today : Evolution or Revolution, Philosophical Library, New York, 1981.
14. Subbian, A Human Rights Systems, New Delhi, 2000.

ELECTIVE COURSE I

B) ARCHIVES KEEPING

Objectives

1. To know the history of the archives
2. To study the activities of various archives
3. To understand the importance of archives keeping

Unit I : History of Archives – Archives keeping Europe through the ages – International Archives – Archives in India: Ancient, Medieval and Modern.

Unit II : Creation of Archives: Establishment of registry – Racking – Shelves and other materials – Archives and Libraries - Organisation of Archives in India: Court Archives – Public Department – Revenue Department – Secret Department – Central Government Archives – Organisation of Archives in European Countries: France, England – Archives in U.S.A., Canada.

Unit III : Preservation of Archives – Methods of Preservation – Preliminary and precautionary measures – Preventive measures – Factors of deterioration – Atmospheric factors: Temperature, Humidity, Sunlight, Dust, Impurities, Micro-organisms and pest: Pests, Silver fish, Termites or White Ants, Wood Warm, other insects – Methods of Preservation and repair of Archival material.

Unit IV : Administration of Archives: National Archive – Tamil Nadu Archive - Functions of Archives - Uses of Archives.

Unit V : National Archives: Its origin, growth and activities - Tamilnadu Archives: Its origin, growth and activities - Private Archives: Definition – Difference between private and public archives – Categories of Private Archives – Nehru Memorial Museum – IUCIS, Hyderabad – Parry and Company, Chennai – Asiatic Society of Bengal – Bengal Club – Vishva Bharathi – Sringeri Mutt – Indo-Portuguese Archive, Goa – Arch Diocese of Madras – Archives of Shenbaganoor, Kodaikanal – Problem of private archives – National Registrar of Private Records.

References:

1. B.S. Baliga, A Guide to the records preserved in the Madras Record Office, Superintendent, Government Press, Madras, 1936.
2. A Guide to the Archival Care of Architectural Records: 19th-20th Centuries, International Council on Archives Section on Architectural Records, ICA, Paris, 2000.
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6. C.L. Prajapathi, Conservation of Documents: Problems and Solutions, A Mittal Publication, New Delhi, 2005.
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17. Sailen Ghose, Archives in India, History and Assets, Calcutta, 1963.
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21. Vijayalakshmi and S.C. Jindal, Digital Libraries and Digital Library Principles and Practivces, Vol.I, S.C. Jindal Isha Books, New Delhi, 2004.
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26. M. Sundararaj, A Manual of Archival Systems and the World of Archives. Siva Publication, 1999.

CORE COURSE V

SOCIO-CULTURAL HISTORY OF INDIA FROM 1707 A.D. TO 1857 A.D.

Objectives:

1. To trace the Islamic influences of Hinduism and Vice versa.
2. To reveal Socio-Economic and Cultural Changes occurred in the Deccanic Kingdoms.
3. To Understand the impact of westerners contact with India.
4. To Study the salient features of the western and Eastern influences.
5. To highlight the influence of Bakthi Movement on Indian society.

Unit I : Disintegration of the Mughal empire-- European settlements and their impact on Indian Society—British Annexation of Bengal.

Unit II : The British conquest and expansion: Lord Clive – Warren Hastings – Lord Wellesley – Lord Hastings. The wars: Anglo-Mysore wars – Anglo-Maratha wars – Anglo Burmese war – Annexation of sind - Ranjit singh – Anglo – Sikh wars – Lord Dalhousie and Doctrine of Lapse – Anglo-Afghan relations.

Unit III : British policy towards India states: Ring Fence Policy 1765-1813, Subordinate Isolation, 1813- 57 – Indian states under the Crown.

Unit IV : Cornwallis and Permanent Land revenue settlement — Lord Dalhousie and his reforms .

Unit V : Socio-religious movements of the 19th century: Reforms of Lord Bentinck – Educational policy under East India Company- Administrative structure and policies : judicial and police reforms.

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CORE COURSE VI

SOCIO-CULTURAL HISTORY OF TAMILNADU FROM 1800 A.D TO 1967 A.D.

Objectives:

1. To know the social condition of Tamilnadu since 1800AD.
2. To understand the Land Systems.
3. To know about the Economic condition in Tamilnadu.
4. To understand the Impact of Western Education.
5. To know the Art and Education of Tamil Country.

Unit I : Sources : archival- institutional papers -Private papers-literature-folklore-newspapers and journals -Social Conditions: Caste system origin and growth - Castes conflicts- Family : Emigrations-Joint family-break up- position of women-sati-child marriage - devadasi system-infanticide-changes in the 19th and 20th centuries - Social beliefs and social practices: social ceremonies- festivals-entertainments- superstitions. Religion: Saivism: St. Ramalingar- Vaishnavism: the Schism- village gods and deities -Christianity: Policy of the Company- growth and impact- Islam: growth and impact-Village Gods and deities.

Unit II : Land systems: - Zamindari to Ryotwari-General economic conditions: agriculture and industry during colonial and post-colonial periods- Landlords-Peasants - small tenant-serfdom-trading classes. Rise of indigenous commercial Elite- the Dubashies.

Unit III : Indigenous institutions of learning-Introduction of Western education- Missionary and Government education-Munro's Scheme of Education- Professional and Technical education-education of Depressed Classes-Muslim education - Female education- rise of Administrative Elite-Professional Elite.

Unit IV : Modern socio-religious movements: Theosophical and Ramakrishna Mission. Radical social reform movements : Concept of Dravidian culture- Non-Brahmin Movement-Periyar E.V.R and Self-Respect Movement-Temple Entry Movement : Dalit Movement : Ayothidhasar-M.C.Raja-Erattamalai Srinivasan.

Unit V : Music: folk and classical- Tamil Literature: Subramania Bharathi-Bharathidasan-Namakkal Ramalingam Pillai-Kavimani Desika Vinayakam Pillai- Maraimalai Adigal-Film : impact on society and politics.

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CORE COURSE VII

HISTORY OF EUROPE FROM 1453 A.D. TO 1789 A.D.

Objectives:

1. To know about the Fall & Roman Empire and ottoman Turks.
2. To understand Renaissance and its results.
3. To know the Emergence of Absolute Monarchies.
4. To understand the Growth of parliamentary institution in England.
5. To trace the Age of Enlightenment.

Unit I : Fall of Eastern Roman Empire-Ottoman Turks-Geographical Discoveries-Decline of feudalism-Beginning of Capitalism.

Unit II : Commercial Revolution in Western Europe -Mercantilism-Renaissance and Reformation-Counter Reformation-Thirty Years War in Europe.

Unit III : Emergence of the Nation States- The rise of new absolute monarchies - Louis XIV

Unit IV : Growth of Parliamentary institutions in England

Unit V : The Age of Enlightenment - The emergence of a scientific view of the world.

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CORE COURSE VIII

HISTORY OF SCIENCE AND TECHNOLOGY

Objectives:

1. To know about the origin of the Science and Technology.
2. To understand the evolution of Science and Technology.
3. To know the development of Indian Science.
4. To make the students to understand the development of Science and Technology in Medieval and Modern period.
5. To understand the Effects of Science and Technology.

Unit I : Science as an Institution: The Emergence and Character of Science - The Methods of Science— The Cumulative Tradition of Science — Science and the Means of Production – Natural Science as a Source of Ideas- Interactions of Science and Society.

Unit II : Science in the Ancient World: Agriculture and Civilization: Civilization - The Techniques of Civilization - The Origin of Quantitative Science - The Legacy of Early Civilization - The Origins of Iron age Cultures - Early Greek Science -Rome and the Decadence of Classical Science - The Legacy of the Classical World - History of Science and Technology in Ancient India -Astronomy, Medicine and Metallurgy.

Unit III : Science in the Age of Faith: Dogma and Science - Islamic Science - Medieval Science -The Revolutions in Science and Society - The Future of the Physical Sciences - Science and Ideas in an Age of Tranisition.

Unit IV : The Birth of Modern Science: The Renaissance(1440-1540) - The New Philosophy - Science Comes of Age(1650-90) - The Character of Science in the Industrial Revolution -The Nineteenth- Century Advances of Science- The World's Need of Science.

Unit V : Science in Colonial India: Colonial Science Policy - Science in Education - Indian response - Indian Advancement Science and Technology since 1947.

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ELECTIVE COURSE II
A) INDIA AND HER NEIGHBOURS

Objectives:

1. To understand the Foreign policy of India.
2. To trace the relationship of India with the neighbouring states.
3. To know the role of India in SAARC
4. To understand the ethnic crisis in Srilanka, Pakistan, Bangladesh.

Unit I : The Sub- continent of India - Determinants of India's foreign policy: Historical factors - Geographical factors -Economic factors - National Interest, Ideologies: World peace - Anti-colonialism - Anti-racism - Pancha Sheel - NAM.

Unit II : India and Pakistan: India's relations with Pakistan - factors influencing Indo-Pak relations -Kashmir issue - The areas of conflict - crisis and co-operation-Nuclear race in the Indian sub- India and Bangladesh.

Unit III : India and China: Sino-Indian relations – Panch sheel Agreement - Chinese action in Tibet - Strains in Sino- Indian Relations - Normalisation process in the Sino- Indian Relations

Unit IV : India and Sri Lanka: Policy towards India-Ethnic Problem and its impact - IPKF. India and Nepal: Interaction between India and Nepal -Indo-Nepal economic co-operation. India's political and economic relations with Bangladesh, Bhutan, Maldives, Burma [Myanmar]; Cultural contacts.

Unit V : India and the Non-Aligned Movement - its role in international relations - Indian Ocean being made a zone of peace - Problems and Prospects - SAARC and Co-operation in South Asia - Trade and economic development U.N. and India- Human Rights in South Asian Countries.

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ELECTIVE COURSE II
B) PRINCIPLES AND METHODS OF ARCHAEOLOGY

Objectives:

1. To understand the scope of the study of Archaeology.
2. To involve the students in understanding the field methods of Exploration.
3. To understand the field Methods of Excavation.
4. To study the Methods of recording and preservation.
5. To understand the study of Antiquities.

Unit I : Definition, Aim and Scope of Archaeology – Methods and Principles

Unit II : Exploration: Identification of Ancient Sites - Nature of Ancient Sites - Open Air – Caves – Mounds – Burials

Unit III : Excavation: Laying of the Trenches - Digging and recording – Stratigraphy - Photography and Surveying – Interpretation - Publication

Unit IV : Study of Antiquities – Stone – Bone – Metals - Pottery and others

Unit V : Preservation: Antiquities – Wood – Bone – Ivory – Metal – Stone - Other objects – Monuments - Principles of Conservation

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3. Plenderleith, H. : Conservation of Antiquities and Works of Art.
4. Crawford, O.G.S. . : Archaeology in the Field.
5. Glynn Daniel : The Origin and Growth of Archaeology.
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7. Padigar, S.V. : Puratatva Sastra Sodhane, Dharwad.

CORE COURSE IX
FREEDOM MOVEMENT IN INDIA

Objectives:

1. To understand the need of freedom movement
2. To know the courses of freedom movement
3. To know and feel the people's conditions of the British rule in India
4. To know the history of Swaraj and non cooperation movement during the period
5. To know the reality while partition of India before independence
6. To understand, how we won our independence

UNIT I : The first war of Indian Independence 1857 – Political, Social, Religious, Economic and Military causes – Proclamation of Queen Victoria - Act of 1858.

UNIT II : Causes of the Nationalist Movement - Predecessors of the congress – British India society.- British Indian Association – Bombay Association – Madras Native Association – The Indian Association – Madras Mahajon Sabha – Bombay Presidency Association

UNIT III : Foundation of Indian National Congress – First session – Second Session, Third session – Calcutta Session. Moderates and Extremists – Home Rule Movement – The Revolutionary and Terrorist Movements – India and World War I.

UNIT IV : Constitutional Development (1919 -35) - Non Co-operation Movement – Swarajist Party – Civil Disobedience movement – India and World War II – Cripps' Mission – Quit – India Movement.

UNIT V : Indian National Army – Partition of India – Indian Independence – Some leaders of Freedom struggle – Gokhale – S.N. Banerjee – Annie Besant – Maulana Azad –Dadabhal Naoroji – Tilak – Vallababhai Patel – Mahatma Gandhi – Pt. Jawaharlal Nehru.

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CORE COURSE X
HISTORY OF EUROPE FROM 1789 A.D. TO 1945 A.D.

Objectives

1. To understand the origin of the revolutionary thinking in modern Europe
2. To study the causes and nature of Revolution in Modern Europe.
3. To know the significance of French revolution in modern Europe.
4. To study the impact of Great Depression in Europe.
5. To analyse the causes and impact of Second War in Europe.

UNIT I : The French Revolution and Napoleonic Era (1789-1815) – Their Significance in World History- Vienna Congress, 1815 - Revolutions of 1830 and 1840.

UNIT II : Industrial Revolution-Stages of Industrial Revolution in Europe - Socialist and Labour Movements in Europe.

UNIT III : Napoleon III - The Unification of Italy and the founding of the German Empire - The European powers and the Ottoman Empire (1815-1914).

UNIT IV : The Russian Revolution, 1917 - The First World War - The Economic and Social impact of the War - The Peace of Paris, 1919- League of Nations- Collective Security.

UNIT V : Great Depression of 1929-32. Totalitarianism in Europe:- Fascism in Italy, Nazism in Germany. Origins and Impact of Second World War - UNO.

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CORE COURSE XI
INTERNATIONAL RELATIONS SINCE 1945 A.D.

Objectives

1. To understand the definition and scope of the International Politics.
2. To familiar with the various theories of International politics.
3. To analyses the post world War II scenario in International relations.
4. To know the impact of World War II in the Global Economics.
5. To understand the role of world organizations in peace making process.

UNIT I : Definition and scope - Theories of international Politics: The Realist Theory, Systems Theory, Decision Making-Game Theory.

UNIT II : Concepts of International Politics: Power - National interest - Balance of Power - Collective Security: NATO, CENTO, Warsaw Pact, SEATO, ANZ US. Old and New Diplomacy-practice.

UNIT III : The (Post-II World War) foreign policies of the major powers: United States, Soviet Union - China. and India's foreign policy and relations; India and the Super Powers-Oil Diplomacy, Palestine-Israel conflicts, West Asian conflict-Palestine- Israel confides- Arms race, disarmament and arms control: - The Partial Test-Ban Treaty - The Nuclear Non-Proliferation Treaty (NPT); Comprehensive Test Ban Treaty [CTBT]- India's-Nuclear Policy — Terrorism its impact — Afghanistan , Iraq — US War.

UNIT IV : New International Economic order; GATT and its implications. The North South: "Dialogue" in the United Nations and Outside — Impact of Globalization.

UNIT V : Origin and Development of International Organizations: The United Nations and its Specialized Agencies; OAS, OAU, the Arab League, The ASEAN, the EEC, SAARC their role in international relations.

References:

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CORE COURSE XII

HISTRIOGRAPHY

Objectives:

1. To understand the need for studying history
2. To analyse definition, nature and scope of history
3. To know the contribution of historians through ages
4. To evaluate their approaches to history.
5. To introduce the methodology in writing

UNIT I : History - Definition - Nature, Scope and Value – Social necessity of History – Philosophy of History – History and its ancillary fields.

UNIT II : Historiography – Traditions of historical writing – Interpretation and Development of history through Ages – Theological Interpretation – Scientific Interpretation – Marxist Interpretation.

UNIT III : Practitioners of history – Herodotus – Banabhatta – Thomas Aquinas – Alberuni –Voltaire – Leopold Von Ranke – James Mill – Vincent Arthur Smith – K.A. Nilakanda Sastri – K.K. Pillai.

UNIT IV : Approaches to history – British Marxists – E.P.Thomson – Indian Marxist – D.D.Kosambi – Cliometrics- R.W. Fogel – Modernism – Lewis Namier – Structuralism – Claude Levi Strauss – Subaltern Studies – Ranajit Guha.

UNIT V : Historian Work – Selection of topic – Review of literature- Collection of data – Primary and Secondary sources – Internal and External Criticism Foot notes – Bibliography – Appendix – Documentation.

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2. Jacques and Henry F. Graff, The Modern Researcher. Harcourt Brace, San Diego, 1985.
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ELECTIVE COURSE III

A) ENVIRONMENTAL HISTORY (With reference to India)

Objectives

1. To know the various aspects of Eco-system and importance of Conservation.
2. To study the cultural tradition and colonial policy towards preservation of environment in India.
3. To analyse the various steps taken towards the preservation of forests in India.
4. To understand the dangers of Environmental threats due to various kinds of pollutions.
5. To study the activities of various movements engaged in Environmental protection.

UNIT- I : Definition - Scope - Eco-system - Bondage between human civilization and Ecology, Nature's Balance, Preservation - Environment and Culture - Conservation — Green House Effect - Global warming - Ozone - Biodiversity.

UNIT-II : Environment in the Indian Cultural Tradition - Colonial environment policy Forest Management.

UNIT-III : Forest Management - Resistance to Forest Management: Kumaun and Garhwar's region - The Utar and forest Movements of 1921 - Social Protest in U.P., 1921-42 - Impact on Nationalism — Forest satyagraha — Karnataka.

UNIT-IV : Environmental threats: Water Pollution - Air Pollution- Land Degradation - Hazardous Wastes - Industrial Pollution.

UNIT-V : Environmental Movements —Chipko Movement — Protest against Narmada Project -Protective Measures - Govt.Legislations - Courts — Activists — Babha Amte -Metha Patkar .

References:

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ELECTIVE COURSE III
B) IDEAS IN HISTORY

Objectives :

1. To provide basic understanding of the concepts
2. To know the necessity of the study of the concepts
3. To understand the origin of the various political ideas.
4. To assess the relevance of various ideas to the current scenario.
5. To study the role of ideas in understanding the nature of history.

UNIT- I : Causation in History - Crisis in History - Determinism in History

UNIT-II : Positivism- Evolutionism- Dialectical Materialism - Historicism

UNIT-III : Liberalism - Democracy - Nationalism - Socialism - Imperialism -International Peace - Ethics of Peace : Progress in the Modern Times

UNIT-IV : Non-violence and Satyagraha- Communalism - Secularism

UNIT-V : Modernism - Post Modernism - Structuralism - Post Structuralism – Globalism.

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9. Dictionary of The History of Ideas Vol.I, II & III, Charles scribner's Sons, New York..

CORE COURSE XIII
INDIA SINCE 1947 A.D

Objectives :

1. To know the significance of parliamentary democracy
2. To know the importance of Nehru Era
3. To understand the origin of the various political ideas.
4. To assess the relevance of various ideas to the current scenario

UNIT- I : **Polity I :** Partition and its impact – The making of Parliamentary Democracy- Architects of Modern India: Jawaharlal Nehru, India's Foreign Policy Lal Bahadur Sastri and Indira Gandhi - Emergency - General Elections of 1977 - J.Prakash Narayanan - Janata Government – Rajiv Gandhi - Coalition Politics and Governance – Movement towards state revolutionary: Tamil Nadu - Punjab - Kashmir - Assam Jharkhand - NEFA.

UNIT-II : **Infrastructure and Science & Technology:**
Energy – Electricity subsector -Dams – Transport and Communication - Telecom Revolution - ISRO and Allied units - Achievements in Space Research - Nuclear Research- DRDO

UNIT-III : **Economy :** Five Year Planning - Panchayat Raj - Agrarian Reform- Industrial Development-Green Revolution - White Revolution - Rolling plan - New Economic Policy and Globalisation.

UNIT-IV : **Society & Culture I :** Educational Policy in Free India - Literacy Movement - Formal and Non-Formal Education – Population, Poverty and Unemployment Policy - Socio - Political Scenario - Reservation Policy and Mandal Commission - Communalism, Secularism and national integration -

UNIT-V : Socio Economic Movements: Peasant Movement: Labour Movement – Tribal Movement – Jharkand – Chipko Movement – Changing status of women – Media and its impact.

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5. Bipan Chandra, History of Modern India, Orient Blackswan, New Delhi, 2009
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15. Pushpesh Pant, International Relations in the 21st Century, Seventh Print, McGraw Hill Education (India) Pvt. Limited, New Delhi, 2014.

CORE COURSE XIV
CONSTITUTIONAL HISTORY OF INDIA

Objectives :

1. To know historical back ground of constitution
2. To study the unique features of the constitution
3. To understand the political scenario behind the origin of the constitution
4. To assess the relevance of various Acts pertaining to the emergence of Indian constitution

UNIT I : Regulating Act, 1773 - Pitt's India Act, 1784 – Charter Acts of 1793, 1813 and 1833

UNIT II : Act of 1858, Queen's Proclamation, Indian Council Acts of 1861 and 1892

UNIT III : Minto – Morely Reforms Act. 1909 – Montague Chelmsford Reform Act, 1919 – Simon Commission – Nehru Report – Jinnah's Fourteen Points - Round Table Conferences – Communal Award

UNIT IV : Indian Government Act, 1935 – August Offer – Cripps Mission – Formation of Constituent Assembly – Bhulabhai Desai and Liaquat Ali Pact – Wevell Plan – Rajagoplalachari Formula – Cabinet Mission – Mountbatten Plan – Indian Independence Act

UNIT V : Features of Indian Constitution Act of 1950 – Constitutional Amendments

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1. R.C. Agarwal and Mahesh Bhatnagar, Constitutional Development and National Movement of India, S. Chand & Company Ltd., New Delhi, 2006.
2. Sumita Singh, Constitutional Development in British India, Pragun Publications, New Delhi, 1012.
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5. Dharam Chand Gupta, Indian National Movement and Constitutional Development, Vikas Publishing House Pvt. Ltd., Noida, 1983.
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7. Sibaranjan Chatterjee, The Governor in the Indian Constitution, Mittal Publication, Calcutta, 1973.
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15. Mahendra Kumar Talware, History of National Movement and Constitutional Development of India

ELECTIVE COURSE IV

A) TOURISM AND TRAVEL MANAGEMENT

Objectives :

1. To understand the concepts of tourism
2. To know the importance of accomodation
3. To study about the various travel agencies
4. To assess the importance of travel agencies to the development of Indian economy

UNIT I : Meaning, Definition – Scope and Content of Tourism – Concept of Tourism – Purpose of Tourism –Kinds of Tourism – Basic Components of Tourism.

UNIT II : Tourism as an Industry: Different types of Transport –Travel Formalities: Passport, Visa and Immigration – Customs formalities.

UNIT III : Tourism and accommodation: Types of accommodation: Hotels – Youth Hostels and Dharmasalas – Importance of accommodation in Tourism Development.

UNIT IV : Travel Agency operations- Day-to-Day operations – Origin and Growth – Modern Travel Agencies - Functions of Travel Agency – Travel Agency with Service Providers – Handling Client.

UNIT V : Travel Intermediaries: Tour Operators – International Air Transport Association (IATA) – World Tourism Organization (WTO) – Travel Agent Association of India (TAAI) – Indian Association of Tour Operators (IATO) - Tourism Offices in India: Tourism Development Corporation of India (ITDC) – Tamil Nadu Tourism Development Corporation (TTDC) -

References

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ELECTIVE COURSE IV
B) JOURNALISM

Objectives :

1. To understand the concepts of journalism
2. To know the importance of press
3. To analyze importance of mass media to the society
4. To study the various press Acts

UNIT- I : Nature and scope of Journalism – Growth of Journalism: Origin of news at global level – Origin of Indian Press – Indian freedom struggle and Press – Growth of press after independence.

UNIT-II : Growth of press in Tamil Nadu: Origin of Tamil Journalism – Role of Tamil Press in the freedom struggle – Tamil journals in modern period - Press laws – Press Council

UNIT-III : Procedure for starting news papers and periodicals: clearance of Title for filling of Declaration – Application for news print – Supply of copies – Registration – Application for printing machinery – Specialized requirements – Annual Statement and annual report – Departments of Newspaper organization: Editorial division – Commercial division – Machinery division – Development division – Administrative bloc – Statistical division

UNIT-IV : Reporting : Types of reporting: Predictable news – Unpredictable news – straight and explanatory news – Hard news – soft and hot news – investigative news – Sources of News – Components of news: 6 Ws – Methods of Reporting: Participating in the action - Observing the action – Asking questions or interview – Reading – Using Scientific Research Techniques – Methods of Obtaining news: Local Reporters – Correspondents – Special Reporters – Stringer and Liner – Radio and Television – Public Reports – News Agencies

UNIT-V : Types of News: Government News – Court News – State Legislative and Parliamentary News – Public Meeting – Economic News – Scientific news – Sports – Editing: – Editor – News Structure: Headline – Lead – Body – Proof Reading.

Reference Book

1. A.N. Ahuja, Theory and Practice of Journalism, Surjeet Publication, Delhi, 1984.
2. David Wain Wright, Journalism Made Simple, Rupa & Co, London, 1981.
3. Tony Harcup, Journalism: Principles and Practice, Third Edition, SAGE South Asia, 2009.
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8. David Hoffman, Citizens Rising: Independent Journalism and the Spread of Democracy.
9. Carole Fleming and Emma Hemmingway, An Introduction to Journalism 2006.
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ELECTIVE COURSE V

A) WOMEN STUDIES

Objectives :

1. To understand the concepts of feminism
2. To know the various theories of feminism
3. To study the legislations regarding the protection of women

UNIT- I : Concept and Need for Women's Studies - Scope of Women's studies - Status of Women – Feminist Theories – kinds of Feminism: Liberal, Socialist, Marxist, Radical, Existentialist, Psycho analytical - Post and modern feminist thinkers

UNIT II : Women's rights – UNO and Women's Rights _ Women's Rights Conferences – Conventions on all forms of discrimination against women - International Women's Year – Decade of Women 1975 – 85 - Feminism in India – Traditional Indian Society – Women in Vedic, Epic, Sangam and Muslim Periods.

UNIT III : Social Reforms Movements in India – Government Policy – Center and Tamil Nadu on Women Status after 1947.

UNIT IV : Women and Law – Laws regarding Child Marriage – Female Infanticide – Protection of Women law to abolish Sati.

UNIT V : Changing role of Women in India – Socio, Economic and Political Challenges for women – Women and Work – Violence – Law and Media – Reservation.

References

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2. Susan Shaw and janet Lee, Women's Voices, Feminist Visions: Classic and Contemporary Readings, McGraw-Hill Professional, New Delhi 2011.
3. Inderpal Grewal and Caren Kaplan, An Introduction to Women's Studies: Gender in a Transnational World, 2nd Edition. McGraw-Hill Humanities Social, New Delhi, 2005.
4. Inderpal Grewal, Home Harem: Nation, Gender, Empire and the Culture of Travel, Cassel, 1996.
5. M.Mics, Patriarchy and Accumulation on a world Scale: Women in international Division of Labour, London, Zed 1986.
6. J. Ghosh "Gender concerns in Macro – Economic Policy EPW 30 April WS-2.
7. L. Dule (ed.), The Women and House hold in Asia, Series of Five volumes, Vol. I.
8. A. Singh A and Avitamen (ed.), Invisible hands, Sage Publication, New Delhi, 1987.

9. B. Agarwal (ed.), Structure of Patriarchy, New Delhi.
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14. B. Cossman and R. Kapur (eds.), Subversive Site, Kali for Women, New Delhi, 1996.
15. Kanpur Ratna (ed) Feminist Terrains in Legal Domains, Kali for Women, New Delhi, 1996.
16. U. Butalia and T. Sarkar (ed.) Women and the Hindu Right, Kali for Women, New Delhi, 1996.
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19. M. Mies M and V. Shiva – Eco feminism, , Kalofar Women, New Delhi, 1993.
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22. Chakravarti and K. Bangari (eds.), Myths & Markets, Manohar Publications, New Delhi, 1999.
23. CWDS – Collection of Papers on "Engendering Disciplines: Disciplining gender", Feb. 2001.

ELECTIVE COURSE V

B) GENERAL KNOWLEDGE AND CURRENT AFFAIRS

Objectives :

- To understand the functions of solar system
- To understand the significant features of constitution
- To study the importance of Indian economic plan
- To acquire the knowledge of science and technology

UNIT- I : **Solar System:** The Earth – Dimensions of Earth – Earth Motions – Earth's Atmosphere - Indian Geography: Monsoons - Mountain Ranges – Rivers - Types of Soils – Minerals – Crops – Forests — National Highways and Railways – Airports and Harbours – National Wild Life Sanctuaries – Tribes in India.

UNIT-II : **Indian Constitution:** – Framing the Constitution – Preamble – Schedules – Amendments - Salient Features – Fundamental Rights and Duties – Directive Principles of State Policy – The President – Prime Minister - Parliament – Supreme Court – The Attorney General – Comptroller and Auditor General – Governor – State Legislature - Regional Issues.

UNIT-III : **Indian Economy:** Planning – Planning Commission – Role of National Development Council – Five Year Plans – Economic Policy – Agricultural and Industrial Development in India.

UNIT-IV : **Science and Technology in India:** Development – Nuclear Science – Space Research – Information Technology – Every day Science – Hygiene and Physiology.

UNIT-V : **Present day India and World:** Indian States – Census (2011) – Flag – Emblem – Indian Defense – Indian Labs – River Valley Projects - Art and Music – Awards in India and World – Sports – Major events in India and World – Who is Who – U.N.O

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1. Ashok Singh, Science and Technology, McGraw Hill Education India Pvt. Ltd, New Delhi, 2007.
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3. Madhav Khosla, The Indian Constitution, Jain Book Agencies, New Delhi, 2014.
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5. Ramesh Singh, Indian Economy, Sixth Edition, McGraw Hill Education India Pvt. Ltd, New Delhi, 2015.
6. Kalpana Rajaram (ed), Development of Science and Technology, Spectrum Books Pvt. Ltd., New Delhi, 2014.
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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI 620 024
Master of Social Work (MSW) Programme under CBCS
(Applicable to the candidates admitted from the academic year 2016-2017 onwards)

Semester	Course details	Course Code	Course title	Inst. Hrs/ Week	Credits	Exam Hrs.	Marks		
							CIA	UE	Total
I	Core Course-I	CC-I	Introduction to Social Work and Society	6	4	**3**	25	75	100
	Core Course-II	CC-II	Social Case Work	6	4	**3**	25	75	100
	Core Course-III	CC-III	Social Group Work	6	4	**3**	25	75	100
	Core Course-IV	CC-IV	Field Work Practice	6	4	**3**	40	60	100
	Elective Course I	EC-I	Counselling: Theory and Practice	6	4	**3**	25	75	100
			Total	**30**	**20**				**500**
II	Core Course-V	CC-V	Community Organisation and Social Action	6	5	**3**	25	75	100
	Core Course-VI	CC-VI	Social Work Research and Social Statistics	6	5	**3**	25	75	100
	Core Course-VII	CC-VII	Human Growth and Personality Development	6	5	**3**	25	75	100
	Core Course- VIII	CC -VIII	Field Work Practice	6	5	**3**	40	60	100
	Elective Course -II	EC-II	Human Resource Management	6	4	**3**	25	75	100
			Total	**30**	**24**				**500**
III	Core Course-IX	CC-IX	Social Welfare Administration, Social Policies, and Social Legislations	6	5	**3**	25	75	100
	Core Course-X	CC-X	Specialisation – I*	6	5	**3**	25	75	100
	Core Course-XI	CC-XI	Specialisation – II*	6	5	**3**	25	75	100
	Core Course-XII	CC-XII	Field Work Practice	6	5	**3**	40	60	100
	Elective Course-III	EC-III	Corporate Social Responsibility	6	4	**3**	25	75	100
			Total	**30**	**24**				**500**
IV	Core Course-XIII	CC-XIII	Specialisation – III*	5	5	**3**	25	75	100
	Core Course-XIV	CC-XIV	Field Work Practice	5	5	**3**	40	60	100
	Elective Course-IV	EC-IV	Disaster Management	5	4	**3**	25	75	100
	Elective Course-V	EC-V	Block Placement (Internship)	5	4	**3**	40	60	100
	Research Project	RPW	Research Project Work	10	4	**3**	Evaluation 80 Viva 20		100
			Total	**30**	**22**				500
			GRAND TOTAL		**90**				**2000**

*** SPECIALISATIONS**

A. COMMUNITY DEVELOPMENT

Specialisation Paper	Course Number	Course Code	Course Title
Specialisation Paper I	Core Course-X	CC-X a	Rural Community Development
Specialisation Paper II	Core Course-XI	CC-XI a	Tribal Community Development and Project Management
Specialisation Paper III	Core Course-XIII	CC-XIII a	Urban Community Development

B. MEDICAL AND PSYCHIATRIC SOCIAL WORK

Specialisation Paper	Course Number	Course Code	Course Title
Specialisation Paper I	Core Course-X	CC-X b	Community Health
Specialisation Paper II	Core Course-XI	CC-XI b	Medical Social Work
Specialisation Paper III	Core Course-XIII	CC-XIII b	Psychiatric Social work

C. FAMILY AND CHILD WELFARE

Specialisation Paper	Course Number	Course Code	Course Title
Specialisation Paper I	Core Course-X	CC-X c	Women and Child Welfare
Specialisation Paper II	Core Course-XI	CC-XI c	Welfare of the Youth and Aged
Specialisation Paper III	Core Course-XIII	CC-XIII c	Demography and Family Welfare

D. HUMAN RESOURCE MANAGEMENT (HRM)

Specialisation Paper	Course Number	Course Code	Course Title
Specialisation Paper I	Core Course-X	CC-X d	Human Resource Development
Specialisation Paper II	Core Course-XI	CC-XI d	Labour Welfare and Industrial Relations
Specialisation Paper III	Core Course-XIII	CC-XIII d	Organisational Behaviour

12. Work Load: The equating formula for the work load of social work teachers shall be as follows:

One hour of P.G. lecture	: 1 ½
Field Work (including field supervision) Correction of field work report and Individual & Group Conferences	: 1 ½ hours per week per student
Research Thesis/Dissertation (Project Report) Guidance and Supervision	: 2 hours per week per student
Continuous Internal assessment (including tests, QP setting, and valuation, assignment correction, seminar supervision, etc,)	: 2 hours per week per student

Course Title: INTRODUCTION TO SOCIAL WORK AND SOCIETY

Semester No : I
Core Course : I
Course Code : CC-I

Introduction:
This course aims at introducing the learners to the critical enquiry of the history and ideologies concerning Social Work and to help the learners to understand fundamental objectives of social work profession, its values, and ethics as linked to contemporary ideology for social change.

Objectives:
1. To develop an insight into the historical context of origin and development of social work profession.
2. To impart social and religious ideologies of India for ensuring change.
3. To cultivate an understanding of the theoretical framework of the subject.
4. To imbibe an idea about the social structure and social problems.
5. To infuse a philosophical foundation and value base of social work profession.

I. Social Work: Concept, Definition, and Historical development of Social Work in UK, USA, and India; Concepts: Social Service, Social welfare, Social Security, Social Defense, Social Justice, Social Development, and Social Reform. **Socio-religious thoughts of India:** Hinduism – four values, Buddhism, Jainism, Sikhism, Christianity- Supreme value of man, concept of love and service, and Christian missions; Islamism: Basic beliefs, values; Islamic religion and cultural system; **Social Reform movements** in India- its impacts and role of Brahma Samaj, Ariya Samaj, Prarthana Samaj, Ramakrishna mission, Theosophical society, Bakthi movements, and D.K. Movement.

II. Social Work as a Profession: Nature and scope, objectives; philosophy and principles, functions, values and ethics. Social work education: as a profession, professional values, training; skills, tools and techniques, professional social work and voluntary social work, professional associations in social work; problems faced by social work professionals in India.

III. Methods of Social Work: Social case work – social group work – community organisation – social work research – social welfare administration – social action – field of social work: family and child welfare, women welfare, youth welfare, community development (rural, urban & tribal), medical and psychiatric social work, correctional social work, and labour welfare.

IV. Theories & Approaches (basic/overview only): Role theory, problem solving theory, and gestalt theory. systems theory, ecological theory, communication theory, existential approach, radical and Marxist perspective of social work, feminist approach; relevance and scope of eclectic/integrated approach to social work practice, role of social worker in remedial, preventive, and developmental models and as an instrument of change and development; modern Indian social thoughts of: Vivekananda, Aurobindo, Tagore, Gandhi, Ambedkar and EVR Periyar.

V. Concept of Society: Community association, institution, social groups, culture and its elements, social stratification, social processes, social change – social movements and social control; concept of urbanisation, industrialisation, modernisation – social disorganisation – social institutions – family, marriage, religion, economic, educational, and political institutions. Social movements: tribal, women liberation, Telangana, SNDP movement, and Naxalbari movement (salient features like reason, leadership, and its effects on the society)

References:

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Stanley, Selwyn. Social Problems-Issues and Interventions, Allied. 20

Course Title: SOCIAL CASE WORK

Semester No : I
Core Course : II
Course Code : CC - II

Introduction:
This course aims to develop simple to complex skills of working with individuals and families in various situations (like crisis, preventive, and developmental) and settings.

Objectives:

1. To understand case work as method of Social Work and to understand values and principles of working with individuals and families.
2. To develop the ability to critically analyse problems of individuals and families and factors affecting them.
3. To enhance the understanding of the basic concepts, tools, and techniques in working with individuals and families in problem solving and in developmental work.
4. Develop appropriate skills and attitudes to work with individuals and families.
5. Develop the ability to reflect on 'self' as person and grow as a professional social worker

I. Case Work: Concepts, objectives/purpose/its importance; nature and scope, historical development; components; values and principles of case work practice; socio-cultural factors affecting the case work practice in India; relationship with other methods of social work, and skills in social case work.

II. Case work process:
Intake: meaning, steps, referral- types, and stages. **Study:** Meaning, tools used/procedure followed in the study process: interviewing: types, purpose, skills, techniques, and principles of interviewing; home visits & reaching out, collateral contacts & relationship. **Assessment:** Social Diagnosis: meaning, types, and models. **Treatment/Intervention:** meaning, objectives, goals and goals setting & treatment planning, principles, models, types, and techniques (supportive/environmental manipulation, reflective/ practical help or material help & direct treatment/ counselling). **Evaluation:** meaning, purpose/objectives, types, methods/techniques/instruments, difference between appraisal, monitoring, and evaluation; **Termination**: meaning, reaction to termination, decision to terminate, and planning for termination. **Follow-up**- meaning, purpose, and types.

III. Case Worker-Client Relationship: meaning, purpose/needs/significance, and elements/components; characteristics of professional relationship: empathy, transference and counter transference, resistance, sustaining the relationship, non-possessive warmth, genuineness and self-disclosure; principles of client-worker relationship; obstacles in client worker relationship. **Case Work and Communication:** meaning, purpose, importance, principles, elements in communication process, types, importance of listening, observing and feedback, communication barriers and ways to overcome them; importance of interpersonal communication in case work.

IV. Approaches to Practice: psychosocial, problem solving, crisis intervention; behaviour modification, functional and development of an eclectic model for practice. **Recording in Case Work**: meaning, sources and types-process record- person oriented and problem oriented records and its components; summative record, etc; principles of recording, uses, and maintenance of record.

V. Application of Social Case Work in different settings & Clientele groups: medical and psychiatric settings- mentally retarded shelter homes; mental rehabilitation center, de-addiction

and detoxification centers, mental health & community based rehabilitation, role of social workers in hospital settings, family and child welfare settings: family, child guidance clinic, schools, geriatric care & aged and the terminally ill; case work practice in community settings including self-help groups, industries and correctional institutions; problems and limitations and role of case worker in various settings; professional self; conflict and dilemmas in working with individuals and family.

References:

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Trevithick, Pamela. "Social work skills." *A practice handbook* (2005).

Course Title: SOCIAL GROUP WORK

Semester No : I
Core Course : III
Course Code : CC - III

Introduction:
This course aims at developing the understanding of group work as a method, developing skills for intervention and gaining knowledge of the scope of this method in various settings

Objectives:

1. Appreciate the importance of groups in the life of an individual and develop awareness about the specific characteristics of group work and its contributions as a method of social work intervention.
2. To gain knowledge about group formation and use of a variety of group approaches and to understand concepts, dynamics, and models.
3. To develop knowledge of the principles, skills, and techniques to be used by the social worker in group.
4. To develop a beginning awareness of the various programme media and skills of programme planning.
5. To identify the various situations and settings where the method could be used in the context of social realities of the country.
6.

I. **a. Social group:** definition, characteristics, types of groups-social group and social group work group; and functions of a group. **b. Phases of group formation:** forming, storming, norming, performing, adjourning, mourning/grieving, basic human needs met by groups at different stages of group development and group goals. **c. Group process:** bond, acceptance, isolation, rejection, sub-group formation, and newcomers in the group, expectation, withdrawal, behaviour contagion, conflict and control; classification of group process: basic, structural, locomotive, and molar. **d. Group dynamics**-meaning, definition, functions, and basic assumptions of group dynamics.

II. a. Social group work: concepts-assumptions, purpose, goals, principles, and values of group work, and historical development of group work; group work as a method of social work and its relation to other methods of social work. **b. Group work process:** Intake and study: selection of members, composing group, orienting the members, preparing the environment, goal setting, motivation, use of home visits, and collateral contacts. **c. Assessment**- preparing for group work, first meetings-interviewing, ground rules for group work meetings, group roles and responsibilities, group meetings, **d. Intervention/treatment:** problem identification, making them work, dealing with difficulties within the group, group presentations, group work evaluation-meaning and its place ingroup work. **e. Evaluation:** steps in-group work evaluation and criteria for good group work and checklist for group work evaluation, v. Termination- reaction to termination and vi. Follow up.

III. a. Group work supervision: concepts, need, tasks, types, purpose, and functions, techniques and conditions for good supervision. **b. Leadership in group:** concepts, definition, characteristics, functions, qualities of leader, types and theories of leadership; training for leadership; sociometry and sociogram; **c. Group work for team building**: meaning, purpose, situational leadership in team building

IV. a. Models and approaches: social goal model, remedial and reciprocal model; group therapy/group psychotherapy/ therapeutic /social treatment, development group and task-oriented

group, etc. **b. Group work recording**: meaning, purpose, types and principles of group work recording, scope, problems, and limitations of group work practice in Indian settings; role of group worker in various settings.

V. **a. Programme planning**: meaning and definition of programme, principles and process of programme planning and the place of agency in programme planning. **b. Programme laboratory**-values and techniques: games, singing, dancing, dramatics, street play, puppetry, group discussions, parties, excursion, psychodrama, socio-drama, role play, brain storming, camping-planning and conducting camps; stages of group development and use of programme for group development: orientation stage, working stage, termination stage, programme planning, implementation, and evaluation **c. Group work settings and practice**: application of group work method in different settings; community settings, medical and psychiatric settings: hospitals, de-addiction, physical and visual and mentally challenged, family and child welfare settings and the aged homes, schools, correctional institutions, industries, and skills of a group worker.

References:

Alissi, Albert S. "Social group work: Commitments and perspectives."*Perspectives on social group work practice* (1980): 5-35.

Conyne, R. K. (1999). *Failures in group work: How we can learn from our mistakes*. Chronicle Books.

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Garvin, Charles D. *Contemporary group work*. Prentice Hall, 1987.

Glassman, Urania. *Group Work: A Humanistic and Skills Building Approach: A Humanistic and Skills Building Approach*. Vol. 13. SAGE Publications, 2008.

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Lifton, Walter M. *Working with Groups*. Wiley, 1966.

Nicolson, Paula, Rowan Bayne, and Jenny Owen. *Applied psychology for social workers*. Palgrave Macmillan, 2006.

Siddiqui, H. Y. *Group Work: Theories and Practices*. Rawat Publications, 2008.

Course Title: FIELD WORK PRACTICE

Semester No : I
Core Course : IV
Course Code : CC – IV

Introduction:
Social work practice is designed to provide a variety of opportunities to develop and enhance professional practice skills through, orientation, observation visits, rural/tribal camps, etc.

1. Orientation: A detailed instruction about field work, objectives importance of field work. Orientation provides information regarding: (1) the importance and place of the practice in the social work education and (2) the purpose, functions, and ethics in professional practice

2. Observation Visits:
The purpose of the observation visits is to acquire skills of systematic observation and to develop a spirit of inquiry; to understand society's response to social problems through various services, understand and appreciate, to develop the ability to critically evaluate the initiative of voluntary and government programmes, and to develop an appreciation of social work intervention in these programmes.

A minimum of 10 visits to different social agencies with at least two settings pertaining to each field of specialisation.
Suggested field:
Health Setting: Hospitals, de addiction centres, community health extension projects, district mental health programmer /projects, etc
Educational Setting: Formal schools, non formal / adult education centres, etc.
*Community Services***:** Community projects, self help groups, successful youth clubs and mahalir mantrams, environment groups, skill development centres, etc.
Services for special groups**:** like differently abled, destitute, elderly- both institutional and non institutional
Criminal Justice system: observation homes, jails, etc.
Civic Administration Centres-: municipal, panchayat union, panchayat etc.

3. Rural /Tribal Camps provide opportunities to experience rural life, analyse rural dynamics, and observe the functioning of local self government and voluntary agencies. This experience helps peer participation in planning for activities for own group and for the local people. It helps to carry out, evaluate, and report the experience. It also helps the social trainees in planning, organising, budgeting, mobilising, implementing and evaluating the projects to be implemented during the camps besides expose their histrionic talents. The camps should be for a minimum of seven days organised by the Social Work students on a self supporting basis.

4. **Group awareness project** on social issues / problems – Minimum of 15 days to be allotted for this purpose. A minimum of two programmes should organised by the group. Each group must comprise of 3-5 students. One programme must be rural based. Suggested themes such as anti – dowry campaign, HIV/AIDS awareness, gender sensitisation, alcoholism, and drug awareness, etc. could be considered.

NORMS FOR SOCIAL WORK PRATICUM

I Semester Field Work:

1. Field work orientation and agency visits- a minimum of 10 visits to different social agencies with at least two settings pertaining to each field of specialisation. – 10 marks.

2. Rural camp for a minimum of seven days organised by the social work students on a self supporting basis and group awareness project. – 15 marks.

3. Group awareness project on social issues / problems – minimum of 15 days to be allotted for this purpose. Each group to be organise a minimum of two programmes. Each group should comprise of three to five students. One programme should be rural based. Suggested themes such as anti – dowry campaign, HIV/AIDS awareness, gender sensitisation, alcoholism, drug awareness, etc. can be considered – 15 marks.

Evaluation : Total Marks – 100

Internal Evaluation - 40 marks

A. Filed Orientation visits (10marks)

(i) Observational Skills	- 3.5 marks
(ii) Reporting	- 3.5 marks
(iii) Attendance for field work	- 3 marks
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	10 marks

B. Rural / Tribal Camp (15 marks)

(i) Individual Participation	- 5 marks
(ii) Initiative and Leadership	- 5 marks
(iii) Community Involvement	- 5 marks
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	15 marks

Group Awareness Project (15 marks)

(i) Organising Ability & Team Work	- 5 marks
(ii) Resource Mobilisation	- 5 marks
(iii) Social Relevance	- 5 marks
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	15 marks

External Evaluation – (60 marks)

External examiner to be appointed by the University as is for project. One examiner may be appointed for every 15 students.

Break up of marks is as follows:

1. Theoretical Knowledge	- 15 marks
2. Practice Skills	- 15 marks
3. Mobilising Resources	- 10 marks
4. Communication and Presentation	- 10 marks
5. Reporting	- 10 marks
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	60 marks

Course Title: COUNSELLING: THEORY AND PRACTICE

Semester No : II
Elective Course : I
Course Code : EC - I

Introduction:
Counselling help is called upon in developmental, preventive, facilitative, and crisis situations throughout the life span during different phase/stages and various life events. The courses aim to equip learners with skills of counselling and understanding of various approaches in various settings.

Objectives:

1. To develop a holistic understanding of counselling as a tool for help.
2. To acquire knowledge of various approaches, their theoretical under-pinning for goals, values, processes, and techniques.
3. To develop skills of application to real life situations.
4. To develop the ability to recognise and synthesise attitudes and values that enhance investment of self in the counsellor's role.
5. To develop the ability to use the tools/scales in various settings.

I. Introduction to Counselling: Meaning, Definition, Need and importance of counselling and professional counselling.

Basic principles of counselling: participation, individualisation, confidentiality, communication, acceptance, self confidence, self awareness, and other principles governing the counselling relationship.

II. Theories of counselling: Psychoanalytic, adlerian, client centered, behavioural approach, rational emotive, reality, gestalt, transactional analysis, cognitive behavioural therapy, and eclectic theories.

III. Counselling process: Interview and it significance in counselling – use of observation in counselling and understanding of emotions in counselling.

IV. Types of counselling: individual and group counselling, family counselling, marital counselling, student counselling, and industrial counselling.

Techniques of group counselling, strategies and structure – barriers to effective counselling sessions; counselling evaluation.

V. a. Components of effective counselling : counsellor's skills – Role and functions of the counsellours in schools, industries, family, hospital, and rehabilitation institution.
b. Application of test (only for practice not for examination)

The following standardised tests must be practiced in counselling settings:
Personality, intelligence, interpersonal relations, stress, anger, self esteem, anxiety, assertiveness, depression, adjustment, and mental health.

References:

Feltham, Colin, ed. *Controversies in psychotherapy and counselling*. Sage, 1999.

Fullmer, Daniel W., and Harold Wright Bernard. *Counseling: Content and process*. Science Research Associates, 1964.

Geldard, Kathryn, David Geldard, and Rebecca Yin Foo. *Counselling children: A practical introduction*. Sage, 2013.

Harms, Ernest, and Paul Schreiber, eds. *Handbook of counseling techniques*. Pergamon Press, 1963.

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SEMESTER II

Course Title: COMMUNITY ORGANISATION AND SOCIAL ACTION

Semester No : II
Core Course : V
Course Code : CC-V

Introduction:
Community organisation as method of social work practice is seen as a means to facilitate communities towards self-directed change. It takes as its basis, the inequalities in society manifested through processes of marginalisation, discrimination or disempowerment of groups, which have resulted in the loss control over resources, be they tangible or intangible. The strategies of CO practice being addressed as part of the course covers a range of different ideologies, from those people initiated and those that are initiated by the elite. CO is seen as a means as well as an end, where collective process sustains the community's capacity to bring about change.

Objectives:

1. To understand the different aspects of a community, its functions, and problems
2. To understand the critical elements of community organisation process
3. To enhance the critical understanding of models and strategies for CO
4. To develop attitudes conducive to participatory activities for a civil society
5. To gain knowledge on the various techniques and skills of community organisation & social action and to develop the basic skills to apply for those in the community.

I. Community: meaning, types, and characteristics; community power structure minority groups; **community dynamics**: integrative and disintegrative processes in the community.
leadership: definitions, types and qualities; leadership in different types of communities, theories of leadership, symbols and rituals, apathy and prejudice and individual predisposition; community power structure and political organisations in the community; factions and sub-groups; minority groups.

II. Community Organisation: concept, definition, objectives, philosophy, approaches, principles and skills; community organisation as method of social work; community welfare councils and community chests; **models** of community organisation; **community participation**: concept, imperatives, types, constraints, methods and techniques; components of community work and community relation.

III. Methods of community organisation: Planning, education, communication, community participation, collective decision making, involvement of groups and organisations, resource mobilisation, community action, legislative and non-legislative promotion, co-ordination, community organisation as an approach to community development.

IV. Phases of community organisation: study, assessment, discussion, organisation, action, evaluation, modification, continuation and community study; **intervention strategies** in community settings: awareness building, organising, activating, people's participation, negotiating, lobbying, and resource mobilisation, resolving group conflicts, programme planning and service delivery, developing human resource, and monitoring and evaluation; a**pplication of community organisation** in different settings: rural, urban, tribal, and target groups: children, youth, women, aged; community organisation in emergencies like fire, flood, drought, famine, earthquake, and war; community organisation at local, state, and national level.

V. Social Action: Concept, objectives, principles, methods and techniques; social action as a method of social work; social action and social reform; scope of social action in India;

enforcement of social legislation through social action; **Approaches**: rights based approach and advocacy based approach; **Strategies**: preparation of carefully worded statement of policies, preparation of carefully analysis of pending legislations, individual consultation with key legislators on the implication of pending measures , persuasion of influential organisation to support or oppose pending legislation and creation of ad hoc citizens committee composed of people of great influence or prestige**; Radical Social Work**: meaning, techniques; role of Paulo Freire and Saul Alinsky Marx; Gandhi, Jayaprakash Narayan, and Vinoba Bhave; community organisation as a para-political process and role of social worker in community organisation and social action.

References:

Biklen, Douglas. *Community organizing: Theory and practice*. Prentice Hall, 1983.

Desai, Akshayakumar Ramanlal. "Peasant struggles in India." 1979.

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Ross, Murray. "G., 1955,“Community Organization: Theory and Principles.”.".

Siddiqui, H. Y. *Working with communities: An introduction to community work*. Hira, 1997.

Course Title: SOCIAL WORK RESEARCH AND SOCIAL STATISTICS

Semester No : II
Core Course : VI
Course Code : CC-VI

Introduction:
This course will equip learners to utilise and conduct research as service managers to improve services, evaluate and develop new services, to develop intervention methods, strategies, techniques, and also to be an active consumer of other research.

Objectives:

1. Develop an understanding of scientific approach to human enquiry in comparison to the native or common sense approach in various aspects and its process.
2. To understand major research strategies, meaning, scope, and importance of social work research.
3. To develop an ability to see the linkage between the practice, research, theory, and their role in enriching one another.
4. To develop attitudes favourable to the judicious integration practice, research and theory, and to develop skills for the use of library and documentation services for research.
5. To develop the ability to conceptualise, formulate, and conduct simple research projects (includes basic research skills such as conceptualisation of a research strategy and problem, writing a research proposal, developing tools for collecting data, use of sampling strategies, data collection methods, processing, presentation, analysis interpretation, writing research report, etc.).

I. Research, Types and Approaches:
Research: concept, objectives, characteristics, ethics, and qualities of good researcher; **social research**: meaning and objectives; **social work research**: meaning, scope, importance, limitations in social work research, and difference between social research and social work research; **scientific method**: meaning, characteristics, and process of scientific inquiry; relationship between theory method & fact; **types of research**: pure, applied, and action research; participatory and evaluation research; **research approaches**: qualitative research: meaning, scope, characteristics, strategies, sampling and design, types of qualitative research: ethnography, focus group discussion, life history and content analysis; use, limitations, and obstacles in qualitative research, **quantitative research**: meaning, type, difference between qualitative and quantitative research.

II. Problem Formulation:

Selection of problem: criteria and sources; surveying the field; **literature review** and developing the bibliography: purpose; using library and internet, library ethics, abstracting and plagiarism; **defining the problem**: need and significance of the problem; basic research questions: meaning and importance; research objectives; **theory:** meaning and use; inductive and deductive theory construction; **concepts, indicators, and variables:** meaning; types of variables; formal and operational definitions; **measurement:** meaning, levels of measurement ; nominal ordinal, interval, and ratio; **hypothesis**: meaning, sources, characteristics, functions and types; assumptions and limitations; attributes of a sound hypothesis; hypothesis testing; level of significance; critical region; Type-I and Type-II errors.

III. Design and Sampling:

Research design: meaning and types- exploratory, descriptive, diagnostic, experimental, and single subject research designs; **universe and sampling:** meaning, need, principles, types and techniques, and advantages and disadvantages; **tools/instrument:** steps involved in tool construction; validity and reliability: meaning and types; use of scales (developed by WHO/ILO, etc.), scaling procedures (thurston, likert, bogardus, and semantic differentials): interview guide, code book, pilot study, and pre-test; **sources of data**: primary and secondary data.

IV. Methods of data collection:

Methods: quantitative- interview- meaning and types; questioners: meaning and types; participatory and rapid appraisal techniques; **qualitative-** in-depth interview, observation and types and document review; mixed and multi method & triangulation; **data processing**; transcription, data processing; presentation of data: tabular and graphical presentation; **data analysis:** univariate, bivariate, and multivariate analysis; interpretation: meaning, techniques, and precautions; **report writing:** content and format; mechanics of writing research reports and precautions; research abstracts; **footnotes, referencing, and bibliography:** meaning and differences; methods of referencing; **preparation of research project proposal**; agencies involved in social work research.

V. Social Statistics

Statistics- meaning, use, and its limitations in social work research; **measures of central tendency**: arithmetic mean, median, and mode; **dispersion**: range, quartile deviation, standard deviation and co-efficient of variation; **tests of significance**: "t" test, f test and chi-square test; **correlation**: meaning, types, and uses; Karl Pearson's coefficient of correlation and rank correlation; **computer applications**: use and application of computer in social work research with special reference to excel, etc.

References:

Anderson, Jonathan, Millicent Eleanor Poole, and Berry H. Durston. *Thesis and assignment writing*. J. Wiley and Sons Australasia, 1970.

Baker, Therese L., and Allen J. Risley. "Doing social research." (1994).

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Slife, Brent D., and Richard N. Williams. *What's behind the research?: Discovering hidden assumptions in the behavioral sciences*. Sage publications, 1995.

Young, Pauline V. *Scientific social surveys and research*. No. 307.2 Y6 1966. 1966.

Course Title: HUMAN GROWTH AND PERSONALITY DEVELOPMENT

Semester No : II
Core Course : VII
Course Code : CC-VII

Introduction:

This course aims to introduce learners to the development of the individual across the life span with an ecological perspective. It also provides an them with an understanding human development and behaviour besides theoretical inputs.

Objectives:

1. Develop an overall understanding of the principles of growth, their relevance, and application to behaviour at various phases in life.
2. To understand the role of hereditary and environmental influences in growth and development.
3. To understand interactional nature of growth and behaviour at various stages in life: infancy, childhood, adolescence, youth, adulthood, and old age.
4. To develop sensitivity towards needs, developmental tasks, and health status along with the need for developmental programmes for the same.
5. To apply the information on growth, development and health in social work practice in general and individuals, groups, and communities in particular.

I. Psychology: definition, scope, application in various fields; introduction to schools of psychology; relevance of psychology for social workers.

II. Human growth and development: meaning, stages of development: pregnancy and child birth - infancy – babyhood-childhood-adolescent – adulthood – middle age – old age.

III. Learning: nature, definition and types; theories of Pavlov and Skinner; remembering and forgetting.

Motivation: concept of instinct: motives for survival – meaning and definition; types and characteristics of motives; hierarchy of motives; conscious and unconscious motivation.

Adjustment: concepts of adjustment and maladjustment; stress; frustration; conflict: nature and types;

Coping mechanisms: nature and types; mental health, and community mental health.

IV. Perception and attitudes: perception space, depth, auditory, and visual attention;
attitude: nature of attitudes, stereotypes, and prejudices, formation of attitudes, and attitude change.

Personality: definition and structure; theories of personality: trait and type theories; important concepts of the contributions of Freud, Jung, Adler, Maslow, and Ericson;

factors influencing personality development: heredity & environment; socialisation process.

V. Social Psychology and its applications: Collective behaviour: nature and reasons for collective behaviour, and manifestations of collective behaviour.

Psychological testing: personality, attitude, and intelligence.

References:

Anastasi, Anne. "Psychological testing ." (1968).

Bernard, Luther Lee. "An introduction to social psychology." (1926).

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Course Title: FIELD WORK PRACTICE

Semester No : II
Core Course : VIII
Course Code : CC - VIII

Concurrent field work is an ongoing learning practice and an opportunity to develop interventions skills in real life situations.

1. Concurrent field work - agency placement in generic setting of practice such as schools/old age homes/counselling centres/rehabilitation settings, etc. to initiate and participate in direct delivery
2. The placement will be for a minimum duration of 30 Field Work days for 2 days per week/semester.
3. Importance to be given for the practice of Social Work methods. Each student is expected to conduct case work with a minimum of 3 clients, group work with at least 2 groups, and organise one community based programme.

Norms for Evaluation

Evaluation: Internal	**: 40 marks**
1. Case Work Practice	- 10 marks
2. Group Work	- 10 marks
3. Community Programme	- 10 marks
4. Reporting	- 5 marks
5. Attendance for field work	- 5 marks
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	40 marks

External (60 marks)

1. Theoretical Knowledge	- 20 marks
2. Practice Skills	- 20 marks
3. Mobilising Resources	- 10 marks
4. Communication and Presentation	- 10 marks
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	60 marks

Course Title: HUMAN RESOURCES MANAGEMENT

Semester No : II
Elective Course : II
Course Code : EC II

Introduction: This course is aimed at enlightening the students on the management of human resources and related aspects.

Objectives:
1. To teach the students about management.
2. To enlighten the students on human resource management.
3. To inform the students about human resource functions.
4. To teach students about wage and salary administration.
5. To enlighten the students about industrial social work.

I. **Management:** Concept, elements, principles and functions of management; management thoughts: Henry Fayol, F.W.Taylor, and Peter Drucker.

II. **Human resource management:** Definition, scope, evolution, and functions. Human resource policy: Formulation and implementation; duties, responsibilities, and qualities of human resource manager and challenges for the 21st century.

III. **Human Resource functions:** Human resource planning, recruitment, selection, induction and placement, promotion, transfer, job analysis, training, performance appraisal; discipline and disciplinary procedure, personnel records and personnel research; HR audit.

IV. **Wage and salary administration:** job evaluation: definition, objectives; methods, advantages and limitation; wage and salary administration: nature and purpose, process of wage determination, wage structure and principles; theories of wages: concepts of wages, wage differentials – financial and non-financial incentives.

V. **Industrial social work:** meaning, scope, and relevance; application of social work methods in the industrial sector; labour problems and industrial counseling in industries and working with the families of industrial workers: meaning, scope, relevance, advantages and disadvantages.

References

1. Agarwal, Rameshwar Dayal, ed. *Dynamics of Personnel Management in India: a Book of Reading*. Tata McGraw-Hill, 1973.
2. Davar, Rustom S. *Personnel management and industrial relations in India*. International Book Distributors, 1976.
3. Flippo, Edwin B. *Principles of personnel management*. McGraw-Hill, 1976.
4. Fraser, John Munro. *Introduction to personnel management*. Nelson, 1971.
5. Indian Institute of Personnel Management. *Personnel Management in Indi.* Asia Publishing. 1977.
6. Mamoria C.B. *personnel management*. Himalaya Publishing House. 1985

Semester III

Course Title: SOCIAL WELFARE ADMINISTRATION, SOCIAL POLICIES, AND SOCIAL LEGISLATIONS

Semester No : III
Core Course : IX
Course Code : CC - IX

Introduction:
This course aims at helping the learner to understand management process and developing administrative skills and also to understand the learners to how policy is a link between constitutional principles and legislative actions and to understand the concept of social development.

Objectives:

1. To acquire knowledge of the basic process of registering, managing, and administrating welfare agencies in the context of social work profession.
2. To acquire skills to participate in management, administrative process, and programme delivery.
3. To develop the ability to see the relationship between policy and programmes and to analyse the process as applied in specific settings and specific programmes.
4. To gain knowledge on policy analysis and policy formulations and to study social policies, plans, legislations and programmes so as to be able to interpret, enforce, and challenge them.
5. To understand critically the concept and content/indicators of social development

I. Social Welfare Administration: meaning and definition of social welfare administration and social work administration; purpose, historical development; principles, functions, and areas (policy making, planning, personnel, supervision, office administration, budgeting, finance, fund raising, accounting, auditing, purchase and stock keeping, record maintenance, co-ordination, public relation, monitoring and evaluation, and research, annual report); social welfare administration at national, state, and local levels; CSWB (Central Social Welfare Board), state social welfare board, directorate of social welfare, and handicapped welfare.

II. Social Welfare Programme and Agencies: evaluation of social welfare in India; voluntary social work, social agencies: meaning, definition, type and models of NGO's; roles of NGO's in national development; governmental schemes on social welfare; agency registration: methods, advantages, preparation of byelaws, memorandum of association, rules, regulation, and registration procedures; registration of societies and trusts: governing board, committees. executives; qualities, functions, and role.

III. Social Policy: definition, need, evolution and constitutional base; sources and instrument of social policy, policies regarding Other Backward Castes (OBCs), Scheduled Castes (SCs), Scheduled Tribes (STs), and de-notified communities; policies and programmes for women, children, aged, and handicapped; development and implementation of programmes for weaker sections.

IV. Social Legislation: Definition, its roles as an instrument of social change, constitutional basis for social legislation: Fundamental Rights and Directive Principles of state Policy.

V. Laws Related to Marriage: Hindu, Muslim, Christian, and personal laws relating to marriage; divorce, minority, and guardianship; adoption, succession, and inheritance; legislation relating to social problems such as prostitution, juvenile delinquency, child labour, untouchability, physical, and mental disabilities.

Note: Emphasis must be given to the Salient features and effects of the various social legislations mentioned in the unit.

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Course Title: RURAL COMMUNITY DEVELOPMENT

Semester No : III
Specialisation Paper : I a
Core Course : X
Course Code : CC- X a

Course Objectives:

1. To enable students to understand rural realities.
2. To develop sensitivity and commitment for working with rural communities.
3. To impart knowledge about the governmental and voluntary efforts towards rural community development.
4. To equip students with specific skills and techniques of working with rural communities.

I. Rural Community: meaning, characteristics; types of villages; scope of studying the rural community and its relation to social work; **rural social structure** and constraints to rural development; **rural organisation and rural development** - school, co-operatives, village panchayat, youth club, women's club, self-help groups etc.; **rural problems**: poverty, illiteracy, unemployment, problems related to agriculture (land holding, productivity, marketing), and community health.

Community Development: meaning, objectives, scope, principles, process, models; methods; earlier experiments in rural developments - Sriniketan experiment, Gurgaon experiment, marthandam experiment, Baroda experiment, Firkha development scheme, Etawa pilot project, Nilokheri experiment, Gandhian constructive programmes; community development during post launching period: national extension services and various phases of cd; **rural extension**: concept, characteristics, philosophy, objectives, principles, approaches, and methods and limitations; **approaches to rural community developmen**t: Tagore, Gandhi and C. Subramaniam, etc.

II. Rural Development Administration: history, structure- central - state, district and block levels and functions, **panchayat raj institutions** (PRI): origin & evolution; philosophy, new panchayat raj system- 73rd amendment and its salient features, structure of PRIs; powers of Gram Sabha; features of Tamil Nadu Panchayat Act, 1994; constitution of village panchayats, panchayat union and district panchayat; elections to PRIs, reservation for women, SC/STs, administration of PRIs, taxes and levies; assigned and shared revenues, grants: government of India finance commission, state finance commission, development grants under various schemes; powers of PRIs in implementation of RCD programmes, **rural development agencies**: council for advancement of people's action and rural technology (CAPART), national institute of rural development (NIRD), national bank for agriculture and rural development (NABARD), regional rural banks (RRB), district rural development agency (DRDA); statistics related to rural development; training of PRI functionaries.

III. Social Development: definition, approaches and indicators; social development in India: historical and social context of development in India; pre and post independence period and government measures and five years plan in India; development sectors: agriculture, and cooperation, and education and health; **agriculture and rural development**: share of agriculture in the national income, agriculture as a source of livelihood, employment, raw materials, capital for development and manpower; agrarian and land reforms, green white and yellow revolution; **cooperatives and rural development**: meaning, principles, objectives, functions, structure, and performance of rural credit and non-credit cooperatives; registration procedures of cooperative societies; **education and rural development**: universalisation of primary education: problems;

adult education-meaning, history, strategies and programmes – social education, workers education, farmers training and functional literacy and non-formal education; national literacy mission; **health** and rural development.

IV Communication and Rural Development: meaning, scope, channels and stages of communication, methods communication: interpersonal communication, group communication and mass communication; skills of communication: questioning, reinforcing, listening, reflecting and exploring, theories and models of communication; transactional analysis and conflict resolution; barriers in communication; communication and its role in rural development, satellite instructional television experiments (site): aims and objectives; use of media in communication; mass media: exhibition, film, press, radio, TV and traditional local folk media: puppet shows, drama, street play, folk songs and folk dances; use of talks, meetings, conferences, camps; campaign; communication through leaflets, pamphlets, bulletins, circulars, posters and notice boards; **community participation**: meaning, elements, base, principles and obstacles in community participation; participatory communication – concept, and methods, use of communication for community participation; participatory communication for rural development.

V. **Rural Development Programmes**: **Area based Programmes-** drought prone area programme (DADP), hill area development programme (HADP), tribal area development programme (TADP), command area development programme (CADP), wasteland development programme, desert development programme (DDP), watershed development programme, intensive agriculture area programme (IAAP) and high yield variety programme (green revolution blue white and yellow revolution), hariyali , MP's area development programme; MLA's area development programme; etc.; **target based programmes**: IRDP, TRYSEM, NREP, RLEGP, JR, Indira Awaas Yozana, millions wells scheme, Swarna Jayanthi Grama Swarajgar Yojana (SJGSY), employment assurance scheme, new life, etc; employment guaranty legislation – its salient features- mahatma Gandhi national rural employment guarantee scheme. **welfare programmes**: minimum needs programme, noon meal scheme - development of women and children in rural areas (DWCRA) - integrated child development scheme (ICDS), Tamil Nadu integrated nutrition programme (TNINP), antyodaya programme, annapoorana scheme, programme of rural health and total sanitation; five year plans and strategies for rural development, and role of social workers, concept of provision of urban infrastructure in rural areas (PURA), role of voluntary organisation in rural community development, problems and limitations.

Note: while setting question paper, emphasis must be given only on the objectives, strategies, target (physical & financial) & achievements of various programmes mentioned in unit –v

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Weil, Marie. *Community practice: Conceptual models*. Vol. 3. No. 3-4. Psychology Press, 1996.

Course Title: COMMUNITY HEALTH

Semester No : III
Specialisation Paper : I b
Core Course : X
Course Code : CC-X b

Introduction: The purpose of this course is to inform the students about the various aspects concerning community health.

Objectives:

1. To inform the students about health and hygiene and related aspects.
2. To enlighten the students about diseases and occupational health.
3. To teach students about the health care delivery system.
4. To make the students aware about health education.
5. To inform students about health work in the community.

I. Health and Hygiene: Health, Primary Health Care and Public Health; Concepts and definition, factors influencing health; Social and Preventive Medicine, Levels of disease prevention, comprehensive health indicators – vital health statistics; Community Mental Health and Community Psychiatry. **Nutrition and Health:** Nutrient Groups: Functions, sources and requirement; Caloric requirements for different age groups; Balanced diet, Malnutrition, Deficiency diseases, prevention of Nutrition problems. **Hygiene:** Personal, food and Environmental hygiene; Relationship between health and hygiene; Environmental pollution; Living conditions: housing, sanitation, waste disposal and their influence on health.

II. Diseases and Occupational Health: Major Communicable diseases: Symptoms, Etiology, Transmission, Prevention and Treatment of : Leprosy, Tuberculosis, STD, HIV, Polio, Malaria, Cholera and Typhoid. Immunisation schedule for children. **Major Non-communicable diseases**: Cancer, Diabetes, Hypertension, Asthma, Cardiac disorders. **Occupational Health**: Occupational Health hazards, Common Occupational diseases.

III . Health care delivery system: Mental Hygiene movements, trends in Community Mental Health, Public health model of mental health prevention and promotion. **School Health**: Helping teachers identify problems of physical and mental health, making appropriate referrals, involving and motivating teachers and children; Involvement of Voluntary Agencies. **Health care delivery system** at the National and State levels, primary health centre, models of community health. **Salient features of legislations related to health:** MTP ACT (Amendment), 2002, Mental Health Act 1987, Factories Act 1949, ESI Act 1948; Allocation for Health care in IX Five Year Plan; Health Policies 2003

IV. Health Education: Meaning and importance, Principles of health education, Techniques and strategies for various community groups, Family Planning: Importance and Techniques; Use of Audio- Visual Aids and Mass Media; First Aid : Concept and methods of dealing with victims of accidents and health education in hospital and rural/slum/ tribal areas.

V. Health work in the community: Major health problems related to women and children; Socio-cultural practices, beliefs and myths influencing community health; Assessing community health needs, Mobilising core groups; community participation: Principles and practice of Community

Participation, Training of multi purpose workers in community health programmes **Social Work Intervention** in relation to: Immunisation, nutrition, family planning, maternal and child health, environmental issues (hygiene, pollution and sanitation), accident prevention, suicide prevention, alcoholism and drug abuse prevention.

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Course Title: **WOMEN AND CHILD WELFARE**
Semester No : III
Specialisation Paper : I c
Core Course : X
Course Code : CC-XI c

Introduction: The main purpose of the paper is to highlight the issue of women and child welfare including the laws that are in place to protect them.

Objectives:

1. To inform the students about the demographic profile of women in India.
2. To enlighten the students on women's welfare and development.
3. To teach students about the issues concerning children.
4. To make students aware about the problems of children.

I. Demographic profile of women in India: changing role and status of women in India; role differences of women in joint and nuclear families; position of women in tribal, rural and urban areas; status of women with reference to health, education, employment and political **problems of women**: gender bias, child marriage, dowry, widowhood, desertion, divorce, destitution, educational backwardness, discrimination in employment; problems of employed women and mothers; problems of unmarried mothers; delinquency, prostitution, trafficking in women and girls; theories on violence against women.

II. Women's welfare and Development: historical development of women welfare; indicators of women development; central and state government policy on women; government of India schemes for women's development; national commission for women, institutional and non-institutional services for women; **women and law**: legislations relating to women; legal and constitutional rights, marriage, divorce, and property rights; labour laws for women; family violence, family courts, **women empowerment:** meaning, characteristics of an empowered women; role of self help groups in women empowerment; feminism; women's movement abroad and in India, India's five year plans- policies, and strategies and programmes.

III. Child: meaning, demographic profile of children in India – rural & urban, its place in family and society; status of girl child; concept of socialisation; factors influencing socialisation; role of family in socialisation; parental socialisation during childhood and adolescence; role of peers in socialisation, role of school in socialisation; impact of television on children.

IV. Problems of Children: childhood diseases and immunisation; behaviour disorders of children; causes, consequences and prevention of child malnutrition, nutritional disorders, neglected children and abused children, child workers, child trafficking, child prostitution, HIV/AIDS affected and infected children; children with disabilities, school dropouts; school social work: concept, need, objectives, and functions.

V. Child Welfare in India:
U.N. charter of children rights; institutional services; constitutional safe guards; five year plans-policies; place of institutional care: scope and limitation, national and international institutions and its role in child welfare; child labour- policies, constitutional and legislative provisions and programmes at national and international level; **child welfare programmes**: non- institutional

care: organisation and functions of crèches, day care center, sponsorship programme, foster- care, adoption, recreation services; integrated child development schemes; services for children in need of special care; exceptional children neglected and abused children; child guidance services.

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Course Title: HUMAN RESOURCES DEVELOPMENT

Semester No : II
Specialisation Paper : I d
Core Course : X
Course Code : CC – X d

Introduction: The aim of this course is to ensure that the students gain an understanding of human resources development and its related aspects.

Objectives:

1. To introduce the students to the concept of human resource development and related aspects.
2. To teach students about performance appraisal.
3. To inform students about training and development as a part of human resource development.
4. To make students aware about the trends in human resource development.
5. To enlighten students on the concept of leadership.

I. Human Resources Development: HRD- concept , objectives, components, process, and mechanism for HRD, principles in designing HRD system; pre requisites for successful HRD programmes; human resource planning (HRP) : meaning, historical development, importance; subsystems and elements; process; HRD at different levels; areas of HRD; HR information system, demand and supply of human resources, HR planning in new and ongoing organisations; investment approach to HR planning, HR planning process; coordination with corporate and other plans.

II. Performance Appraisal: meaning, approaches to performance appraisal, methods / techniques of appraisal system, importance, purpose and limitation; potential appraisal: meaning, scope and importance, latest trends in potential appraisal; 360 performance appraisal; management by object; stress management and conflict at work place: meaning, causes and consequences, strategies for reduction of stress; conflict: meaning, types of conflict and management of conflict

III. Training and Development: meaning, need, importance, types: on the job and off the job training, training effectiveness, evaluation of training programme; **career planning and performance counseling**: meaning and steps involved; career development: steps importance and problems, succession planning; performance counselling: conditions for effective counseling, process involved.

IV. HRD Trends: job rotation, job enlargement, job enrichment. Quality of work life, total quality management (TQM) human resource information system: meaning and importance; ISO 9000 series, competency management meaning & importance; People capability, maturity, model – meaning and importance.

V. **Leadership:** concept, leadership and management-difference, styles, skills, teamwork, decision-making and steps; theories of leadership, motivation: concept, motivation skills and theories of motivation: drive theory, incentive theory, opponent process theory, optimal level theory.

References:

Bhatia, B. S., and G. S. Batra. *Human Resource Development*. Vol. 6. Deep and Deep Publications, 2001.

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Course Title:TRIBAL COMMUNITY DEVELOPMENT AND PROJECT MANAGEMENT

Semester No : III
Specialisation Paper : II a
Core Course : XI
Course Code : CC-XI a

Introduction: The aim of this course is to enable students to understand the problems of tribal people and also to gain an understanding of project management.

Course Objectives:

1. To enable students to understand the unique nature of tribal culture.
2. To develop sensitivity and commitment for working with tribal community.
3. To provide knowledge on the government and voluntary efforts towards tribal development.
4. To equip students with specific skills and techniques of working with tribal communities.

I. Tribes: definition, concept, characteristics of the tribal community; nomadic and de- notified tribes; history of Indian tribes and tribes in Tamil Nadu; regional distribution of tribes and Nehru's Panchsheel principles of tribes; social system of tribes: socio economic conditions; cultural and religious aspects; status of women: dress, food, & marriage-polygamy, polyandry, dormitory marriage; status of children; tribal leadership and political participation -local, state, and national levels.

II. Tribal Development Administration: administrative stricture at central, state, and district levels; hill development councils; functions of tribal development blocks/agencies; constitutional provisions for the protection of tribes; research and training in tribal development, role of voluntary agencies in tribal development.

III. Tribal Problems and Programmes: child marriage, poverty, ill-health, illiteracy, sexually transmitted diseases and acquired immune deficiency syndrome, exploitation and atrocities on tribes; immigration and its related problems; lack of infrastructure facilities and amenities; tribal resettlement and rehabilitation and its related problems; tribal movements and tribal revolt, naxalbari movement. tribal development programmes: tribal development policies, tribal area development programme; hill area development programmes; tribal sub-plans, forest land cultivation, need and importance of social work practice in tribal areas, application of social work methods in tribal development, problems in implementation of tribal development programmes.

IV. Introduction to project Management: concept, objectives, principles, scope, importance and methodology; micro and macro level planning; project dimensions: identification and formulation; detailed project report (DPR); project appraisal: technical, economic and financial feasibility; participatory development (participatory planning and participatory rural appraisal (PRA), participatory management and participatory evaluation).

V: Planning and Management of Project Implementation: activity planning, network analysis, monitoring of development projects: management information system, project evaluation: programme evaluation and review technique (PERT) and critical path method (CPM); resource mobilisation: techniques of fund raising; statutory requirements for the formation of society and trust; foreign contribution regulation act; special provisions related to income tax exemption for development organisations.

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Course Title: MEDICAL SOCIAL WORK

Semester No : III
Specialisation Paper - II b
Core Course : XI
Course Code : CC-XI b

Introduction: The aim of this course is to introduce the students to medical social work and to highlight its specific aspects.

Objectives:

1. To introduce the students to the concept of medical social work and related aspects.
2. To inform the students about the Psychological, Social and economic implications of illness and disability.
3. To enlighten the students about hospital as a formal organisation.
4. To make students aware of Impairment, Disability, and Handicap.
5. To highlight the specific needs and problems of patients and their families.

I. Medical social work: definition, concept, objectives, its nature, need and scope; the roles and functions of a medical social worker; historical development in India and abroad; medical sociology and its relevance to medical social work practice; practice of social work methods in hospital settings: their need and importance in working with patients and families: scope and limitations of practice.

II. Psychological, social and economic implications of illness and disability: for the patient and his family; concepts of patient as a person, patient as a whole, the psychosomatic approach; multidisciplinary team work: need, importance, and principles; role of social worker as a member of the team.

III. The hospital as a formal organisation: its goals, technology, structure and functions, departments, administrative procedures, implications of hospitalisation for the patient and his family; medical social work department: staffing, organisation and functions; extension services; public relations.

IV. Impairment, Disability and Handicap: causes, types and classification of physical handicaps: orthopedic disability, visual handicap, aural impairment and speech disability; psychosocial problems and implications for each specific handicap and role of the medical social worker in intervention; physical medicine, physiotherapy and occupational therapy: objectives and types; rehabilitation: definition, concept, principles, and process; role of the medical social worker in rehabilitation planning, resource mobilisation, and follow-up.

V. Specific needs and problems of patients and their families: need for assistance and role of the medical social worker in the following settings: outpatient unit, intensive care unit, pediatric ward, maternity ward, abortion clinic, family planning centre, std clinic, HIV clinic, orthopedic department, cardiology department, blood bank, TB sanatorium and cancer hospitals, training of the volunteers to work with the chronically ill in the community, and special focus on rural/tribal areas.

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Course Title: WELFARE OF THE YOUTH AND THE AGED

Semester No : IV
Specialisation Paper : III c
Core Course : XI
Course Code : CC-XI c

Introduction: The purpose of this course is to highlight the issue of welfare of the youth and aged.

Objectives:

1. To introduce the students to the concept of youth and youth as a special category.
2. To enlighten the students on the youth movement in India.
3. To inform students about youth welfare.
4. To talk teach students about the issues being faced by the aged.
5. To highlight the existing services for the aged.

I. Youth: concept, demographic profile in rural and urban; youth in Indian society: a historical over view of their role; process of socialisation of Indian youth; aspirations of the youth in contemporary Indian society; role of youth in social change and national development; **youth as special category**: basic needs of youth: problems of youth in relation to family life; social relation, education, recreation, leisure, recreation, employment, sex, marriage, political status, adjust mental problem of the youth.

II. Youth Movement in India: YMCA, YWCA, SFI, DYFI and other youth movements of various political parties in India, ideologies of youth movements and its role in nation building; youth unrest; need for youth policy in India; **youth work**: concept, objectives, approaches to youth work in tribal, rural and urban areas: training programmes.

III. Youth Welfare: definition and scope: philosophy and evolution of youth welfare programmes in India; services for student youth: education, physical education, sports, recreation; vocational guidance, youth services, bharath scouts and guides, national services scheme, community and social service scheme, national cadet corps, youth festivals and youth camp; student counselling; need, services, for non-student youth; non-formal education for school drop outs; nehru yuvak kendra, vishwa yuva kendra, youth welfare programmes under government and voluntary agencies; organization by and for youth, -youth policies, strategies and programmes in India's five year plans.

IV. Aged: definition, types, demographic profiles; aging population in rural and urban gerontology; theories of aging; dimension of aging; changing status of the aged in India society; problems of the aged- health, family, social relation and employment; perspective on the population of aging in India; retirement as a social and economic event; family, social, economic and religious life of retired people.

V. Services for the aged: geriatric services in India; social work and social services and the aged; family social work with the aged; social welfare services for the aged; old age social security measures in India and other countries; physical activity, rehabilitation and community linkage programme; gerentophenotime-an aging reversal agent; national and international agencies for aged welfare, policies, strategies and programmes for the elderly in India's five year plans.

References:

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Course Title: LABOUR WELFARE AND INDUSTRIAL RELATIONS

Semester No : III
Specialisation Paper : II d
Core Course : XI
Course Code : CC-XI d

COURSE OBJECTIVE:

To familiarise students with the concepts of industrial relations and the current industrial relations scenario in India.

Objectives:

1. To highlight the issue of labour welfare.
2. To inform students about the labour legislations in India.
3. To enlighten students about social security legislations.
4. To introduce students to the concept of industrial relations.
5. To highlight the issue of industrial conflict.

I. Labour welfare: an introduction on Indian constitution - unorganised labour sector in industry and agriculture - problems faced by unorganised labour sector - constitutional safeguards to unorganised labour - judicial activism (case laws); concept, scope, principles, theories, origin and growth of labour welfare in India; types of welfare; labour problems: absenteeism addiction, indebtedness, family distress and social work intervention; labour welfare programmes: safety, health and hygiene, occupational diseases, crèche, canteen, credit society, worker's education labour welfare officer: status, role, duties and functions; labour welfare agencies in India and international

II. Labour legislations in India: factories act 1948; the plantation labour act 1951; Indian mines act 1952, apprentices act 1961; labour relations legislations : the trade union act 1926, industrial disputes act 1947; Tamil Nadu shops and establishment act 1947, Tamil Nadu industrial establishment (national and festival holidays) act 1951; employment legislations: industrial disputes act 1947, the industrial employment (standing orders) act 1946, employment exchanges (compulsory notification of vacancies) act 1959, employment of children act 1938.

III . Social Security Legislations: workmen's compensation act 1923, employees' state insurance act 1948; employee's provident fund act 1952 including the pension scheme 1995; the maternity benefit act 1961, payment of gratuity act 1972; **wage legislations**: the payment of wages act 1936, the minimum wages act 1948, the payment of bonus act 1965, the equal remuneration act, 1976; the Tamil Nadu payment of subsistence allowance act and case laws.

IV. Industrial Relations: definition, meaning of industrial relations, characteristics of a good industrial relations system - changing profile of industrial workers – labour in constitution – administration of labour department. **ILO** – history, aims, objectives, structure and functions, social security measures, achievements, influence of ILO on Indian industrial relations - labour welfare practices in India; **trade unionism** – history, objectives, problems faced, recognition – trade union movement in India – employer federation, collective bargaining : methods, issues, problem and settlement.

V. Industrial Conflict: standing orders, industrial disputes, settlement machineries, industrial peace and harmony, industrial conflict types, causes, consequences, grievance, discipline, domestic enquiry – recent trends; **industrial democracy – workers participation**: objectives schemes, methods – participation schemes in industries in India - quality circles – quality of work life.

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Course Title: FIELD WORK PRACTICE

Semester No : III
Core Course : XII
Course Code : CC-XII

a. To be based on the student's specialisation
b. Agency placement for a minimum of 30 days for two to three days per week/semester
c. Content of Field work to be finalised between the concerned department and the placement agency according to the field of specialisation.

Guidelines for Community Development Specialisation

1. Exposure to DRDA/Panchayat Union and Panchayat administration
2. Orientation to community based surveys/PRA
3. Organise at least two need based community programmes
4. Practice of Social Work methods in Community Settings (Rural/Tribal areas)
5. Knowledge of CD programmes.

Guidelines for Medical and Psychiatric Social Work Specialisation

1. Practice of Social Case Work with at least five clients
2. Practice of Social Group Work with at least two groups
3. One Community based programme.

Guidelines for F & C Welfare Specialisation

1. Exposure to family and child welfare programmes
2. Practice of social work methods – practice of social case work with at least five clients
3. Practice of social group work with at least two groups
4. One community based programme.

Guidelines for HRM Specialisation

1. Exposure to welfare measures and programmes in industries.
2. Orientation to IR activities/Trade Union
3. Understanding of Organisation profile/Organisational Culture
4. Knowledge of labour legislations.

1. Agency placement in generic settings of practice such as schools/old age homes/counselling centres/rehabilitation settings etc.
2. The placement will be for a minimum duration of 30 field work days for two days per week/semester.
3. Importance to be given for the practice of social work methods. Each student is expected to conduct case work with a minimum of three clients, group work with at least two groups, and organise one institutional/ community based programme (trainees of all specialisations).

Evaluation: Internal : 40 marks

1. Case Work Practice - 10 marks
2. Group Work - 10 marks
3. Awareness Programme - 10 marks
4. Reporting - 5 marks
5. Attendance for field work - 5 marks

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40 marks

External (60 marks)

1. Theoretical Knowledge	- 20 marks
2. Practice Skills	- 20 marks
3. Mobilising Resources	- 10 marks
4. Communication and Presentation	- 10 marks

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60 marks

Course Title: CORPORATE SOCIAL RESPONSIBILITY

Semester No : III
Elective Course : III
Course Code : EC-III

Introduction: The aim of this course is to introduce the students to the concept of corporate social responsibility and its related aspects.

Course objectives

1. To understand the scope and complexity of corporate social responsibility (CSR).
2. To gain knowledge on the impact of CSR implementation on corporate culture, particularly as it relates to social issues
3. To acquire skills to frame CSR policies and practices appropriate to the Indian workplace

I: Social Responsibility: corporate social responsibility – meaning, definition and scope of CSR – evolution of CSR – CSR, sustainability, public private partnerships, corporations' role in climate change, supply chain responsibility, stakeholder engagement, cause and social marketing, environmental responsibility, socially responsible investing, sustainability reporting, transparency and human rights; CSR as economic development and CSR in cultural context.

II: Stakeholders and Perspectives - interest groups related to CSR – tools of CSR – business benefits of CSR.

III: Designing a CSR policy – factors influencing CSR policy – managing CSR in an organisation – role of hr professionals in CSR – global recognitions of CSR- ISO 14000 - SA 8000 - AA 1000 - codes formulated by UN global compact – UNDP, global reporting initiative.

IV: Implementing CSR – CSR in the marketplace – CSR in the workplace – CSR in the community – CSR in the ecological environment – case studies: lifebuoy soaps' swasthya chetna, itc's e-choupal venture, titan industries limited, TATA power; tools for communicating CSR (skill building): social media, films and reports and developing strategic partnerships

V: CSR in India: an overview of CSR rules under companies Act, 2013
legal provisions and specifications on CSR – TCCI (TATA council for community initiatives), TATA model on CSR – national CSR hub, TISS Mumbai – success
and failure with CSR initiatives – CSR awards in India – role of social workers in CSR

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Semester IV

Course Title: URBAN COMMUNITY DEVELOPMENT

Semester No : IV
Specialisation Paper : III a
Core Course : XIII
Course Code : CC-XIII a

Introduction: The aim of this course is to enable students to grasp the various issues concerning urban community development.

Course Objectives:

1. To enable students to understand the unique nature of urban community.
2. To develop sensitivity and communication for working with urban poor.
3. To provide knowledge on the government and voluntary efforts towards urban development.
4. To equip students with specific skills and the techniques of working with urban communities.

I. Urban Community: meaning, characteristics, rural urban linkages and contrast; city - meaning, classification, trends in urbanisation process.

II. Urbanisation & Urbanism: meaning, theories of urbanisation, characteristics of urbanism, slums – definition, approaches, theories and classification and culture of slums; urban problems: housing, drug addiction, juvenile delinquency, prostitution, and pollution.

III. Urban Community Development: definition, concept, objectives and historical background; approaches, principles process and methods of urban community development, welfare extension projects of central social welfare board, urban development planning: legislation related to urban development: urban land ceiling act, town and country planning act, nagarpalika act and Tamil Nadu slum clearance and improvement act) community planning, and community participation.

IV. Urban Development Administration: national, state and local levels; structure and functions of urban development agencies: urban services and urban deficiencies; metropolitan development authorities, Housing and Urban Development Corporation (HUDCO) and United Nations Centre for Human Settlement (UNCHS); housing board, role of voluntary agencies in urban development.

V. Urban Development Programmes: five year plans and urban development; Madras Urban Development Projects (MUDP) I & II; Tamil Nadu Urban Development project (TNUDP); Urban Basic Services Programmes (UBSP), Nehru Rozgar Yojana (NRY), etc. Tamil Nadu Slum Area (clearance and improvement) Act 1971, and problems in implementation of urban community development programmes; role of development worker – application of social work methods in urban development.

References:

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Course Title: PSYCHIATRIC SOCIAL WORK
Semester No : IV
Specialisation paper : III b
Core Course : XIII
Course Code : CC XIII b

Introduction: The purpose of this course is to introduce the students to the concept of psychiatric social work and various other issues covered under it.

Objectives:

1. To introduce the students to the concept of psychiatric social work**.**
2. To highlight the historical development of psychiatric social work.
3. To make students aware about psychiatric illnesses.
4. To throw light on therapeutic intervention in psychiatric illness.
5. To inform students about the scope of psychiatric social work practice.

I. Psychiatric Social Work: definition and concept, historical development in India and abroad; current status as a field of specialisation.; case work, group work, and community organisation in the psychiatric services; limitations and difficulties faced in psychiatric social work practice; psychiatric epidemiologist in India.

II. Historical development of Psychiatry as a Field of Specialisation: attitudes and beliefs pertaining to mental illness in ancient, medieval and modern times; concepts of normality, abnormality and mental health; classification of mental illness: diagnostic statistical Manual (DSM) iii-R ; international classification of diseases (ICD); psychiatric assessment: interviewing, case history taking; sources of intake, mental status examination; formulation of psychosocial diagnosis.

III. Psychiatric Illness: neuroses, psychoses, organic and functional, culture bound syndromes, personality disorders, sexual deviations, alcoholism and drug dependence; mental handicap: definition, classification, clinical types and causes, cerebral palsy: clinical types, causes, associated disabilities; epilepsy: definition, types, causes, management; ageing: biological, social and psychological problems; suicide: causes, indications, prevention; childhood disorders: behaviour disorders; eating, elimination, sleep and speech disorders; childhood psychoses: autism, schizophrenia; scholastic backwardness: symptoms, causes and management; attention deficit disorders.

IV. Therapeutic Intervention in Psychiatric Illness: psycho education, cognitive therapy, group psychotherapy, family therapy, marital therapy: scope and types; behaviour therapy: principles and techniques, ECT, chemotherapy, psychosurgery and mega vitamin therapy; occupational therapy (purpose and concept).

V. Scope of Psychiatric Social Work practice: roles and functions of a psychiatric social worker with regards to the problems of patients and their families in:
1) psychiatric OPD'S 2) psychiatric specialty clinics 3) de-addiction centres, 4) child guidance clinics; rehabilitation of psychiatric patients: role of the social worker in rehabilitation - planning, mobilisation, reintegration of the patient in the family and community; principles and models of psychiatric rehabilitation; role of the psychiatric social worker in team work. concepts of : therapeutic community, partial hospitalisation, day care centers, half way homes, sheltered workshop and transitory homes; national mental health programme; district mental health programme.

References:

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Course Title: DEMOGRAPHY AND FAMILY WELFARE

Semester No : IV
Specialisation Paper : III c
Core Course : XIII
Course Code : CC-XIII c

Introduction:

This course is to promote understanding of the changing norms of the social system and development opportunities throughout its cycle. It also aims to develop skills in identifying scope for reform and positive awareness for need of healthy family unit.

Objectives:

1. Understand the changing norms of the institution of family and variations in them with reference to the family social ecology.

2. Understand the dynamics of family interactions and developmental tasks through the family life span.

3. Develop positive attitude to support understanding the need of a healthy family unit.

4. Understand the demographic aspects of family in India. Family planning, family size preference and various approaches to family welfare planning.

I. Family and Marriage: origin and evolution of family and marriage; ideology of family rights and responsibilities,; normative family and marriage functions; social change and changes in family and marriage functions; implications for the family and its members; dual earners families, single parent families, female headed households, childless families; family interactions; family development and family life cycle; family assessment: methods and its implications.

II. Demographic aspects of the family in India; social in equalities and fertility behaviour, trends of population growth; factors affecting population growth; consequences of population explosion; sources of demographic data, vital statistics: population structures and projection; theories of population.

III. **Family Planning**: scope, concept of eligible couple and child protection rate; importance of population control; family welfare planning and five years plans; objectives, targets and achievements, population policy, population education and sex education; physiology of reproduction: reproductive anatomy and physiology, menarche and menopause, fecundity, fertility, treatment of infertility; adoption.

IV. Family Size preference and contraceptive behaviour- methods of contraception: conventional and modern methods- male and female; temporary methods; behavioural methods; mechanical contraceptives; chemical contraceptive; semi-permanent methods: abortion and I.U.C.D; permanent methods: vasectomy and tubectomy, advantages and disadvantages, medical termination of pregnancy act.

V. Approaches to family welfare planning: welfare approach, clinical, extension and educational approach and cafeteria approach; training and research in family welfare planning; mass media of

communication; national and international agencies of family welfare planning services; social work techniques in promoting parenthood.

References:

Agarwala, S.N., India's Population Problem, Tata Mc Graw Hill, Bombay.

Chandrasekaran, C.S, Population and Planned Parenthood, George Allen & Unwin, London.

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Course Title: ORGANISATIONAL BEHAVIOUR

Semester No : IV
Spceialisation Paper : III d
Core Course : XIII
Course Code : CC XIII d

Introduction:

Organisational behaviour focuses on developing an understanding of the individual and group level factors that influence employee attitudes and behavior at work.

Objectives:

1. To know themselves and be able to recognise individual differences in others.
2. To understand OB theories that influence individual and group behaviour – perception, attitude formation, motivation, role theory etc.
3. To understand how to form effective work teams.
4. To understand how to change individual's attitude and motivation.
5. To understand how to build effective team leadership.

I. Focus and Purpose of OB : definition, need and importance of organisational behaviour nature and scope – framework – organisational behavior – models; **individual behaviour**: personality – types – factors influencing personality – theories; learning: learning process – learning theories – organisational behaviour modification; attitude: characteristics – components – formation; perception: importance – factors influencing perception; motivation – importance – types – effects on work behavior.

II. Group Behaviour: organisation structure – formation – groups in organisations – influence – group dynamics – emergence of informal leaders and working norms – group decision making techniques – interpersonal relations – communication – control – Hawthorne studies; **leadership and power** – meaning – importance – leadership styles – theories – leaders vs. managers – source of power – power centers – power and politics.

III. Dynamics of Organisational Behaviour: concept of organisational culture and climate – factors affecting organisational climate; job satisfaction – determinants – measurements; organisational change – importance – change process – resistance to change – managing change; organisational effectiveness – perspective and application of transactional analysis.

IV. Organisational Dynamics: leadership; process, styles, types and theories; Fiedler's contingency model, managerial grid, Redding's groups in organisation: nature, cohesiveness, performance, norms and work design for group (power, status, authority) and group dynamics; human engineering - man, machine system, human factors engineering and its applications: structural design, job design and work design, Hawthorne experiments; employee counselling; Japanese style of management and its applicability.

V. Organisational Development: concept, characteristics – objectives process/phases, theory and practice, interventions: quality circles; organizational change: process, resistance to change, planning and implementation & theories of change.

Reference:

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Robbins, Stephen P., Organizational *behavior: Concepts, controversies, and applications*. New Jersey, Prentice Hall, 1991.

Edgar, Schein., Organisational Psychology, Englewood Cliffs New Jersey, Prentice Hall, 1970.

Course Title: **FIELD WORK PRACTICE**
Semester No : IV
Core course : XIV
Course Code : CC-XIV

Objectives:

a. To be based on the student's specialisation
b. Agency placement for a minimum of 30 days for two to three days per week/semester
c. Content of Field work to be finalised between the concerned department and the placement agency according to the field of specialisation.

General Guidelines for Community Development

1. Exposure to DRDA/Panchayat Union and Panchayat administration
2. Orientation to community based surveys/PRA
3. Organise one need based community programme
4. Practice of Social Work methods in Community Settings (Rural/Urban Slum/Tribal areas)
5. Knowledge of CD programmes.

General Guidelines for Medical and Psychiatric Social Work Students

1. Practice of Social Case Work with at least five clients
2. Practice of Social Group Work with at least two groups
3. One Community based programme.

General Guidelines for F & C Welfare Specialisation

1. Exposure to family and child welfare programmes
2. Practice of social work methods – practice of social case work with at least five clients
3. Practice of social group work with at least two groups
4. One community based programme.

General Guidelines for HRM Students

1. Exposure to welfare measures and programmes in industries.
2. Orientation to IR activities/Trade Union
3. Understanding of Organisation profile/Organisational Culture
4. Knowledge of labour legislations.

Evaluation (Concurrent Field Work for Semester IV)

Internal Evaluation – 40 marks

1. Practice of Social Work Methods	- 10 marks
2. Contribution to the Agency	- 10 marks
3. Understanding the Agency and its Functional services	- 10 marks
4. Attendance	- 5 marks
5. Reporting	- 5 marks
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	40 marks

External Evaluation – 60 marks

1. Understanding of the agency and its services	- 15 marks
2. Theoretical Knowledge	- 15 marks
3. Practice Skills	- 20 marks
4. Communication & Presentation	- 10 marks
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	60 marks

Course Title: DISASTER MANAGEMENT
Semester **:** IV
Elective Course : IV
Course Code **:** EC-IV

Introduction:
Disaster management is a process of pre disaster prevention, preparedness, education, and preparedness. It is important for Social Workers to learn this as they are involved in providing psychological assistance to survivors.

Course Objectives:

a. To understand ecosystem equilibrium and disequilibrium
b. To develop skills to analyse factors contributing disaster
c. To develop an understanding of the process disaster of disaster
d. To develop skills to participate in disaster management
e. To develop an understanding of the social worker's role in the team for disaster management.

I. Disaster & Types:
a. Disaster: definition, dimensions of disaster, progress in vulnerability.

b. Types of disaster: *Water and climate related:* Floods and drainage management, droughts, cyclones, tsunami, tornadoes, hurricane, hailstorms, cloudburst, snow avalanches, heat and cold waves, thunder and lightening.
Geological related: Earthquakes, landslides, mudflows, sea erosion, dam bursts and dam failures, mine fires.
Chemical, industrial and nuclear related: road, rail transportation accidents including waterways – boat capsize, mine flooding, major building collapse, serial bomb blasts, festival related disasters, electrical disasters, fires, forest fires, mine flooding, oil spills, village fires.; *biological related:* biological disasters, epidemics, cattle and bird epidemics, pest attacks, food poisoning.

II. Phases:
a Phases of disaster (rescue, relief, rehabilitation, rebuilding). Rescue, relief phase: Need assessment, rescue and relief provisions by Army, Police, Fire services, Panchayat Raj institutions. Psychological first aid, health camps, relief center, water and sanitation issues, epidemic breakages in camps, climatic changes and seasonal variations; humanitarian concerns in relief provision; management of relief experts, volunteers, materials, equipment; standard operation procedure to deal with trigger mechanism.

b. Crisis and emergency management: government response system in disasters – central, state, district, taluk disaster management cell; trigger mechanisms – l1, l2, l3 levels of determination of disaster; BIRMS – Basic Initial Response Management Steps.

c. Communication systems during disasters: HAM (help all mankind) radio promotions, police wireless network, SMS, mobile services, satellite communications; warning systems in disasters.

IV. Impact of disaster:

a. Impact :
Physical, social, economic, and psychological impact of disasters.
mpact on the individual, family, and community.

b. Compensation:
Compensation and legal issues among the disaster survivors.
Assessment of damage.
Providing compensation.
Corruption in compensation.

c. Housing support.
Housing and materialistic support for the disaster survivors.
Town planning after a major disaster.
Maintaining minimum standard

d. Livelihood and community micro planning:
Impact of disaster on livelihood and economic activities.
Livelihood options for the vulnerable groups
Creating self-sustenance among the disaster survivors.

IV. **Issues in disaster**:
a. Gender issues in disaster: Special needs of the women, increased vulnerability, problems of the women and care provisions; special issues of the women in human made disaster; role of the women organisations and government; special needs of the men groups and vulnerable men. working with PRI for Psychosocial care of the men.

b. Children in disaster:
Special needs of the children, adolescents and the vulnerable groups; role of child care personnel for the children affected by disaster. (Teachers/ICDS); empowering caregivers after the disaster; methods of working with children affected by disaster; community care vs. institutional care after the disaster for the vulnerable/ destitute children; foster caring of the destitute children after the disaster.

c.Disaster mental health and psychosocial care:
Psychological impact of disaster in different phase ;behavioural disorders subsequent to disasters including PTSD; methods of providing psychosocial care to the disaster survivors; principles of psychosocial care; techniques of providing psychosocial care; normalization model; needs of the special groups in disaster and psychosocial care.

d. Capacity building:
Capacity building: of governmental, non governmental, community based organizations, and the local community, spectrum of care, inter sectoral and coordinated care provision between organisations, disaster preparedness, disaster sub-culture, disaster resilience role of social workers in disaster services.

b. Policies and role of government sectors: role of state, central government, UN agencies, international organisations and NGOs, in disaster management services, India disaster management plan, quality assurance in disaster management – sphere, national health policy on disaster management, disaster survivors and human rights

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Course Title: **BLOCK PLACEMENT (Internship)**

IV Semester
Elective Course - V
Course Code No: EC-V

Introduction:
This time is to be designed for the learner to integrate theory and practice to enhance competencies of social work practice and experience self in that role.

The internship must be for a minimum of one month in an organisation related to the candidate's specialisation.

Objectives:

a. Develop enhanced practice skill and integrate learning.
b. Develop greater understanding of reality situations through involvement in day to day work.
c. Develop appreciation of other's efforts and develop sensitivity to gaps in the programme.
d. Enhance awareness of self in the role of a professional social worker.

Evaluation:
40 marks - Internal
30 marks - Agency Evaluation
30 marks - Viva-Voce by External Examiner

(**Note:** Common viva-vice for concurrent field work and Block placement at the end of IV semester with 30 marks)

Course Title: **RESEARCH PROJECT WORK**
IV Semester
Course Code: RPW

A learner should prepare and submit dissertation, under the guidance of a faculty The learner is to engage meaningfully in the process of problem formulation, review of literature related to the study, preparing the research proposal, choosing an appropriate research strategy and developing instruments of data collection, collecting the data, processing, analysing and interpreting the data and preparing the research report.

The length of the research report may be between 60-75 pages and not exceeding 100 pages

Assessment
Evaluation
Viva Voce

1. PROJECT REPORT EVALUATION (Both Internal & External)

	I. Plan of the Project	- 20 marks
	II. Execution of the Plan/collection of Data / Organisation of Materials / Hypothesis, Testing etc and presentation of the report.	- 45 marks
	III. Individual initiative	- 15 marks
2. Viva-Voce / Internal& External		- 20 marks
TOTAL		**- 100 marks**

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI 620 024
Course Structure under CBCS for Master of Social Work (MSW)
(Applicable to the candidates admitted from the academic year 2016 – 2017 onwards)
SEMESTER PATTERN - REGULATIONS for affiliated colleges

1. Name of the course:
Bharathidasan University under choice based credit system (CBCS) is offering a two year MSW (Master of Social Work) degree course (Semester Pattern) in Social Work to be conducted in the University Department of Social Work with provision for a research project in the second year. The term credit is used to describe the quantum of syllabus for various programmes in terms of hours of study. Core and elective courses are a set of compulsory courses required for each programme. The minimum credit requirement for a two-year master's programme is 90

2. Eligibility for Admission:
A person who has passed any degree of this University or an examination of any other University accepted by the Bharathidasan University as equivalent thereto shall be eligible.

3. Selection procedure:
The selection of candidates will be made based on the marks obtained from the qualifying examinations.

4. Duration of the course:
The course for the degree of Master of Social Work shall consist of four semesters, two in the first year and two in the second year.

5. Semester Examination:
For the purpose of these regulations, the academic year shall be divided into two semesters, the first being from 1st July to 31st December and the second from 1st January to 30th June. Candidates who have failed in the University examination of any subject or subjects for the first, second, and third semesters will be permitted, to appear in each failed subject(s) in April/May and November/December.

A candidate should get registered for the first semester examination. He/she shall register for the subsequent semester examinations only after registering for the previous semester examinations.

6. Course features: The programme consists of core courses (CC) and elective courses (EC), distributed among the four semester periods. The courses include concurrent fieldwork practice, block placement, and research thesis work.

7. Field Work:
a) Field Work requirements include:
1. 100 % field work attendance
2. Appropriate code of conduct
3. Fulfilling the workload norms as prescribed by the department
4. Regular and timely submission of field work reports
5. Regular attendance of the field work Conference

b) Field work methodology:
Theory classes and field work are arranged on a concurrent basis. On concurrent field work days, there will be no classroom lectures and on such days students will report to the field work agencies. Field work may commence with orientation visits to selected welfare agencies followed by placement of students in field work agencies. The agencies selected for the field work programme should have a well defined practice training programme, willingness to give facilities

for the training of students, and a policy of maintaining high standards of service through application of the methods of Social Work.

c) Block field work (internship):
The block field work training is a mandatory requirement of a master degree in Social Work. After the fourth semester examinations, the students shall undergo a minimum of one month on the job training in an agency with respect to the field of specialisation of the students, with the approval of the department.

8. Research project work:
Every candidate shall be required to complete a research project on a topic related to his/her field of specialisation. Candidates shall select the topic of the research in consultation with the faculty supervisor. Each candidate shall submit one copy of his/her research project report in the prescribed format by the first week of March during the fourth semester.

9. Evaluation:

S.N	Components	Internal (CIA)		External (UE)		Total	
		Passing Minimum	Maximum	Passing Minimum	Maximum	Passing Minimum	Maximum
1	Theory	10	25	30	75	50	100
2	Practical/ Field Work	16	40	24	60	50	100
3	Research Project Work	**Dissertation** = 80 marks (passing min. 32 marks) **Viva** = 20 marks (passing min. 08 marks)				50	100

Separate passing minimum is prescribed for Internal **(CIA)** and External **(UE)**

The passing minimum for Internal (CIA) shall be 40 % out of 25 marks (i.e.10 marks)
The passing minimum for External (UE) shall be 40 % out of 75 marks (i.e. 30 marks)
The passing minimum for Internal Field Work (CIA) shall be 40 % out of 40 marks (i.e.16 marks)
The passing minimum for External Field Work (UE) shall be 40 % out of 60 marks (i.e. 24 marks)
The passing minimum for Dissertation valuation shall be 40% out of 80 marks (i.e. 32 marks)
The passing minimum for project viva shall be 40% out of 20 marks (i.e. 08 marks)

The total passing minimum of each course in MSW shall be 50% out of a total 100 marks (i.e. 50 marks)

10. SCHEME OF EXAMINATION

Note:

No. of Core Courses	: 14	4 courses x 4 credits	= 16
		10 courses x 5 credits	= 50
No. of Elective Courses	: 5	5 courses x 4 credits	= 20
Project Work	: 1	1 course x 4 credits	= 04
		Total Credits	**= 90**

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024
M.Com (Bank Management) Course Structure under CBCS
(For the candidate admitted from the academic year **2016-2017** onwards)
(Updated on 12.6.2017)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Indian Banking System	6	4	3	25	75	100
	Core Course – II (CC)	E - Banking	6	4	3	25	75	100
	Core Course – III (CC)	Advanced Financial Accounting	6	4	3	25	75	100
	Core Course – IV (CC)	Business Law	6	4	3	25	75	100
	Elective Course– I (EC)	a) Insurance Management (or) b) Services Marketing	6	4	3	25	75	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Banking Theory Law & Practice	6	5	3	25	75	100
	Core Course – VI (CC)	Quantitative Techniques for Bank Managers	6	5	3	25	75	100
	Core Course – VII (CC)	Fundamentals of Information Technology (Theory & Practical)	6	5	3	25	75	100
	Core Course – VIII (CC)	Management Accounting For Bank Managers	6	5	3	25	75	100
	Elective Course–II (EC)	a) E – Commerce (or) b) Organisational Behaviour	6	4	3	25	75	100
		TOTAL	**30**	**24**				**500**

III	Core Course – IX (CC)	Advanced Corporate Accounting	6	5	3	25	75	100
	Core Course – X (CC)	Research Methodology	6	5	3	25	75	100
	Core Course – XI (CC)	Marketing for Banking services	6	5	3	25	75	100
	Core Course – XII (CC)	Security Analysis and Portfolio Management	6	5	3	25	75	100
	Elective Course – III (EC)	a) Bank Audit (or) b) Foreign Exchange Management	6	4	3	25	75	100
	TOTAL		**30**	**24**				**500**
IV	Core Course – XIII (CC)	Merchant Banking and Financial Services	5	5	3	25	75	100
	Core Course – XIV (CC)	Advanced Financial Management	5	5	3	25	75	100
	Elective Course - IV (EC)	a) Banking for Economic Development (or) b) Global Banking System	5	4	3	25	75	100
	Elective Course - V (EC)	a) International Finance (or) b) Human Resource Management	5	4	3	25	75	100
	Core Course – XV (CC)	Project Work Viva voce (20 marks) Dissertation (80 marks)	10	4	---	---	---	100
		TOTAL	**30**	**22**				**500**
		GRAND TOTAL	**120**	**90**				**2000**

Note:

Project :100 Marks

Dissertation : 80 Marks **Passing Minimum 40 Marks**

Viva Voice : 20 Marks **Passing Minimum 10 Marks**

Core Papers - 14

Elective Papers - 5

Project - 1

Note:

1. Theory Internal 25 marks External 75 marks
2. Separate Passing Minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)

b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)

c) The Passing minimum not less than 50% in the aggregate

CORE COURSE – I

INDIAN BANKING SYSTEM

Objective : To make the students familiar with the various banking concepts.

UNIT I

Banking – evolution – traditional functions – Banking concepts – Commercial banks ; Central banks; investment banks and recent developments – merchant banking; leasing ; mutual funds.

UNIT II

Banking system – Branch banking – Unit banking – Universal banking – co-operative banking – structure – objectives – functions, difference between commercial banking and co-operative banks.

UNIT III

Commercial banking – functions – credit creation mechanism – limitations – portfolio management – Balance sheet structure and analysis – priority sector banking pressures and problems

UNIT IV

Financing of trade – domestic and foreign – loans and advances – type – secured and unsecured – securities - documentation – procedures syndicated advance – participation – project financing.

UNIT V

Banking Nationalization – objectives – experience – case for and against privatization – recent developments – role of commercial banks in developing economies.

Text and Reference Books (Latest revised edition only)

1. Sundaram and Varshney, "**Banking Theory, Law & Practice"** Sultan Chand Company, New Delhi
2. S.M. Sundaram"**Banking Theory, Law & Practice"** Sri Meenaksi Publications, Karaikudi
3. M.Kumar, Srinivasa, "**Banking Theory, Law & Practice"** New Central Book Agency
4. **Tannan's"Banking Law & Practice in India"**M.S. Ramasamy, Sultan Chand Company, New Delhi.
5. Prem Kumar Srivastsav, Banking Theory and Practice.
6. M.C. Vaish, Money, Banking and International Trade.
7. M.L. Seth, Banking Theory
8. R.S. Sayers, Modern Banking
9. Frederick A. Bradford, Money and Banking.

CORE COURSE – II

E-BANKING

Objective: To make the students to understand the e-banking transactions.

UNIT I

Networking of computers – Types – LAN – WAN – Internet and Intra net – E-mail .net banking services.

UNIT II

Electronic payment system : Automatic teller machine merits and demerits – installation and security aspects of ATM, MICR equipment – precautions in handling MICR instrument – benefits and limitations.

UNIT III

e-cash : features – benefits of e-cash – limitations of electronic data interchange – electronic fund transfer credit card – debit card – payment through bank network – payment by smart card – electronic pass book – home banking.

UNIT IV

Electronic clearing services – SWIFT – types of message in SWIFT (society for worldwide interbank financial telecommunication) – message format in SWIFT – bank information code – message flow in SWIFT system – advantages and structure of SWIFT.

UNIT V

E-Banking challenges and opportunities – services offered through e-banking – strengths of e-banking – weakness of e-banking – opportunities –threats of e-banking.

Text and Reference Books (Latest revised edition only)

1. R.V. Kulkarni ,Knowledge based system in banking sector.
2. R.S. Viramani, Computer Application in Business and, Commerce and Banking .
3. R.Parameswaran,Computer Application in Business.

CORE COURSE – III

ADVANCED FINANCIAL ACCOUNTING

Objective: To make the students to understand the Corporate accounts.

(Theory & Problem)

UNIT I:

Valuation of Goodwill – Factors affecting value of Goodwill – Methods of Valuing Goodwill – Valuation of Shares – Methods of Valuation of Equity Shares.

UNIT II:

Amalgamation, Absorption and External Reconstruction of Companies – Purchase consideration – Accounting treatment – Books of Purchasing Company – Books of Vendor Company – Alteration of Share Capital and Internal Reconstruction –Scheme of Capital Reduction

UNIT III:

Holding Company Accounts – Banking Company Accounts – Insurance Company Accounts.

UNIT IV:

Double Account System – Main Features – Final Accounts – Revenue Account – Net Revenue Account – Capital Account – General Balance Sheet – Investment Accounts.

UNIT V:

International Financial Reporting Standards – Indian Accounting Standards – Human Resource Accounting – Inflation Accounting - Social Responsibility Accounting – Environmental Accounting.

Note: Theory- 25 Marks ; Problems – 50 Marks

Text and Reference Books (Latest revised edition only)

1. R.L. Gupta and Others :**"Advanced Accountancy**", Sultan Chand Sons, New Delhi.
2. S.P. Jain and K.L. Narang: **"Advanced Accounting**", KalyaniPublishers, New Delhi.
3. R.S.N. Pillai, Bagavathi, S. Uma: "**Advanced Accounting**",S.Chand& Co, New Delhi.
4. M.C. Shukla: **"Advanced Accounts"** S. Chand and Co., New Delhi.
5. Mukerjee and Haneef "**Modern Accountancy**" ,Tata McGraw Hill, Delhi.
6. Arulanandam "**Advanced Accountancy** ", Himalaya Publications,Delhi
7. B.S.Raman ," Corporate Accounting", United Publishers, Managalore.

CORE COURSE – IV

BUSINESS LAW

Objective: To make the students to understand the law relating to various commercial transaction.

UNIT I

The Contract Act, 1872 (I of 1872, Nature and Kinds of Contract – Contractual terms (offer, acceptance, consideration, capacity, free consent) performance and Discharge of contracts – Breach of contracts – Remedies for Branch.

UNIT II

Indemnity and Guarantee – Bailment and Pledge – Law of Agency.

UNIT III

Major provisions relating to sale of Goods Act, 1930 Partnership Act, 1932 and Law of Insurance (Fire and Marine insurance only).

UNIT IV

Major provision of Law relating to carriage of goods by land, sea and Air.

UNIT V

General concepts and main provisions relating to The Registration, 1908 (16 of 1908) The Stamp Act, 1899 (2 of 1899) .

Question paper must contain one question of case Law in section "C".

Text and Reference Books (Latest revised edition only)

1. Venkatesan. E, Hand book of Mercantile Law ,M.L.J. Publications.
2. M.C. Shukla ,A Manual of Mercantile Law , S.Chand& Co, Delhi.
3. R.P. Maheswari& S.N. Maheswari, Principles of Mercantile Law , National Publishing Trust)
4. N.D. Kapoor, Essentials of Mercantile Law, Sultan Chand &Sons, Delhi.
5. Das Gupta , Mercantile Law, Starling Publishers.

ELECTIVE COURSE – I
(A) INSURANCE MANAGEMENT

Objective : To impart knowledge on the theory of insurance and to educate the process of insurance activities in India.

UNIT I

Insurance – Definition – Nature - Principles – Role and Importance – Types of Insurance & Insurance Organization. Insurance contract. Privatization of Insurance in India – Major Players in Insurance Business – Impact of Privatization in India

UNIT II

Life Insurance – Nature – Classification of Policies- Annuities - Selection of Risk - Measurement of Risk – Mortality Table- Calculation of Premium- Surrender Value- Cover Note – Policy Conditions- Progress of Life Insurance Business in India.

UNIT III

Fire Insurance – Nature – Fire Insurance Contract – Kinds of Policies- Policy Conditions- Payment of Claims – Re-Insurance- Double Insurance.

UNIT IV

Marine Insurance – Nature of Marine Insurance Contract – Marine Insurance Policies – Policy Conditions – Premium Calculation – Marine Losses – Payment of Claims- Progress of Marine Insurance Business in India.

UNIT V

General Insurance – Motor Insurance – Burglary and Personal Accident Insurance – Miscellaneous Forms of Insurance – Employee Liability Insurance – Property Insurance - Cattle Insurance – Crop Insurance - Medi-Claim – Overseas Medi -claim Policy - Rural Insurance in India. Insurance Regulatory and Development Authority Act,1972 - IRDA Regulations 2000.

Text and Reference Books :(Latest revised edition only)

1. Dr.P.K.Gupta-Insurance and Risk Management-Himalaya Publishing House, Mumbai.
2. NaliniPravaTripathy and PabirPai-Insurance, Theory and Practice-Prentice Hall , New York.
3. M.N.Mishra-Insurance Principles and Practices-S.Chand& Sons, New Delhi
4. Mark S. Dorfman-Introduction to Risk Management and Insurance-Prentice Hall, New York.
5. IRDA 1999.

ELECTIVE COURSE – I

(B) SERVICES MARKETING

Objective: To enable students to gain expert knowledge on marketing of various Services.

UNIT I

Services Marketing – Definition – importance – characteristics of services – Growth of Services Marketing – Types of services – Comparative analysis between services and products.

UNIT II

Concept of services marketing – Societal concept – Buyer behaviour concept – Factors influencing buyer behaviour – Decision making process. Delivering quality Service - TQM in services marketing - Quality standards - process and technological requirements to implement quality standards in services marketing.

UNIT III

Services Marketing Mix – Product Strategy – Product Life Cycle concept – Strategies during the ProductLife Cycle – Product Planning Strategy – Development of new products – Diversification and elimination.

UNIT IV

Bank Marketing – Insurance Marketing – Transport Marketing.

UNIT V

Tourism and Hotel Marketing - Education Marketing – Communication Services Marketing – Health services.

Text and Reference Books : (Latest revised edition only)

1. S.M.Jha , Services Marketing, Himalaya Publishing House, Mumbai.
2. M.Y.Khan, Services Marketing, Tata McGraw Hill, New Delhi.
3. C.B.Memoria&R.K.Suri, Marketing Management, KitabMahal,
4. Kotler -Marketing Management , Sultan Chand & Sons, New Delhi.
5. Cowell.- Marketing of Services, Heinemann Publishers, London.
6. Christopher Lovelock, JochenWirtz & Jayanta Chatterjee – Service Marketing People, Technology, Strategy. Pearson Education.

CORE COURSE V

BANKING THEORY LAW & PRACTICE

Objective: To make the students to know the law relating to banking transactions.

UNIT I

Evolution of Banking legislation in India – Major provisions of banking Regulations Act, 1949. Reserve Bank of India Act, 1934 and Banking Companies (Acquisition and transfer undertaking) Act, 1970.

UNIT II

Banker and customer – Concepts Definitions – Legal relationship – general and special feature –opening of new accounts – special types of customers – precautions to be taken before opening new accounts. Pass book – entries in the pass book – its legal implications.

UNIT III

Cheques – features – Material alternations – crossing of cheques – their significance – Endorsement. Paying banker – duties – statutory protection – forgery of customer's signature – payment in due course – Closure of Accounts.

UNIT IV

Collection banker – Legal position – Duties – Statutory protection – Holder in due course. Bills of exchange and promissory notes – Special features – Rights and Liabilities of parties to Negotiable Instruments.

UNIT V

Employment of Funds – Loan, Cash credits and over Drafts – Advances against documents of title of goods. Pledge, Hypothecation and Mortgage – Advances against securities FDRs, shares, Debentures, Life Assurance polices, Movable and other immovable properties.

Note : One Question From Section 'C' Should Be a Case Law)

Books for Reference:

1. Sundaram and Varshney, "**Banking Theory, Law & Practice"** Sultan Chand Company, New Delhi
2. S.M. Sundaram"**Banking Theory, Law & Practice"** Sri Meenaksi Publications, Karaikudi
3. M.Kumar, Srinivasa, "**Banking Theory, Law & Practice"** New Central Book Agency
4. **Tannan's"Banking Law & Practice in India"**M.S. Ramasamy, Sultan Chand Company, New Delhi.

CORE COURSE VI
QUANTITATIVE TECHINIQUES FOR BANK MANAGERS

Objective : To acquaint the students with the Statistical tools and techniques for managerial decisions.

(Theory & Problem)

UNIT I:

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series .

UNIT II:

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

UNIT III:

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

UNIT IV:

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

UNIT V:

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables.

Note: 50 Marks Problem : 25 Marks Theory

Text and Reference Books (Latest revised edition only)

1. S.P. Gupta, Statistical Methods - Sultan Chand & Sons, New Delhi.
2. S. Gurusamy, Operations Research, Vijay Nicole Imprints Pvt. Ltd, Chennai.
3. D. Joseph Anbarasu, Business Statistics –Vijay Nicole Imprints Pvt. Ltd., Chennai.
4. C.R.Kothari, Quantitative Techniques –Vikas Publishing House, New Delhi.
5. Levin, Richard I. and David S Rubin: Statistics for Management, Prentice Hall, Delhi.
6. Gupta S.P. Statistical Methods, Sultan Chand, New Delhi
7. Hooda, R.P: Statistics for Business and Economics, Macmillan 3rd edition, New Delhi.
8. Hein, L.W: Quantitative Approach to Managerial Decisions, Prentice Hall, Delhi

CORE COURSE VII

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Internal Assessment : Theory – 15 Marks; Practical – 10 Marks

University Examination : Theory - 45 Marks ; Practical - 30 Marks.

Examination Duration : Theory 2 Hours ; Practical 2 Hours

Objective: To enable the students to acquire knowledge in computers, Information Technology and to develop skills in Computerized Accounting System both theory and in practical

(Theory & Practical)

(Theory 45 Marks)

UNIT I:

Introduction to Computers – Classification of Computers – Generations of Computer – Memory Units – Auxiliary Storage Devices – Input and Output Devices - Computer Software – Operating System – Programming Languages.

UNIT II:

Fundamentals of Computerized Accounting – Computerized Accounting Vs Manual Accounting - Procedure for Creating a new company – Groups Creation - Ledger Creation.

UNIT III:

Vouchers creations – Payment voucher – Receipts voucher – Sales voucher – Purchase voucher – Journal voucher – Contra voucher.

(PRACTICAL – 30 Marks)

UNIT IV:

Creation of a new company – Groups Creation – Multiple Groups and Single Groups - Creation of ledgers – Multiple Ledgers and Single Ledgers.

UNIT V:

Vouchers creations – Voucher entry – Payment vouchers – Receipt vouchers – Sales vouchers – Purchase vouchers – Journal voucher and Contra vouchers.

Text and Reference Books (Latest revised edition only)

1. Dr.S.V.SrinivasaVallabhan - Computer Applications in Business, Sultan Chand & Sons, Delhi.
2. Alexis Leon and Mathews Leon by Fundamentals of Information Technology.Vikas Publishing Company, Delhi.
3. Deepak Bharihoke, Fundamentals of Information Technology, Excel Publications.

CORE COURSE VIII

MANAGEMENT ACCOUNTING FOR BANK MANAGERS

Objective: To make the students understand the techniques and tools of Management Accounting for decision making in Banks.

(Theory & Problem)

UNIT I

Management Accounting – Meaning – Nature and Scope – Functions – Tools & Techniques - Distinction between Cost and Management Accounting – Relationship between Cost and Management Accounting. Financial Statement Analysis and Interpretation – Meaning – Process – Kinds.

UNIT II

Ratio Analysis – Meaning – Advantages – Limitations – Classification of Ratios. Working Capital Management – Meaning – Importance – Forecast of Working Capital Requirements - Determinants and Computation of Working Capital.

UNIT III

Funds Flow Statement – Meaning – Importance – Benefits – Limitations – Schedule of Changes in Working Capital – Preparation of Funds Flow Statement – Cash Flow Statement – Meaning – Uses – Limitations - Comparison between Funds Flow Statement and Cash flow statement – Preparation of Cash flow Statement.

UNIT IV

Budgeting and Budgetary Control – Meaning – Definition – Objectives – Essentials – Advantages – Limitations – Classification of Budgets – Sales, Production, Cost of Production, Purchase and Flexible Budgets – Cash Budget.

UNIT V

Marginal Costing – Break Even Analysis – Cost Volume Profit Analysis – Utility and Limitations of Cost Volume Profit Analysis. Standard Costing and Variance Analysis – Advantages and Limitations of Standard Costing.

Note: Theory- 25 Marks; Problems – 50 Marks.

Text and Reference Books (Latest revised edition only)

1. R.K.Sharma & ShashiK.Gupta, “Management Accounting”, Kalyani Publisher, New Delhi.
2. S.N.Maheswari, “ Management Accounting”, Vikas Publications, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, “Management Accounting”, Margham Publication, Chennai.
4. S.P.Jain& K.L. Narang, “Cost and Management Accounting”, Kalyani Publishers, New Delhi.
5. M.N.Arora, “Cost and Management Accounting”, 8th Edition, Vikas Publishing House (p) Ltd, Chennai.
6. Hilton, Mahar and selto, “Cost Management”, 2nd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
7. B.M. Lall Nigam and I.C. Jain, “ Cost Accounting”, Prentice Hall of India (P) Ltd, New Delhi.

Elective Course II

(A) E - COMMERCE

Objective: To make the students understand E - Commerce in the modern net working world.

UNIT I

Introduction to E-Commerce – Electronic Commerce Frame work – Electronic commerce and Media convergence –anatomy of E-Commerce applications – Components of the IWay – Network Access Equipment – Global Information Distribution Networks – Internet Terminology – NSFNET : Architecture and Components - National Research and Educational Network.

UNIT II

Electronic Commerce and World Wide Web: Architectural Frame work for E-Commerce – WWW Architecture – Hypertext Publishing – Consumer Oriented Applications – Mercantile Process Models – Consumer's Perspective – Merchant's Perspective – Electronic Payment Systems (EPS) – Types - Designing EPS - Smart Cards and EPS – Credit Cards and EPS.

UNIT III

Electronic Data Interchange (EDI) : Applications – Security and Privacy Issues – Software Implementations – Value Added Networks – Internal Information System – Work-flow Automation and Coordination – Customization – Supply Chain Management.

UNIT IV

Marketing on the Internet: Advertising on the Internet – Charting the On-Line Marketing Process – E-Commerce Catalogs or Directories – Information Filtering – Consumer-Data Interface: Emerging Tools.

UNIT V

Multimedia and Digital Video: Concepts – Digital Video and E-Commerce – Video Conferencing – Frame Relay – Cell Relay – Mobile Computing Frame Work – Wireless Delivery Technology – Cellular Data Communication Protocols – Mobile Computing Applications.

Text and Reference Books (Latest revised edition only)

1. Frontiers of Electronic Commerce - Ravi Kalakota, Andrew Winston, Himalaya Publishing House, Mumbai.
2. E-Commerce- A Managerial perspective - P.T.Joseph, Prentice-Hall of India Pvt. Ltd. New Delhi.
3. Designing Systems for Internet Commerce- G.WinfieldTreese& Lawrence C.Stewart,Addison-Wesley Publisher, New York.
4. E-Commerce The Cutting Edge Of Business - Kamelesh K Bajaj, Debjani Nag, Tata Megraw-Hill, New Delhi
5. E Business Road Map for Success - Dr.RaviKalakota, Marcia Robinson, **Addison-Wesley Publisher, New York.**
6. E – Commerce – SrinivasaVallabhan .S.V.TataMegraw-Hill, New Delhi.

ELECTIVE COURSE II

(B) ORGANISATIONAL BEHAVIOUR

Objective : To make the students understand the basics of individual behaviour and group behaviour of people at work and enable them to gain knowledge relating to overall development of the organisation

UNIT I

Organisational Behaviour – Meaning – Characteristics – Disciplines contributing to OB – Relationship with other Social Sciences – Approaches to OB – Hawthorne Experiments.

UNIT II

Perception: Process – Factors influencing perception - Distortion in Perception – Learning: Theories of Learning – Attitudes: Factors influencing Attitude.

UNIT III

Personality: Theories of Personality – Determinants – Types - Emotional Intelligence – Features - Group Dynamics: Formal and Informal Groups – Group Cohesiveness – Stress Management: Causes and Effects of Stress – Coping strategies for stress.

UNIT IV

Leadership: Theories and styles – Motivation – Theories of Motivation – Communication – Conflict Management: Role Conflict – Goal Conflict and inter personal conflict

UNIT V

Organisation change – Process – causes of resistance to change and Overcoming resistance to change –Organisation Development – OD Process and Techniques – Organisation Culture – Factors influencing organisation culture – Organisational Effectiveness – Process and factors influencing organizational effectiveness.

Text and Reference Books (Latest revised edition only)

1. L.M. Prasad – OrganisationalBehaviour – Sultan Chand & Sons, Delhi.
2. K. Aswathappa – Essentials of OrganisationalBehaviour, McGraw Hill, Delhi.
3. Fred Luthans, Organisation Behaviour, McGraw Hill, Delhi.
4. Hell Riegel, Slocum and Woodman, OrganisationBehaviour, South Western, Thomson Learning.
5. R.S. Dwivdi, Human Relations and Organizational Behaviour, Mc Millan India Ltd., 5th Edition.
6. Stephen P. Robbins, Organizational Behaviour, 9th Edition, Pearson Education, New Delhi,
7. P.Subba Rao, Essentials of Human Resource Management and Industrial Relations, Himalaya Publishing House.
8. C.S. VenkataRatnam and B.K.Srivastava, "Personnel Management and Human Resources, TMH.
9. P.C. Tripathi, Personnel Management and Industrial Relations , Sultan Chand & Sons.
10. B.S.Bhatia and G.S.Batra Human Resource Management — Deep & Deep Publications.

CORE COURSE – IX

ADVANCED CORPORATE ACCOUNTING (updated on 31-3-2017)

Objective : To enable the students to understand the detailed concepts of corporate accounting

UNIT – I

Issue of shares - under subscription and over subscription - calls in arrears and call in advance- issue of shares at premium and discount - forfeiture of shares - effects of pro-rata allotment on forfeiture of shares - reissue of forfeited shares - redemption of preference shares .

UNIT –II

Final accounts of companies - profit and loss account - tax adjustments - dividends transfer to reserve - managerial remuneration - perquisites to be included in managerial remuneration - remuneration payable to different categories of managerial personnel administrative ceilings regarding managerial remuneration - computation of net profits for managerial remuneration - balance sheet - form of balance sheet

UNIT – III

Profits prior to incorporation - treatment of profit or loss prior to incorporation - relevance of "Date of certificate to commence business" methods of ascertaining profit or loss prior to incorporation - basis of apportionment of expenses - steps involved in ascertaining pre and post incorporation profits.

UNIT – IV

Liquidation of companies - statement of affairs and deficiency / surplus accounts and liquidator's final statement of account.

UNIT –V

Accounting Standards - objectives function - purpose - scope - advantages and disadvantages AS 1 : Disclosure of accounting policies AS 2 : Valuation of inventories - As 6 : depreciation accounting - AS 7 : construction contracts - AS 8 : accounting for research and development - AS 10 : Accounting for fixed assets AS 11 : Accounting for the effects of changes in foreign exchange rates. (Theory only)

Note: Theory 25 Marks : Problems 50 Marks

BOOKS FOR REFERENCE:

1. M.C.Shukla, T.S.Grewall & S.C.Gupta – Advanced Accountancy - II
2. S.P.Jain and K.L. Narang – Advanced Accountancy
3. Dr R Palaniappan & Dr N Hariharan, Corporate Accounting, Vijay Nicole Imprints Pvt. Ltd., Chennai
4. R.L.Gupta and M.L.Radhaswamy – Advanced Accountancy
5. Mukherjee and Hanif – Modern Accountancy – II
6. Reddy & Murthy – Advanced Accounts

CORE COURSE – X

RESEARCH METHODOLOGY
(Theory only)

Objective: To make the students understand the research process and the method of presenting reports.

UNIT – I

Research in Management: An Introduction – Definition, meaning and nature – Scope and objects of Research. Types of Research : Experimental Research – Survey Research – Case Study methods – Ex Post Facto Research.

UNIT – II

Research Design – Defining Research Problem and Formulation of Hypothesis – Experimental Designs.

UNIT – III

Research Process – Steps in the process of Research, Data Collection and Measurement: Sources of Secondary data – Methods of Primary data collection – Questionnaire construction – Attitude measurement and Scales – Sampling and Sampling Designs – Philosophy and Pre-testing.

UNIT – IV

Data presentation and Analysis – Data Processing – Methods of Statistical analysis and interpretation of Data – Testing of Hypothesis and theory of inference.

UNIT – V

Report writing and presentation –steps in Report writing - types of reports – Substance of Reports – Formats of Reports – Presentation of a Report - Documentation, Foot Note, Bibliography.

BOOKS FOR REFERENCE:

1. V.P.Michael : Research Methodology in Management, Kitib Mohan Publications, Alahabad.
2. C.R.Kothari : Research Methodology, Wiley Eastern Ltd, New Delhi
3. P.Saravanavel, Research Methodology, KitabMahal, Alahabad.
4. O.R. Krishnaswami : Methodology of Research in Social Science
5. D.Amarchend : Research Methods in Commerce.
6. R. Prabhu& T Raju – Research Methods in Management – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE XI

MARKETING FOR BANKING SERVICES

Objective : To make the students to know the various bank marketing techniques.

UNIT I

Role of Marketing – Relevance of Marketing to Banks – Six P's in Bank Marketing – Components of Marketing mix – Customer Segment – Future of Bank Marketing.

UNIT II

Marketing Plan – Market information system – Marketing Research in Indian Banks – Product (service) – Development of IBA – Desirable Product Mix.

UNIT III

Pricing in Bank Marketing – Costing and Pricing Practices – Uniformity in services charges – Branch Expansion Policy in India – Suitable location for a Bank Branch.

UNIT IV

Branch Layout – Promotional Mix in Bank Marketing – Joint publicity Committee – Media Support – Effectiveness.

UNIT V

Marketing Department at the Bank Level – Selection of Marketing Officers – Motivation of Marketing personnel – Training in Bank Marketing – Training Needs – Training Programme – Marketing in Rural Areas.

Books for Reference:

1. R.K. Madukar – Dynamics of Bank Marketing
2. Kenneth Andrew – Bank Marketing concepts and Applications.
3. KK.Sexena – Bank Marketing Concepts and Applications
4. Richard Handscombe – Bank Management Handbook.

CORE COURSE – XII
SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Objective: To make the student to understand the investment opportunities and portfolio management

UNIT – I

Investment Management - Nature and scope - Objectives – Process – Investment Media Security and Non-security forms of Investment - gilt edged securities – Sources of Investment information.

UNIT – II

New Issues Market – Methods of Issuing – Parties involved in the new issue market – Secondary market – Stock Exchanges – NSE and BSE – Trading mechanism – online trading – SEBI and Investors production.

UNIT – III

Security Analysis – Approaches – Fundamental Analysis – Technical Analysis – Dow Theory – Random Walk Theory - Efficient Market Hypothesis.

UNIT – IV

Portfolio Analysis – Traditional and Modern approach – Rationale of Diversification of Investments – Markovitz theory – Sharpe Index Model - Capital Asset Pricing Model.

UNIT – V

Investment companies in India – Types Mutual Fund Operations in India – UTI – SEBI and RBI Guidelines for Mutual Funds.

Note: Theory only

BOOKS FOR REFERENCE:

1. PunithavathyPandian : Security Analysis and Portfolio Management (Vikas Publishing House)
2. Dr S Gurusamy –Security Analysis & Portfolio Management –Vijay Nicole Imprints Pvt Ltd, Chennai.
3. Gupta L.C. : Return of Equities – The Indian Experience (New Delhi OXFORD).
4. Bhalla V.K. : Investment Management and Portfolio Management (S.Chand& Co. Delhi).
5. Fisher &Jordon : Security Analysis and Portfolio Management.
6. PreetiSingh : Security Analysis (Himalaya Publishing House).
7. Avadhani V.A. : Investment and Securities Markets in India.
8. SEBI : Guidelines 1992.
9. Jack dark Francis Investment : Analysis and Management (McGraw Hill 1990).
10. Gara.K.L : Stock Exchanges in India.

ELECTIVE COURSE III

A) BANK AUDIT

Objective: To make the students to know about the various forms of bank audit.

UNIT I

Definition of Audit – Difference between book keeping, accountancy, auditing and investigation – objectives of audit – Qualities of an Auditor – Advantages of Audit – Limitations.

UNIT II

Detection of Errors – Location of Errors – Detection of fraud – Fraudulent Manipulation of account – prevention of fraud.

UNIT III

Audit of Banking companies – capital adequacy norms - provision of the Banking Regulation Act, 1949, relating to capital, reserves, P & L a/c and Balance sheet.

UNIT IV

Audit of prudential Accounting Norms – Types of assets – Good Assets, performing assets, non-performing assets.

UNIT V

Verification and valuation Fixed assets. Investment and liabilities –Audit of bank branches – Publication of accounts – control by Board of Inspection of RBI.

Books for Reference:

1. M.L. Tandon – Auditing
2. Jeqdesh Prakash – Auditing
3. Spicer and Pegler – Auditing
4. Narashimahan Committee report on Bank Reforms

ELECTIVE COURSE – III

B) FOREIGN EXCHANGE MANAGEMENT

Objective: To make the student to have basic knowledge about Foreign exchange management.

UNIT I

Foreign exchange – Meaning and Administration – Functions of Foreign Exchange Department of Commercial Banks – Foreign Exchange and Balance of Trade and Balance of Payment.

UNIT II

Exchange system – Exchange rate system prior to IMF and under IMF – External value of Rupee – Convertibility of Rupee.

UNIT III

Exchange Arithmetic – Nostro and Vastro Accounts – Spot and Forward Deal of Foreign Currencies – Forward Rates – Foreign Exchange Regulation Act, 1973 (Relevant Provisions).

UNIT IV

Exchange Control – Objectives – Methods – Foreign Exchange Management Act – Administration of Foreign Exchange – Functions of Foreign Exchange Department.

UNIT V

Foreign Exchange Transaction – Exchange Quotations – Spot & Forward Transaction – Forward Exchange contracts. Introduction to currency – features and options.

Books for Reference:

1. N.S. Jeevanandam – Foreign Exchange – Practice, Concepts and Control.
2. A.K. Chatterji – Principle of Foreign Exchange
3. Francis Cherumnilam – International Trade and Export Management
4. K.R. Gupta – International Economics
5. Surendra S. Yadav, P.K.Jain and Max peyrard, Foreign Exchange Markets understanding derivatives& Other instruments, Macmillan.
6. Yadav, Foreign Exchange Management.

CORE COURSE – XIII

MERCHANT BANKING AND FINANCIAL SERVICES

Objective: To provide conceptual understanding and in depth knowledge of merchant banking services concerning financial markets in India and to provide knowledge of financial services

UNIT I

Merchant Banking – merchant bankers – corporate counseling – project counseling – pre-investment studies – capital restructuring services – credit syndication – issue management –portfolio management – working capital finance – mergers and acquisition – foreign currencyfinancing – brokering fixed deposits – project appraisal – merchant banking – regulatory framework – SEBI guidelines

UNIT II

Public issue management – functions – categories of securities issue – issue manager – role of issue manager – activities involved in issue management – marketing of new issue – pure prospectus method – offer for sale method – private placement method – IPO method – rights issue method – bonus issue method – book-building – ESOP – OTCEI – Credit Syndication Services

UNIT III

Post-issue activities – major activities – steps – factors in public issue proposal – pricing of issues – law relating to issue management – SEBI regulations – Prospectus – information – abridged prospectus – misstatement in prospectus – golden rule – types of prospectus – red-herring prospectus – shelf prospectus – M & A services – Portfolio Management Services

UNIT IV

Underwriting – meaning – types – mechanism – benefits and functions – Indian Scenario – underwriting agencies – underwriter – underwriting agreement – SEBI guidelines – Bought-out deals – grey market – capital market instruments – types – preference shares – equity shares – CCPS – company deposits – warrants – debentures and bonds – SEBI guidelines – global debt instruments – indexed bonds – floating rate Bonds – ECBs

UNIT V

Depository receipts – meaning and mechanism – benefits – steps in issue of GDR – IDR – Stock exchange – history – functions – Indian stock exchanges – SEBI regulations – mechanics of settlement – margin trading – stock trading system - dealer trading system – NSMS – ISE – INDONEXT – NSE – Financial Services – leasing – hire-purchase finance – bill financing – factoring – consumer finance – real estate financing – credit cards – credit rating venture capital

Book References

1. Gurusamy S, Merchant Banking and Financial Services 4 Edition, Vijay Nicole Imprints Prints Pvt Ld., Chennai
2. Khan M Y, “Financial Services”, Tata McGraw Hill
3. Sri Ram, “Handbook of Leasing & Hire purchases”, ICFAI Hyderabad
4. Stewart, Simon (University Of Adelaide), “Financial Services & Their Regulation”
5. Rose, Peter S., And Fraser, Donald R. “Financial Institutions: Understanding and Managing Financial Services”, Tex Business Publications
6. Kinsella, Ray, “New Issues in Financial Services”, Powell's Books
7. Anderton, Brian, Ed, “Current Issues in Financial Services”, Macmillan

Web References

www.rbi.org.in
www.sebi.gov.in
www.nse-india.com

CORE COURSE - XIV
ADVANCED FINANCIAL MANAGEMENT

Objective : To enable the students understand concepts and application of financial management tools.

UNIT I

Financial Management: Meaning, nature and scope of finance; financial goal – Profit Vs Wealth Maximisation; Finance functions – investment, financing and dividend decisions.

UNIT II

Fundamental valuation concepts: - Time value of money – Compound value, Present value; Risk and Return – concept, Risk in a portfolio context, Relationship between Risk and Return. Valuation of Securities – Valuation concept – Bond Valuation – Valuation of Preference shares, Equity valuation – Dividend valuation approach, Earnings capitalisation approach and Ratio approach.

UNIT III

Cost of capital: Meaning and Significance of cost of capital; calculation of cost of debt, preference capital, equity capital and retained earnings; combined cost of capital (weighted). Financial Leverage: Meaning, Measurement of leverages; Effect of Operating and Financial Leverage on Profit; Analysing alternate financial plans;combined financial and operating leverages.

UNIT IV

Planning the Capital Structure – Factors influencing capital structure; EBIT-EPS Analysis, Return on Investment Analysis, Cash flow analysis, capital structure policies – Theories. Dividend policy -Factors determining dividend pay-out, Forms of dividend; stability in dividend policy; corporate dividend behaviour

UNIT V

Management of working capital:- Meaning, Significance and Types of working capital; calculating operating cycle period and estimation of working capital requirements; sources of working capital; Management of cash, receivables and inventory.

Note: Theory 30 Marks : Problems 45 Marks

****EQUAL IMPORTANCE TO BE GIVEN TO ALL UNITS***

Text and Reference Books (Latest revised edition only)

1. I.M.Pandey. Financial Management,Vikas Publishing House Pvt ltd, New Delhi.
2. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
3. M.Y.Khan&P.K.Jain,Financial Management, Text and Problems. Tata McGraw-Hill Publishing Company Ltd, New Delhi.
4. P.V. Kulkarni & B.G. Sathyaprasad,Financial Management –Himalaya Pulishing House, Mumbai.
5. S.N.Maheswari, "Financial Management principles and practice,"Sultan Chand & Sons, New Delhi.
6. James C. Van Horne & John M. Wachowicz, Jr.Fundamentals of Financial Management- PHI Learning Private Limited, New Delhi.
7. Srinivasan, Financial Management, Vijay Nicole, Chennai

ELECTIVE COURSE IV

(A) BANKING FOR ECONOMIC DEVELOPMENT

Objective: To make the student know the role of Banks in Economic Development

UNIT I

Concept of Development Banks – Difference between commercial banking and development banking – role of development banks in developing countries - sources of funds – uses of funds priorities and criteria for financial assistance.

UNIT II

Industrial Banking – Mixed Banking – the German experience – investment banking in India – its evolution and growth.

UNIT III

Co-operative Banking – State Co-operative Banks – Central Co-operative Banks – Functions - Role of Primary Agricultural Credit Societies and Primary Urban – Cooperative Banks.

UNIT IV

Development banks in India – Investment Trust – U.T.I – I.F.C.I – I.C.I.C.I – I.D.B.I – S.F.C N.D.C – N.S.L.C – L.I.C and R.E.C – their organization – objects – working – review and future.

UNIT V

Functions of RBI – Monetary control and Monetary Policies – Changing Role of RBI in the Liberalization of economy – Privatization.

Books for Reference:

1. Corporation Finance in India by S.C. Kuchchal
2. Development Banks by Williams Palmond.
3. Development Banking by Vasant Desai – Himalaya.
4. Vasanth Desai – Indian Banking Nature and Problem
5. Vasanth Desai – Banking and Financial Systems
6. Vasanth Desai – Development Banking : Issues and Options

ELECTIVE COURSE – IV

B) GLOBAL BANKING SYSTEM

Objective : To make students learn and understand the global banking and financial system.

UNIT I

Financial Management in a global control – need for international Finance – The finance function – The emerging challenges – recent changes in global financial markets – objectives of the firm – risk management and wealth maximization - a frame work of financial decisions.

UNIT II

Exposure and Risk – the nature of exposure and risk – exchange rate and interest rate volatility – foreign exchange exposure and risk classification of foreign exchange exposures and risk. - Exchange rates, interest rates, inflation rates and exposure.

UNIT III

International monetary system and financial markets – exchange rate regimes – the IMF – the problem of adjustment – The European monetary system – the Euro market – overview of major markets – international equity markets.

UNIT IV

The foreign exchange market – the structure – mechanics of currency trading – type of transactions and settlement exchange rate quotations and arbitrage – short date and broken date contracts, exchange rate – regimes and the foreign exchange.

UNIT V

Forward, Swaps and Interest parity – Arbitrage – swaps and Deposit markets – option forwards – forward – forward swaps : swap positions – forward exchange rates in India.

Books for Reference:

1. Avadhani V.A. International Finance Theory and Practice, Himalaya Publishing House, New Delhi
2. Chaudhari B.K. Finance of Foreign Trade and Foreign Exchange, Himalaya Publishing House, New Delhi
3. RBI Manual of Exchange control.

ELECTIVE COURSE – V
A) INTERNATIONAL FINANCE

Objective: To facilitate the students to learn concepts of international finance, foreign exchange exposure and international project appraisal and understand the risks involved in foreign exchange market.

UNIT I Financial Management in a Global Perspective:
Globalisation: Trends in International Trade and Cross Border Financial Flows - India in the Global Economy- Challenges of International Financial Management- International Monetary System and Financial Markets- Balance of Payments- International Monetary system. An overview of International Financial Markets - Exchange Rate Determination and Forecasting- Purchasing Power Parity, Theory - The Fishers' Effect, Interest Rate Parity.

UNIT II The Foreign Exchange Market:
Structure and the Participants, Types of Transactions, Mechanics of Currency Dealing - Exchange Rate quotations - Arbitrage, Forward Rates- Evolution of Exchange Control and the Foreign Exchange Market in India- Exchange Rate Computations. Currency Derivatives: Currency Futures, Currency Options

UNIT III Foreign exchange Exposure and Risk:
Economic Exposure, Transaction Exposure, Translation Exposure, Management of Exposures.

UNIT IV Working Capital Management in a Multinational Context:
Short-term Borrowing and Investment, Centralised Vs. Decentralised Cash Management - Cash Transmission. International Equity Investment: Risk and Return, The International CAPM, Equity Financing in the International Markets. Long-term Borrowing in International Capital Markets: The Major Market Segments, the International Financing Decision, International Leasing.

UNIT V International Project Appraisal:
Review of NPV Approach - Adjusted Present Value Framework, Project appraisal in the International Context, Exchange Rate Risk and Cost of Capital, International Joint Ventures. An Introduction to Financial Swaps: Major Types, Motivations Underlying Swaps, Application of Swaps, Valuation of Swaps, International Accounting and Taxation: Accounting for Foreign Currency Transactions, Accounting for Foreign Operations.

Reference:

1. Apte, P.G., International Financial Management, 2nd Ed., Tata McGraw Hill, 1998
2. Jeff Madura, International Financial Management, 6th Ed., South-Western, 2000
3. CheolS.Eun, Bruce G.Resnick,. International Financial Management, Irwin McGraw Gill.1998.
4. Maurice D.Levi, International Finance, 3rd Ed., McGraw Hill, 1996.
5. Alan C.Shapiro, Multinational Financial Management. Prentice Hall India.

ELECTIVE COURSE V
B) HUMAN RESOURCE MANAGEMENT

Objective: To impart knowledge on the concepts and principles of HRM followed in different types of organization.

UNIT I:

Human Resource Management- Meaning – Nature and Scope, Objectives - Functions - Distinction between HRM and Personnel Management. Personnel Policies: Procedure and Programmes. Organization of HRM Department– Needs - Recent Trends in HRM Practices – Personnel Audit- Human Resource Information System- need and benefits.

UNIT II :

Man Power Planning – Characteristics: Need, Process - Job Analysis- Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment- Job Enlargement – Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement - Induction

UNIT III :

Training –Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes- Methods.- Promotion – Types, Merits- Demotions; Carrier Planning - Transfers.

UNIT IV :

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

UNIT V :

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre -requisites – Benefits.

Text and Reference Books (Latest revised edition only)

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi
2. Dr.Ashwathappa, Human Resource Management ,McGraw Hill Education (India) Pvt. Limited, New Delhi.
3. Edwin Phillip, Personnel Management - Tata McGraw Hill, Delhi.
4. L.M. Prasad ,Human Resources Management, Jain Book Agency, New Delhi.
5. DaleYoder& Paul D. Staudohar, Personnel Management, Prentice Hall.
6. S.S. Khanka, Human Resource Management ,S.Chand& Sons, New Delhi.
7. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
8. H.JohnBernardin&JoyeeE.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
9. David A. DeCenzo& Stephen P.Robbins, Personnel/Human Resource Management, Thirdedition, PHI/Pearson.
10. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, NewDelhi.

PROJECT

PROJECT (DISSERTATION AND VIVA-VOCE)

OBJECTIVE :

To facilitate the students to understand the Business enterprises systematically and present the research report as per the acceptable format.

The project topics are to be finalised to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various problems and issues pertaining to Commerce and Bank Management. Each candidate should submit two copies of dissertation as per the guidelines to the Controller of Examination and one copy to the department concerned. The project will be evaluated for 100 marks (ie. 80 marks for Dissertation work and 20 marks for Viva-Voce) by Internal (Supervisor) and External Examiners. The average of the Marks of the Internal Examiners (Supervisors) and External Examiners shall be considered as the final marks to be awarded for project. The passing minimum for Dissertation is 40 marks and viva voce examination is 10 marks.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPALLI – 620 024

M.Com (Computer Applications) Programme – Revised Course Structure under CBCS

(For the candidate admitted from the academic year 2016 – 2017 onwards)

(updated on 12-6-2017)

Semester	Course	Course Title	Ins. Hrs/ Week	Credit	Exam Hrs	Marks		Total
						Int	Ext	
I	Core Course – I (CC)	Managerial Economics	6	4	3	25	75	100
	Core Course – II (CC)	Marketing Management	6	4	3	25	75	100
	Core Course – III(CC)	Management Information System	6	4	3	25	75	100
	Core Course – IV(CC)	E – Commerce	6	4	3	25	75	100
	Elective Course – I(EC)	a) Working Capital Management (or) b) Organisational Behaviour	6	4	3	25	75	100
	Total		**30**	**20**				**500**
II	Core Course – V (CC)	Quantitative Techniques for Business Decisions	6	5	3	25	75	100
	Core Course – VI (CC)	Office Programming (Theory & Practicals)	6	5	3	25	75	100
	Core Course – VII (CC)	Oracle and RDBMS	6	5	3	25	75	100
	Core Course – VIII (CC)	Cost & Management Accounting	6	5	3	25	75	100
	Elective Course – II (EC)	a) E – Banking (or) b) Advanced Managerial Communication	6	4	3	25	75	100
	Total		**30**	**24**				**500**
III	Core Course – IX (CC)	Research Methodology	6	5	3	25	75	100
	Core Course – X (CC)	Advanced Corporate Accounting	6	5	3	25	75	100
	Core Course – XI (CC)	Data Base and Desk Top Publication (Theory & Practicals)	6	5	3	25	75	100
	Core Course – XII (CC)	Programming in C++ (Theory & Practical)	6	5	3	25	75	100
	Elective Course – III (EC)	a) Management Concepts (or) b) Customer Relationship Management	6	4	3	25	75	100
	Total		**30**	**24**				**500**

IV	Core Course – XIII (CC)	Java Programming and its Business Applications (Theory & Practical)	5	5	3	25	75	100
	Core Course – XIV (CC)	Advanced Financial Management	5	5	3	25	75	100
	Elective Course - IV (EC)	a) Logistics and Supply Chain Management (or) b) Computer Networks & Internet Applications	5	4	3	25	75	100
	Elective Course - V (EC)	a) Human Resource management (or) b) Total Quality Management	5	4	3	25	75	100
	Project	Dissertaion (80 marks) Viva voce (20 marks)	10	4				100
	Total		**30**	**22**				**500**
	GRAND TOTAL			90				2000

Note:

Project :100 Marks

Dissertation : 80 Marks - Passing minimum 40 marks

Viva Voice : 20 Marks - Passing minimum 10 marks

Core Papers - 14

Elective Papers - 5

Project - 1

Note:

1. Theory Internal 25 marks External 75 marks
2. Separate Passing Minimum is prescribed for Internal and External
   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

CORE COURSE I
MANAGERIAL ECONOMICS

Objective : To make the students to realize the usefulness of economic tools, principles & laws in making business decisions.

(Theory only)

Unit I

Managerial Economics – Meaning, Nature, Scope and Applications – Relationship with other disciplines – Role of Managerial Economist – Demand Analysis – Demand Determinants - forecasting.

Unit – II

Production Function – Managerial uses – Supply analysis - Law of Supply – managerial uses of supply curve. Cost Concepts, classification & determinants – Cost Output relationship – Economies of scale - Cost Control and Cost Reduction.

Unit – III

Price and Output decisions under different marketing structures - Perfect competition – Monopoly - Oligopoly & Monopolistic Competition – Price discrimination – Pricing Objectives – policies - Strategies and methods - Price differentials – Price forecasting.

Unit - IV

Profit – Nature & Concept – Profit Planning, policies and Forecasting- measurement of profit Interest – Rent.

Unit - V

Business Cycle and business policies – Economic forecasting for business – Input output analysis – National income - accounting and measurement.

Text and Reference Books (Latest revised edition only)

1. Joel Dean, Managerial Economics – Prentice Hall, New York.
2. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi.
3. Varshney and Maheswari - Managerial Economics - Sultan Chand and Sons, New Delhi.
4. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai.
6. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi.
7. Cauvery, SudhaNayak and Others - Managerial Economics - S. Chand and Sons, New Delhi.
8. H. Craig Petersen, W. Cris Lewis, Managerial Economics, 4th Edition, Pearson Education.

CORE COURSE II
MARKETING MANAGEMENT

Objective : To impart knowledge on the concepts of marketing and to educate and understand the strategies to be followed in marketing.

UNIT I

Marketing Definition- Importance- Concepts of Marketing Task- Conventional & Situational Marketing -, Approaches to Marketing, Remarketing, De-Marketing, Counter Marketing, Synchro-Marketing Concepts- Traditional and Modern Concepts, Marketing Mix, Modern Marketing Functions, Features of Industrial, Consumer and Services Marketing.

UNIT II

Product – Meaning-Classification of Goods- Product Planning and Development- Product Life Cycle - New Product Development- Product Positioning – Diversification – Obsolescence – Elimination - Product Related Strategies – Branding - Brand Image Building- Brand Extension - Brand Celebrity.

UNIT III

Market Segmentation, Bases - Benefits - Consumer Behavior- Factors Influencing Consumer Behavior, Post Purchase Behavior - Marketing Research - Steps In Conducting Marketing Research, Sales Forecasting- Techniques and Criteria

UNIT IV

Pricing - Meaning and Objectives - Pricing Policies Strategies- Pricing Methods - Promotion Mix- Purpose of Promotion- Promotion Strategy – Sales Promotion - Levels, Advertising - Kinds of Advertising - Advertising Copy- Advertising Budget - Advertising Agency. Sales Management – Salesmanship – Qualities - Effective Selling - Sales Process

UNIT V

Distribution – Selection of Channel Of Distribution - Wholesalers and Retailers – Functions and Importance In Distribution Net Work. Warehousing –Types - Decisions. Management of Physical Distribution. Ethics in marketing.

Text and Reference Books :(Latest revised edition only)

1. R.S.N.Pillai & Bagavathi, (2010, 1st edition), Modern Marketing, S.Chand& Co., New Delhi.
2. RajanNair.N.,SanjithR.Nair, (1999),Marketing, Sultan Chand & Sons, New Delhi.
3. Kotler Philip, 15th edition, (2015) Marketing Management, Prentice Hall of India (Pvt) Ltd., New Delhi.
4. Monga&ShaliniAnand, (2000), Marketing Management, Deep & Deep Publications, New Delhi
5. J. Jayasankar , 2nd edition,(2013), Marketing, Margham Publications, Chennai.
6. Dr. L. Natarajan (2013), Marketing, Margham Publications, Chennai.
7. Grewal , 14th edition (2015), Marketing, Tata McGraw Hill management, New Delhi.
8. B.S.Raman, Marketing, United Publishers, Managalore.

CORE COUSE III
MANAGEMENT INFORMATION SYSTEM

Objective :

To enable the students to trace the growing importance of information system, vital role in decision making, role of computers in this task and it emphasis on the system, development process & approaches.

UNIT – I

Information System – Establishing the framework - Business model – information system architecture – Evolution of information systems.

UNIT – II

Modern information system – System development Life Cycle – Structured methodologies – Designing computer based method - procedures control and designing structured programs.

UNIT – III

Functional areas - Finance, Marketing, Production, Personnel – Levels, Concepts of DSS, EIS, ES – Comparison - concepts and knowledge representation – managing international information system.

UNIT – IV

Testing security – Coding Techniques – Detection of Error – Validation – Cost benefit analysis – Assessing the value and risk of information systems.

UNIT – V

Software engineering qualities – Design, production, service, software specification, software metrics, software quality assurance – Systems methodology - objectives – Time and Logic, Knowledge and Human dimension – Software life cycle models – Verification and validation.

Text and Reference Books :(Latest revised edition only)

1. Management Information Systems, Management Perspectives, D P Goyal, Second Edition, Macmillan, New York.
2. Management Information Systems, Dr. S.P. Rajagopalan, Margham Publications, Chennai.
3. Gordon B.Davis, Management Information System: Conceptual Foundations, McGraw Hill, U.S.A.

CORE COURSE IV

E – COMMERCE

Objective: To make the students understand the elements and uses of E Commerce.

(Theory only)

UNIT I

Introduction to E-Commerce – Electronic Commerce Frame work – Electronic commerce and Media convergence –anatomy of E-Commerce applications – Components of the IWay – Network Access Equipment – Global Information Distribution Networks – Internet Terminology – NSFNET : Architecture and Components - National Research and Educational Network.

UNIT II

Electronic Commerce and World Wide Web: Architectural Frame work for E-Commerce – WWW Architecture – Hypertext Publishing – Consumer Oriented Applications – Mercantile Process Models – Consumer's Perspective – Merchant's Perspective – Electronic Payment Systems (EPS) – Types - Designing EPS - Smart Cards and EPS – Credit Cards and EPS.

UNIT III

Electronic Data Interchange (EDI) : Applications – Security and Privacy Issues – Software Implementations – Value Added Networks – Internal Information System – Work-flow Automation and Coordination – Customization – Supply Chain Management.

UNIT IV

Marketing on the Internet: Advertising on the Internet – Charting the On-Line Marketing Process – E-Commerce Catalogs or Directories – Information Filtering – Consumer-Data Interface: Emerging Tools.

UNIT V

Multimedia and Digital Video: Concepts – Digital Video and E-Commerce – Video Conferencing – Frame Relay – Cell Relay – Mobile Computing Frame Work – Wireless Delivery Technology – Cellular Data Communication Protocols – Mobile Computing Applications.

Text and Reference Books :(Latest revised edition only)

1. Frontiers of Electronic Commerce - Ravi Kalakota, Andrew Winston, Himalaya Publishing House, Mumbai.
2. E-Commerce- A Managerial perspective - P.T.Joseph, Prentice-Hall of India Pvt. Ltd. New Delhi.
3. **Designing Systems for Internet Commerce- G.WinfieldTreese& Lawrence C.Stewart,**Addison-Wesley Publisher, New York.
4. E-Commerce The Cutting Edge Of Business - Kamelesh K Bajaj, Debjani Nag, Tata Megraw-Hill, New Delhi
5. E Business Road Map for Success - Dr.RaviKalakota, Marcia Robinson, **Addison-Wesley Publisher, New York.**
6. E – Commerce –SrinivasaVallabhan .S.V.Tata Megraw-Hill, New Delhi.

ELECTIVE COURSE I
(A) WORKING CAPITAL MANAGEMENT

Objective : To make the students understand the concept of working capital Management.

Unit I Working Capital Policy :

Working capital – meaning – definition - Importance of Working Capital Management, Component of Working Capital, Factors influencing the requirements of Working Capital, Risk-return Trade- off, Profitability Vs. Liquidity , Estimating Working Capital Requirements Operating Cycle Method, Percent of Sales Method, Role of finance managers in working capital Management.

Unit II Cash Management:

Cash Management – meaning -, Factors influencing cash balance - Determining optimum cash balance - Cash Budgeting – Controlling and monitoring collections and disbursements - Cash management models.

Unit III Receivables Management:

Receivables Management – meaning – importance - Credit Policy variables - Credit Standards, Credit period - Cash discount and collection efforts. Credit Evaluation- Credit granting decision - Control of Receivables – Management of Trade Credit - Aging schedule.

Unit IV Inventory Management:

Inventory Management – meaning –- need for inventories and importance of inventory management, Techniques for managing inventory – Economic Order Quantity –E.O.Q. model – Order point – Safety stock – Analysis of Investment in inventory – Selective inventory control – A.B.C. analysis - VED analysis – Inventory Turnover Ratio..

Unit V: Financing Current Assets:

Financing Current Assets – need and significance- approaches to financing current assets: conservative - aggressive and matching approach, Sources of finance - Spontaneous source, Trade credits, Short term bank finance, Commercial papers and Public deposits,

(Theory – 30 Marks Problem - 45 Marks)

Text and Reference Books :(Latest revised edition only)

1. Hrishikesbattacharya, Working Capital Management: Strategies and Techniques, Prentice Hall of India.
2. I.M.Pandey, Financial Management, Vikas Publishing House, New Delhi.
3. K.M.Chitnis, Working Capital Management of Large Industrial units, DastaneRamachandra & Co., Pune.
4. Prasanna Chandra, Financial Management- Theory and Practice, Tata McGraw Hill,New Delhi.
5. Joshi, R.N., Cash Management, New Age International Publishers,New Delhi.

ELECTIVE COURSE I

(B) ORGANISATIONAL BEHAVIOUR

Objective : To make the students understand the basics of individual behaviour and group behaviour of people at work and enable them to gain knowledge relating to overall development of the organization.

UNIT I:

Organisational Behaviour – Meaning – Characteristics – Disciplines contributing to OB – Relationship with other Social Sciences – Approaches to OB – Hawthorne Experiments.

UNIT II:

Perception: Process – Factors influencing perceptual selection and Distortion in Perception – Learning: Theories of Learning – Attitudes: Factors influencing formation of Attitude – OB Modification

UNIT III:

Personality: Theories of Personality – Determinants – Types - Emotional Intelligence – Features - Group Dynamics: Formal and Informal Groups – Group Cohesiveness – Stress Management: Causes and Effects of Stress – Coping strategies for stress

UNIT IV:

Leadership: Theories and styles – Motivation – Theories of Motivation – Communication – Conflict Management: Role Conflict – Goal Conflict and inter personal conflict

UNIT V:

Organisation change – Resistance to change and Overcoming resistance to change – Organisation Development – OD Process and Techniques – Organisation Culture – Factors influencing organisation culture – Organisational Effectiveness – Process and factors influencing organizational effectiveness.

Text and Reference Books :(Latest revised edition only)

1. L.M. Prasad – Organisational Behaviour – Sultan Chand & Sons, Delhi.
2. K. Aswathappa – Essentials of Organisational Behaviour, **McGraw Hill, Delhi.**
3. Fred Luthans, Organisation Behaviour, McGraw Hill, Delhi
4. Hell Riegel, Slocum and Woodman, Organisation Behaviour, South Western, Thomson Learning, 9th Edition,
5. R.S. Dwivdi, Human Relations and Organizational Behaviour, Mc Millan India Ltd., 5th Edition.
6. Stephen P. Robbins, Organizational Behaviour, 9th Edition, Pearson Education, New Delhi,
7. P.Subba Rao, Essentials of Human Resource Management and Industrial Relations, Himalaya Publishing House.
8. C.S. VenkataRatnam and B.K.Srivastava, "Personnel Management and Human Resources, TMH.
9. P.C. Tripathi, Personnel Management and Industrial Relations , Sultan Chand & Sons.
10. B.S.Bhatia and G.S.Batra Human Resource Management — Deep & Deep Publications.

CORE COURSE V
QUANTITATIVE TECHINIQUES FOR BUSINESS DECISIONS

Objective : To acquaint the students with the Statistical tools and techniques for managerial decisions.

Unit I:

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple–Regression Analysis – Time Series.

Unit II:

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

Unit III:

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

Unit IV:

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

Unit V:

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables.

Problem : 50 Marks ; Theory 25 Marks

****EQUAL IMPORTANCE TO BE GIVEN TO ALL UNITS***

Text and Reference Books (Latest revised edition only)

1. S.P. Gupta, Statistical Methods - Sultan Chand & Sons, New Delhi – 600 002.
2. S. Gurusamy,Operations Research, Vijay Nicole Imprints Pvt. Ltd, Chennai.
3. D. Joseph Anbarasu,Business Statistics –Vijay Nicole Imprints Pvt. Ltd., Chennai.
4. C.R.Kothari, Quantitative Techniques –Vikas Publishing House, New Delhi.
5. Levin, Richard I. and David S Rubin: Statistics for Management, Prentice Hall, Delhi.
6. Hooda, R.P: Statistics for Business and Economics, Macmilla 3rd edition, New Delhi.
7. Hein, L.W: Quantitative Approach to Managerial Decisions, Prentice Hall, Delhi

CORE COURSE VI
OFFICE PROGRAMMING

Objective : To understand the theory as well as practical knowledge of MS-Word, MS-PowerPoint and MS-Excel.

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks
University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*
Examination Duration : Theory 2 Hours ; Practical 2 Hours

(Theory & Practical) (Theory 45 Marks)

UNIT – I

Introduction to Computers – Classification – Generation – Memory Units – Auxiliary Storage Devices – Areas of Computers – Input and Output devices.
MS-Word : Working with Menus – File, Edit, View, Insert, Format, Tools and Tables - Find and Replace - Header and Footer – Spelling and Grammar.

UNIT – II

Introduction to Spreadsheets – Entering data's in Worksheet – Editing and Formating worksheets - Formula bars – Types of Charts and Diagrams – Functions in Excel – Auto controlling – Protect sheet.

UNIT – III

MS- Powerpoint – Adding and Formatting text - Insert pictures – Slide design - Slide Layout – Background – Insert Pictures, Clip Art and Diagrams – Movie and Sounds – Custom Animation.

(PRACTICAL – 30 Marks)

UNIT – IV

Preparation of Word Document - Paragraph Alignment – Page setup – Preparation of Business letter – Preparation of Bio-data – Mail merge – Page columns – Creation of Tables.

UNIT – V

MS- Excel – Mark Statement Preparation – Electricity Bill Preparation – Pay bill preparation – Creating Charts.
MS-Powerpoint – Slide Preparation – Background colour settings – Insert pictures – Slide Number – Slide Design – Custom Animation – Draw Table.

Text and Reference Books :(Latest revised edition only)

1. Stephen L. Nelson and Peter by Complete Reference of MS-Office, OSBORNE MCGRAW HILL.U.S.A
2. Ran Mansfield by Working in MS Office,Tata McGraw Hill, New Delhi.
3. Krishnan.Nby Windows and MS-office 2000 with database concepts,Scitech Publications, Chennai.

CORE COURSE – VII
ORACLE AND RDBMS

Objective: To understand the theory and to gain practical knowledge about Oracle and RDBMS

UNIT –I

Database concepts : A relational approach – Database management Systems(DBMS) – RDBMS – Integrity rules – Theoretical Relational Languages – Database Design: Data Modeling and Normalisation.

UNIT –II

Oracle 8: An overview- Personal Databases – Client/server Databases- Table creation & modification : Data types – constraints – creating an oracle Table – Working with tables - Data Management and retrieval.

UNIT – III

Multiple Tables: Join – Set operators – Sub-Query – Advanced Features : Objects , Transactions and Control – Views- Sequences – Synonyms – Index – controlling Access – Object privileges.

UNIT – IV

PL/SQL : Programming Language Basic – History of PL/SQL – Fundamentals – Data types – Variable Declaration – SQL and Control Structures.

UNIT – V

Cursors and Exceptions – Procedures, Functions and Packages.

Text and Reference Books :(Latest revised edition only)

1. Nilesh Shah, “Database Systems Using Oracle” , Prentice – Hall of India private Ltd.
2. Raghu Ramakrishnan & Johannes Gehrke, “Database management systems” , McGraw – Hill – Editions.
3. Abraham silberschatz Henry F.KorthS.Sudarshan, “Database system concepts”. McGraw – Hill – Editions.

CORE COURSE VIII
COST & MANAGEMENT ACCOUNTING

Objective: To make the students understand the techniques and tools of Cost & Management Accounting for decision making.

Unit :I

Cost Accounting – Meaning – Objectives – Nature and Scope – Methods – Techniques of Costing – Classification and Coding of Costs – Inventory Control – Stock levels – Inventory Systems – Methods of pricing material issues.

Unit: II

Labour Costs – Direct and Indirect – Importance – Labour Remuneration method. Overheads – Importance – allocation and apportionment of overheads – Overhead cost control – Absorption costing – Activity Based Costing.

Unit : III

Contract Costing – Meaning – Features – Fully Completed Contract – Incomplete Contract – Cost Plus Contracts - Process Costing – Procedure Involved in Process Costing – Inter Process Profit – Joint Products and By Products.

Unit :IV

Management Accounting – Meaning – Nature and Scope – Functions – Tools & Techniques. Distinction between Cost and Management Accounting – Relationship between Cost and Management Accounting. Ratio Analysis – Meaning – Advantages – Limitations – Classification of Ratios.

Unit :V

Budgetary Control – Classification of Budgets - Marginal Costing – Break Even Analysis – Cost Volume Profit Analysis - Standard Costing and Variance Analysis.

(**Theory : 25 Marks Problem:50 Marks)**

Text and Reference Books : (Latest revised edition only)

1. R.K.Sharma& Shashi K.Gupta, "Management Accounting", Kalyani Publisher, New Delhi.
2. S.N.Maheswari, " Management Accounting", Vikas Publications, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, "Management Accounting", Margham Publication, Chennai.
4. S.P.Jain& K.L. Narang, "Cost and Management Accounting", Kalyani Publishers, New Delhi.
5. M.N.Arora, "Cost and Management Accounting", 8th Edition, Vikas Publishing House (p) Ltd, Chennai.
6. Hilton, Mahar and selto, "Cost Management", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
7. B.M. Lall Nigam and I.C. Jain, " Cost Accounting", Prentice Hall of India (P) Ltd, New Delhi.

ELECTIVE COURSE – II
(A) E- BANKING

Objective : To make the students to understand the e-banking transactions.

Unit I

Networking of computers – Types – LAN – WAN – Internet and Intra net – E-mail .net banking services.

Unit II

Electronic payment system : Automatic teller machine merits and demerits – installation and security aspects of ATM, MICR equipment – precautions in handling MICR instrument – benefits and limitations.

Unit III

e-cash : features – benefits of e-cash – limitations of electronic data interchange – electronic fund transfer credit card – debit card – payment through bank network – payment by smart card –electronic pass book – home banking.

Unit IV

Electronic clearing services – SWIFT – types of message in SWIFT (society for worldwide interbank financial telecommunication) – message format in SWIFT – bank information code – message flow in SWIFT system – advantages and structure of SWIFT.

Unit V

E-Banking challenges and opportunities – services offered through e-banking – strengths of e-banking – weakness of e-banking – opportunities –threats of e-banking.

Text and Reference Books :(Latest revised edition only)

1. R.V. Kulkarni Knowledge based system in banking sector , New Century Publications, Chennai.
2. Computer Application in Business and, Commerce and Banking – R.S. Viramani.
3. Computer Application in Business – R.Parameswaran.

ELECTIVE COURSE – II
(B) ADVANCED MANAGERIAL COMMUNICATION

Objective : To impart knowledge on the theory of communication and to educate the communication technique to be used in orgnisations.

UNIT – I

Communication and Management - Concept of Management – Evaluation and Growth - Functions – Principles - Objectives – Communication as Management Tool, as a Process- as a Social Process. Exploring the Nature of Human Communication Process - Oral Communication - Written Communication - Filtering and Distortion of Message - Perception of Interpersonal Communication.

UNIT-II

Communication Process and Organization - Self Confidence - Essentials for Effective Communication - Barriers – Measures to Overcome Barriers. Group Communication Net Work- Wheel Pattern - Y-Pattern- Chain Pattern- Cycle Pattern and Free Flow pattern.

UNIT-III

Non Verbal Communication- Introduction, Kinesics, Para-language, Proxemics, Signals. Listening- Importance, Process- Types - Barriers to Effective Listening- Steps in Better Listening.

UNIT-IV

Business Correspondence – Importance - Functions-Characteristics - Structure of Business Letters - Common Errors in Letter Writing. All types of Business Letters.

UNIT-V

Group Communication – Group and Team Interactions - Team Briefing – Introduction – Process – Sample - Benefits- Format-Pre-requisites for Successful Briefing- Internal Communication – Memos /Circulars / Notes. Company Meetings – Agenda - Minutes.

Text and Reference Books :(Latest revised edition only)

1. Media & Communication Management, Dr. C.S. Raydu
2. Organizational Mcommunication, Wofford, E. Gerloff
3. Process Of Communication, Berlo, David
4. Managerial Communication, Iillico, T. Michael
5. Business Communication, Sunder &Kamaraj
6. Business Communication, Ramachandran K.K

CORE COURSE – IX (CC)
RESEARCH METHODOLOGY
(Theory only)

Objective : To make the students understand the research process and the methods of presenting report

UNIT – I

Research in Management: An Introduction – Definition, meaning and nature – Scope and objects of Research. Types of Research : Experimental Research – Survey Research – Case Study methods – Ex Post Facto Research.

UNIT – II

Research Design – Defining Research Problem and Formulation of Hypothesis – Experimental Designs.

UNIT – III

Research Process – Steps in the process of Research, Data Collection and Measurement: Sources of Secondary data – Methods of Primary data collection – Questionnaire construction - Attitude measurement and Scales – Sampling and Sampling Designs – Pilot Study & Pretesting

UNIT – IV

Data presentation and Analysis – Data Processing – Methods of Statistical analysis and interpretation of Data – Testing of Hypothesis and theory of inference

UNIT – V

Report writing and presentation –steps in Report writing – Substance of Reports – Formats of Reports – Presentation of a Report.

Books For Reference:

1. V.P.Michael : Research Methodology in Management, Kitib Mohan Publications, Alahabad.
2. C.R.Kothari : Research Methodology, Wiley Eastern Ltd, New Delhi
3. P.Saravanavel, Research Methodology, Kitab Mahal, Alahabad.
4. O.R. Krishnaswami : Methodology of Research in Social Science
5. D.Amarchend : Research Methods in Commerce.
6. R Prabhu & T Raju Research Methodology in Business, Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – X (CC)
ADVANCED CORPORATE ACCOUNTING

Objective : To gain detailed accounting knowledge of various companies

UNIT – I

Valuation of Goodwill and Shares – Liquidation.

UNIT –II

Amalgamation by merger and Amalgamation by purchases - External Reconstruction of Companies and alteration of Share Capital .

UNIT – III

Holding Company Accounts (including inter company holdings) Bank Accounts – NPA – Classification of investments.

UNIT – IV

Insurance Company Accounts – Double Account System.

UNIT –V

Human Resource Accounting – Definition, Objectives, Valuation Methods – Advantages – Accounting Standards, with reference to depreciation, inventory valuation. (Theory only) - Inflation Accounting - (Theory only).

(Theory 25 Marks; Problems- 50 Marks).

BOOKS FOR REFERENCE:

1. M.C.Shukla, T.S.Grewall & S.C.Gupta – Advanced Accountancy - II
2. S.P.Jain and K.L. Narang – Advanced Accountancy
3. Dr R Palaniappan & Dr N Hariharan, Corporate Accounting, Vijay Nicole Imprints Pvt. Ltd., Chennai
4. R.L.Gupta and M.L.Radhaswamy – Advanced Accountancy
5. Mukherjee and Hanif – Modern Accountancy – II
6. Reddy & Murthy – Advanced Accounts

CORE COURSE – XI (CC)
DATA BASE AND DESK TOP PUBLICATION

(THEORY & PRACTICAL)

Objective : To gain knowledge about the importance of Data base

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks
University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*
Examination Duration : Theory 2 Hours ; Practical 2 Hours
(Theory & Practical) (Theory 45 Marks)

UNIT I

Database – importance of Database – MS Access – MS Access – Introduction – Parts of Access Window, Creating a Database, Relationships, Creating Table through Design view – Relationship – Query – Form – Reports.

UNIT II

Importance of Desktop publishing – Page Maker – DTP – Menu – File, Edit, Utilities, Layout, Story, Type, Element, Window, Help – Working with Page Column – Indent.

UNIT III

Importance of Photo creation and editing – Photoshop – The Photoshop Screen – Using the Toolbox – Document and Scratch Sizes – The Info Palettee – Saving and loading custom settings – Opening and saving files – Images – Layers – Channels and Mask – Colour Correction Techniques – Animation.

Practical – (30 marks)

UNIT IV

Access – Creation of Database – Creation of relationships – Creating tables through design view – Database for salary, mark sheet, inventory, Form creation.

UNIT V

Creating files – Photoshop – Saving and loading custom settings – Creating new file – Use of painting tools – Copying and pasting selections – Moving selections – Grow and Similar command – Editing Points – Use of Colour Balance Dialogue box.

Books for Reference:

1. Photoshop 6 in easy steps – Robert Shufflebotham, Dreamtech Press.
2. Page Maker 6.5 Vishnu Priya Singh, Meenakshi Singh, Asian Publications Limited.
3. MS Office 2000 (Access only), Sanjay Sexana, Vikas Publishing House.
4. Computer Applications in Business, (Access only) Srinivasa Vallabhan, Sultan Chand & Sons, New Delhi.
5. Desk Top Publishing, SK Yadava, Yatin Publishers, Delhi.

CORE COURSE – XII (CC)
PROGRAMMING IN C++

(THEORY & PRACTICAL)

Objective : To gain knowledge about C++ programming

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks
University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*
Examination Duration : Theory 2 Hours ; Practical 2 Hours

(Theory & Practical) **(Theory 45 Marks)**

UNIT I

C++ Language – Features – Character Sets – Identifiers – Reserved Words – Concept of Data Types – Qualifiers – Specifiers – constant – Escape sequences – C++ Program structure - Type of Operators – Arithmetic – Relational – Logical – Bitwise – Assignment – Type conversion – Operator precedence and associativity - Simple Input / Output Facilities – Header Files.

Unit II

Control constructs – If – else – nested if – do while – while – nested loops – break statement – continue, switch case – storage classes – Arrays – Pointers – Structure – Union – Files - Programs using control constructs, arrays, pointers, Structures.

Unit III

Object Oriented Programming Principles ; Object - Classes - Operator Overloading - Function Overloading - Inheritance - Polymorphism - Functions – Formatted I/O functions – Writing C++ Simple Program

Practical - 30

Unit IV

Program to print pay bills - Result processing – Electricity bill preparation - Telephone bill preparation – Bank Transactions; Income Tax Calculations – Admission list preparation; Driving License Application – Medical Diagnosis.

Unit V

Calculation of simple interest and compound interest – Reverse a String & Integer - Property Tax Calculation – Profit and Loss Account; Balance Sheet.

Book for Study :

Programming in C++ – Balagurusamy.

ELECTIVE COURSE – III (EC)

A) MANAGEMENT CONCEPTS

Objective : To impart knowledge on the concepts of management principles and to educate and understand the human behaviour & relations in organisations.

(Theory only)

Unit- I

Management – Meaning – Nature of Management - Management and Administration - Function of Management- Levels of Management - Evaluation of Management Thoughts- F.W. Taylor - Hendry Fayol - Elton Mayo, Hendry Gantt- Oliver Sheldon. Scientific Management – Hawthorne Experiments.

Unit- II

Planning- Meaning – Importance – Nature – Advantages And Limitations of Planning. Process of Planning - Kinds of Planning - Planning Premises – Making Planning Effective. Planning and Decision Making

Unit- III

Organization – Nature and Importance- Principles- Key Elements in Organization Process. Types of Organization- Authority and Responsibility-Centralization and Decentralization- Delegation of Authority - Span of Control – Committees and Informal Organization.

Unit- IV

Staffing – Selection- Recruitment, Sources of Recruitments, Selection, Selection Procedure, Training-Need and Importance - Types of Training. Direction- Significance – Leadership - Meaning - Types. Coordination - Determinants of Coordination Needs- Coordination Mechanisms- Techniques of Coordination.

Unit- V

Control – Meaning – Factors - Control Process- Characteristics of an Ideal Control System. Control Devices - Traditional Devices – Budgetary Control Essentials of Budgetary Control - ZBB, Inventory Control - BEp Analysis - Statistical Quality Control Devices -Profit & Loss Control Technique. Modern Control Devices- ROI, PERT, CPM, MIS, Cybernetics, Management Audit.

Recent Trends and New Perspective in Management –Strategic Alliances, Core Competences, Business Process Reengineering, Total Quality Management, Bench marking.

Text and Reference books : (Latest Revised Edition only)

1. Keith Davis, Human Behaviour at work, Tata Mc Graw Hill, New Delhi.
2. Koontz, Harold, Cyril O'Donnell, and Heinz Woihrich; Essentials of Management, Tata McGraw – Hill, New Delhi.
3. VSP Rao & V. Hari Krishna, "Management' Excel Pulishers, New Delhi.
4. KumkumMacharjee, 'Principles of Management and Organisational Behaviour' TataMcGrawHill, New Delhi.
5. Stephen P. Robbins, Marg Coulter NeharisaVohra,"Management" Prentice Hall of Pearson, New Delhi.
6. L.M Prasad; Organizational Behaviour, Sultan Chand & Sons, , New Delhi.
7. Sukla, Madhukar: Understanding Organisations: Organisation Theory and Practice in India, Prentice Hall, New Delhi.
8. Stephen P. Robbins, Organisational Behavior, Prentice Hall, NewDelhi 2005.

ELECTIVE COURSE – III (EC)

B) CUSTOMER RELATIONSHIP MANAGEMENT

Objective : To facilitate students to understand the process and strategy of Customer Relationship Management.

UNIT 1

Introduction and Significance of Customer Relationship Management: CRM Emerging Concepts; Need for CRM; CRM Applications; CRM Decisions; The Myth of Customer Satisfaction; CRM Model; Understanding Principles of Customer Relationship; Relationship Building Strategies; Building Customer Relationship Management by Customer Retention; Stages of Retention; Sequences in Retention Process; Understanding Strategies to Prevent Defection and Recover Customers.

UNIT 2

CRM Process: Introduction and Objectives of a CRM Process; an Insight into CRM and e- CRM/online CRM; The CRM cycle i.e. Assessment Phase; Planning Phase; The Executive Phase; Modules in CRM, 4C's (Elements) of CRM Process; CRM Process for Marketing Organization; CRM Affiliation in Retailing Sector; Key e-CRM features.

UNIT 3

CRM Architecture: IT Tools in CRM; Data Warehousing Integrating Data from different phases with Data Warehousing Technology; Data Mining: - Learning from Information Using Date Mining Technology like OLAP etc.; Understanding of Data Mining Process; Use of Modeling Tools; Benefits of CRM Architecture in Sales Productivity; Relationship Marketing and Customer Care, CRM Over Internet.

UNIT 4

CRM Implementation: Choosing the right CRM Solution; Framework for Implementing CRM: a Step- by-Step Process: Five Phases of CRM Projects

UNIT 5

Development of Customizations; Beta Test and Data Import; Train and Retain; Roll out and System Hand-off; Support, System Optimization and Follow-up; Client/Server CRM Model; Use of CRM in Call Centers using Computer Telephony Integration (CTI); CTI Functionality; Integration of CRM with ERP System. Case Studies

Books for Reference:

1. Mohammed, H. Peeru and a Sagadevan (2004). Customer Relationship Management. Vikas Publishing House, Delhi.
2. Paul Greenberge (2005). CRM-Essential Customer Strategies for the 21st Century. Tata McGraw Hill.
3. William, G. Zikmund, Raymund McLeod Jr.; Faye W. Gilbert (2003). Customer Relationships Management. Wiley.
4. Alex Berson, Stephen Smith, Kurt Thearling (2004). Building Data Mining Applications for CRM. Tata McGraw Hill

CORE COURSE – XIII (CC)
JAVA PROGRAMMING AND ITS BUSINESS APPLICATIONS

Objective : To understand the knowledge of Java based applications

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks
University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*
Examination Duration : Theory 2 Hours ; Practical 2 Hours

(Theory & Practical) **(Theory 45 Marks)**

UNIT – I

Fundamentals of object oriented programming – Java Evolution – Java Tokens – Constants, Variables and Data types – Operators and Expressions – Branching and Looping Statements – Arrays – Call by Reference and Value.

UNIT - II

Classes – Objects and Methods – Define a class – Create a class – Constructors – Function overloading – Inheritance – String Handling - applet - AWT - Try & Catch Statement.

UNIT – III

Interfaces: Implementing Multiple Inheritance – Packages – Creating and Accessing Packages – Threads – Creation of threads, thread methods – Exceptions – Types of Exceptions – Try, catch, throw, throws statements – Managing Input/Output statements

(Practical – 30 Marks)

UNIT – IV

Business Applications using classes, objects, packages, inheritance and interfaces

UNIT – V

Developing applet programs using AWT & Graphics

Books for Reference:

1. C. Xavier – Programming with Java 2 – SCITECH Publications
2. E. Balagurusamy – Programming with Java – Second Edition
3. John R. Hubbard – Programming with Java – McGraw Hill International Edition
4. C Muthu – Programming with Java – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – XIV (CC)
ADVANCED FINANCIAL MANAGEMENT

Objective : To enable the students understand concepts and application of financial management tools.

UNIT I

Financial Management: Meaning, nature and scope of finance; financial goal – Profit Vs Wealth Maximisation; Finance functions – investment, financing and dividend decisions.

UNIT II

Fundamental valuation concepts: - Time value of money – Compound value, Present value; Risk and Return – concept, Risk in a portfolio context, Relationship between Risk and Return. Valuation of Securities – Valuation concept – Bond Valuation – Valuation of Preference shares, Equity valuation – Dividend valuation approach, Earnings capitalisation approach and Ratio approach.

UNIT III

Cost of capital: Meaning and Significance of cost of capital; calculation of cost of debt, preference capital, equity capital and retained earnings; combined cost of capital (weighted). Financial Leverage: Meaning, Measurement of leverages; Effect of Operating and Financial Leverage on Profit; Analysing alternate financial plans; combined financial and operating leverages.

UNIT IV

Planning the Capital Structure – Factors influencing capital structure; EBIT-EPS Analysis, Return on Investment Analysis, Cash flow analysis, capital structure policies – Theories. Dividend policy - Factors determining dividend pay-out, Forms of dividend; stability in dividend policy; corporate dividend behaviour

UNIT V

Management of working capital:- Meaning, Significance and Types of working capital; calculating operating cycle period and estimation of working capital requirements; sources of working capital; Management of cash, receivables and inventory.

Theory – 45 Marks and Problems – 30 Marks

EQUAL IMPORTANCE TO BE GIVEN TO ALL UNITS

Text and Reference Books (Latest revised edition only)

1. I.M.Pandey. Financial Management,Vikas Publishing House Pvt ltd, New Delhi.
2. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
3. M.Y.Khan&P.K.Jain,Financial Management, Text and Problems. Tata McGraw-Hill Publishing Company Ltd, New Delhi.
4. P.V. Kulkarni & B.G. Sathyaprasad,Financial Management –Himalaya Pulishing House, Mumbai.
5. S.N.Maheswari, “Financial Management principles and practice,”Sultan Chand & Sons, New Delhi.
6. James C. Van Horne & John M. Wachowicz, Jr.Fundamentals of Financial Management- PHI Learning Private Limited, New Delhi.
7. Srinivasan, Financial Management, Vijay Nicole, Chennai

ELECTIVE COURSE - IV (EC)

A) LOGISTICS & SUPPLY CHAIN MANAGEMENT

Objective : To facilitate students understand the concepts and methods of Logistics and supply chain management.

UNIT I:

Introduction to logistics management- Definition, scope, functions, objectives – Integrated logistics management, role of logistics in the Supply chain - Logistics & customer service, Role of logistics in competitive strategy, Logistics organization & performance measurement, ERP – SAP - ORACLE

UNIT II:

Inventory planning, inventory costs, classifying inventory, Nature & importance of warehousing, types of warehouses, warehousing functions, warehouse layout & design. Material handling objectives, guidelines & principles, selection of material handling equipments. Packaging-role of packaging, packaging materials, consumer & industrial packaging, material handling efficiency

UNIT III:

Transportation- role of transportation in logistics, transportation selection decision, basic modes of transportation- Rail, Road, Water, Air, Pipeline- characteristics of different modes- transport economics - Inter modal operations

UNIT IV:

Containerization-concept, types, benefits, Types of carriers- indirect & special carriers, Role of intermediaries- shipping agents, brokers- freight management- route planning Role of ports, ICDs, CONCOR - Global shipping options

UNIT V:

Reverse logistics- scope, design, e-logistics- logistics information system-application of IT in logistics- automatic identification technologies- bar coding, RFID, Logistics outsourcing- 3PL & 4PL, Global logistics- operational & strategic issues

Books for Reference:

1. Logistics Management, Ailawadi C Sathish & Rakesh Singh, , Prentice Hall, India, 2005
2. Textbook of Logistics & Supply Chain Management,Agrawal D K, Macmillan India Ltd, 2003
3. The Management of Business Logistics, Coyle et al., , Thomson Learning, 7th edition, 2004
4. Logistical Management- The Integrated Supply Chain Process, Bowersox Donald J, Tata McGraw Hill, 2000
5. Logistics & Supply Chain Management – B Nanadakumar – Vijay Nicole Imprints Pvt. Ltd., Chennai

ELECTIVE COURSE - IV (EC)
B) COMPUTER NETWORKS & INTERNET APPLICATIONS

Objective : To help students practically learn the concepts and uses of networking and internet.

UNIT I

Networking – Type of networking – Importance – components of network – Network Protocol – TCP/IP – Internet Service Providers – Dialer Programs and Internet Programs – Internet Explorer – Netscape.

UNIT II

Introduction to Internet – A Brief History of Internet – Uses of Internet – The connection to the Internet – Simple HTML tags - Web pages – Web Pages come from the Web server – Web sites – The normal Modem – ISDN, ADSL, CABLE Modems – Animation – Frames: Several Web pages at once – Several Windows simultaneously – Printing.

UNIT III

Internet Basics : Evolution – Basic Terminology – Getting into the net – Browsers – Applications of Internet – Introduction to internet protocols – Language of Internet – Email and Voice mail – Creating mail address – Meaning of Net Meeting and Chatting – Tool bar.

(Practical – 40 marks)

UNIT IV

E-mail id creations, composing, attaching files and sending mails - developing websites with hyperlinks - browsing – search engines – downloads.

UNIT V

Visiting business places, libraries, Railway and Airline reservation centers online, online chatting.

Books for Reference:

1. The Internet Instance Reference – Paul E Hoffman, BPB Publications.
2. Internet for Everyone – Alexis Leon Mathews, Vijay Nicole Imprints Pvt. Ltd., Chennai
3. Computer Applications in Business (Internet only), Srinivasa Vallabhan, Sultan Chand & Sons, New Delhi.
4. Internet Programming and Web Design – S.Aarathi, Kalaikathir Achagam.
5. Internet & E-mail – Yatin Publications, Delhi.
6. Internet Complete – BPB Publications.

ELECTIVE COURSE - V (EC)

A) HUMAN RESOURCE MANAGEMENT

Objective : To impart knowledge on the concepts and principles of HRM followed in different types of organization.

Unit I:

Human Resource Management- Meaning – Nature and Scope, Objectives - Functions - Distinction between HRM and Personnel Management. Personnel Policies: Procedure and Programmes. Organization of HRM Department– Needs - Recent Trends in HRM Practices – Personnel Audit- Human Resource Information System- need and benefits.

Unit II :

Man Power Planning – Characteristics: Need, Process - Job Analysis- Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment- Job Enlargement–Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement - Induction

Unit III :

Training –Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes- Methods - Promotion – Types, Merits- Demotions; Carrier Planning - Transfers,

Unit IV :

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

Unit V :

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre -requisites – Benefits.

Text and Reference Books (Latest revised edition only)

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi
2. Dr.Ashwathappa, Human Resource Management ,McGraw Hill Education (India) Pvt. Limited, New Delhi.
3. Edwin Phillip, Personnel Management - Tata McGraw Hill, Delhi.
4. L.M. Prasad ,Human Resources Management, Jain Book Agency, New Delhi.
5. DaleYoder& Paul D. Staudohar, Personnel Management, Prentice Hall.
6. S.S. Khanka, Human Resource Management ,S.Chand& Sons, New Delhi.
7. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
8. H.JohnBernardin&JoyeeE.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
9. David A. DeCenzo& Stephen P.Robbins, Personnel/Human Resource Management, Thirdedition, PHI/Pearson.
10. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, NewDelhi.

ELECTIVE COURSE - V (EC)

B) TOTAL QUALITY MANAGEMENT

Objective : To make students understand concepts, process and importance of Total Quality Management in manufacturing and service organisation.

UNIT I

Introduction to Quality Control - Quality and Cost Considerations - Statistics and its Applications in Quality Control

UNIT II

Sampling Inspection in Engineering Manufacture- Statistical Quality Control by the Use of Control Charts- Methods of Inspection and Quality Appraisal - Reliability Engineering – Value Engineering and Value Analysis

UNIT III

Theory of Sampling Inspection - Standard Tolerancing - ABC Analysis - Defect Diagnosis and Prevention

UNIT IV

Quality Improvement: Recent Technique for Quality Improvement - Zero Defect – Quality Motivation Techniques - Quality Management System and Total Quality Control

UNIT V

Selection of ISO Model ad Implementation of ISO 9000 - Human Resource Development and Quality Circles - Environmental Management System and Total Quality Control

Books for References

1. Dahlgaard Jens J., Kristensen K., Kanji Gopal K, “Fundamentals Of Total Quality Management”, Bross Chapman & Hall, London
2. George, Stephen and Weimerskirch, Arnold, “Total Quality Management - Strategies and Techniques
3. Proven”, Mohit Publications
4. Hakes, Chris (editor), “Total Quality Management: The Key to Business Success”, NY: Chapman and Hall
5. Fox, Roy, “Making Quality Happen. Six Steps to Total Quality Management”, McGraw-Hill
6. Srinivasa Gupta and Valarmathy, Vijay Nicole Imprints
7. Jain, “Quality Control And Total Quality Management”, Tata McGraw Hill
8. Lal H, “Total Quality Management: A Practical Approach”, New Age International Private Ltd
9. Rao, Ashok, “Total Quality Management: A Cross Functional Perspective”, Wiley & Sons

PROJECT

PROJECT (DISSERTATION AND VIVA-VOCE)

OBJECTIVES :

To facilitate the students to understand the Business enterprises systematically and present the research report as per the acceptable format.

The project topics are to be finalised to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various problems and issues pertaining to Commerce and Computer Applications. Each candidate should submit two copies of dissertation as per the guidelines to the Controller of Examination and one copy to the department concerned. The project will be evaluated for 100 marks (ie. 80 marks for Dissertation work and 20 marks for Viva-Voce) by Internal (Supervisor) and External Examiners. The average of the Marks of the Internal Examiners (Supervisors) and External Examiners shall be considered as the final marks to be awarded for project. The passing minimum for Dissertation is 40 marks and viva voce examination is 10 marks.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.Com. Cooperative Management –Course Structure under CBCS

(For the candidate admitted from the academic year 2016-2017 onwards)

(updated on 12-6-2017)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int	Ext	
I	Core Course – I (CC)	Cooperation: Theory and Development	6	4	3	25	75	100
	Core Course – II (CC)	Management of Cooperative Enterprises	6	4	3	25	75	100
	Core Course – III (CC)	Managerial Economics	6	4	3	25	75	100
	Core Course – IV (CC)	Organisational Behaviour	6	4	3	25	75	100
	Elective Course – I (EC)	Rural Development or Rural Social Institutions	6	4	3	25	75	100
	TOTAL		**30**	**20**				**500**
II	Core Course – V (CC)	Cooperative Accounts and Audit	6	5	3	25	75	100
	Core Course – VI (CC)	Financial Management	6	5	3	25	75	100
	Core Course – VII (CC)	Human Resource Management	6	5	3	25	75	100
	Core Course – VIII (CC)	Research Methods and Statistics	6	5	3	25	75	100
	Elective Course – II (EC)	Investment Management or Quantitative Techniques	6	4	3	25	75	100
	Total		**30**	**24**				**500**
III	Core Course – IX (CC)	Legal Frame work for Cooperatives	6	5	3	25	75	100
	Core Course – X (CC)	Dynamics of Cooperation	6	5	3	25	75	100
	Core Course – XI (CC)	Marketing Management	6	5	3	25	75	100
	Core Course – XII (CC)	Practical Training and Internship	6	5	3	25	75	100
	Elective Course – III (EC)	Services Marketing or Export Marketing	6	4	3	25	75	100
	TOTAL		**30**	**24**				**500**

IV	Core Course – XIII (CC)	Cost and Management Accounting	5	5	3	25	75	100
	Core Course – XIV (CC)	Management Information System	5	5	3	25	75	100
	Elective Course - IV (EC)	Strategic Management or Project Management	5	4	3	25	75	100
	Elective Course - V (EC)	Total Quality Management or Retail Management	5	4	3	25	75	100
	Project	Project (Dissertation and Viva-Voce)	10	4				100
	TOTAL		**30**	**22**				**500**
GRAND TOTAL				**90**				**2000**

Note:

Project : 100 Marks
Dissertation : 80 Marks - Passing minimum 40 marks
Viva Voice : 20 Marks - Passing minimum 10 marks

Core Papers - 14
Elective Papers - 5
Project - 1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate Passing Minimum is prescribed for Internal and External
   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

CORE COURSE - I
COOPERATION: THEORY AND DEVELOPMENT

OBJECTIVES:

- To facilitate the students to understand the values and Principles of Cooperation
- To facilitate the students to gain knowledge on the various cooperative development models
- To enable the students to understand the Government Policies towards cooperatives and development of cooperatives during pre and post independence era.

UNIT I

Concept of Cooperation: Cooperative Thought Process - Pre–Rochdale Thinkers: Robert Owen, Charles Fourier - Post-Rochdale Thinkers: Raiffeisen, Dr.Warbasse, Fauquet, Charles Guide - Jawaharlal Nehru and Mahatma Gandhiji's views on Cooperation – Statement of Cooperative Identity, 1995.

UNIT II

Cooperative Development Models: Voluntary Vs Imported Compulsory Cooperation - Limited Vs. Unlimited Liability - Federal Vs. UNITary Structure - Univalent Vs Polyvalent Cooperatives - Conventional Vs. Integrated Model - New Generation Cooperatives – Merits and demerits of various models

UNIT III

Cooperative Development in Abroad: Working profile of Consumers Cooperatives in Sweden and U.K - Cooperative Banking in Germany & Italy - Milk Producers Cooperatives in Denmark - Cooperative Farming Societies in Israel - Reasons for their success in their performance and contribution to their national economy.

UNIT VI

Cooperative Development in India - Pre–Independence Period: Cooperative Credit Societies Act-1904 – Cooperative Societies Act 1912- Recommendations of various Committees and Commissions for development of cooperatives: Sir Edward Maclagan Committee 1914 – Royal Commission on Agriculture 1928 - Cooperative Planning Committee 1945.

UNIT V

Cooperative Development in India - Post – Independence Period: Recommendations of various Committees and Commissions for development of cooperatives: All India Rural Credit Survey Committee 1954 - All India Rural Credit Review Committee 1969 – CRAFICARD 1981 - Report of Task Force on Cooperative Credit (STCCS) 2004 – Report of the High Powered Committee on Cooperatives 2009 - Constitution Amendment 2011 - Problems and Challenges faced by Cooperative Sector in India.

REFERENCES :

1. Dubhashi, P.R (1970), Principles and Philosophy of Cooperation, VAMNICOM, Pune.
2. Government of India (2009), Report of the High Powered Committee on Cooperatives.
3. Hajela T.N (2000), Principles, Problems and Practices of Cooperation, Konark Publishers, New Delhi.
4. Ian Mac Pherson (1995), Cooperative Principles for the 21st Century, ICA, Geneva.
5. Krishnasamy O.R and Kulandaiswamy, V (2000), Cooperation: Concept and Theory, Arudra Academy, Coimbatore.
6. Krishnasamy O.R. (1985), Fundamentals of Cooperation, S.Chand & Co., New Delhi.
7. Mathur B.S. (2000), Cooperation in India, Sahithya Bhavan Publishers, Agra.
8. Paul Lambert (1969), Studies in Social Philosophy of Cooperation, Cooperative Union Ltd., Manchester.
9. Plunkett Foundation (1996), The World of Cooperative Enterprises.

CORE COURSE - II
MANAGEMENT OF COOPERATIVE ENTERPRISES

OBJECTIVES :

- To familiarize the students with the concepts of Management of Cooperative Enterprises.
- To enable the students to understand the governance structure of cooperative enterprises.
- To enable the students to understand the basic issues faced by the cooperatives.

UNIT I

Cooperatives as an Economic Enterprise: Characteristics-Cooperatives as social Enterprises – Cooperatives as Tiny and Village enterprises - Group and CommUNITy, Socio –Cultural factors influencing Cooperative behaviour-Cooperation as a Social Movement.

UNIT II

Cooperative Management: Concept – Goals – Governance Structure – Board and Executive Relationship - Participative Democratic Control – Comparison of Managements of Profit Businesses and Cooperative (non profit) Businesses.

UNIT III

Administrative System for Cooperatives: At Central, State levels – Registrars of Cooperative societies – Functional Registrars- Their powers and duties – Administrative set up under the control of RCS.

UNIT IV

Issues in Cooperative Management: Professional Management, De-Officialisation – State Partnership- Operational Efficiency – Key Result Areas – Strategies for sustainable Development of Cooperatives in India.

UNIT V

Cooperative Governance and Empowerment-97th Constitutional Amendment-2011-New Generation Cooperatives – SWOT Analysis

References

1. I.C.A (1977), Readings in Cooperative Management, New Delhi.
2. Kamat G.S. (1987) New Dimensions of Cooperative Management, Himalaya Publishing House, New Delhi,
3. Krishnaswamy, O.R (1976), Cooperative Democracy in Action, Somaiya Publishing House, Mumbai.
4. Kulandaisamy, V (2000), Cooperative Management, Arurdhra Academy, Coimbatore.
5. Nakkiran S (2013), Cooperative Management, Deep and Deep Publications, New Delhi.
6. Sha A.K (1984), Professional Management for Cooperative, Vikas Publishing House, New Delhi.
7. Sinha S.K. & R. Sahaya (1981), Management of Cooperative Enterprises, NCCT, New Delhi.

CORE COURSE -III
MANAGERIAL ECONOMICS

OBJECTIVE :

To make the students to realize the usefulness of economic tools, principles &laws in making business decisions.

(Theory only)

UNIT I

Managerial Economics – Meaning, Nature, Scope and Applications – Relationship with other disciplines – Role of Managerial Economist – Demand Analysis – Demand Determinants - forecasting.

UNIT II

Production Function – Managerial use of production function – Supply analysis - Law of Supply – managerialuses of supply curve. Cost Concepts, classification & determinants – Cost Output relationship – Economies of scale - Cost Control and Cost Reduction.

UNIT III

Price and Output decisions under different marketing structures - Perfect competition, Monopoly, Oligopoly & Monopolistic Competition – Price discrimination – Pricing OBJECTIVEs, policies, Strategies and methods - Price differentials – Price forecasting.

UNIT IV

Profit – Nature &Concept – Profit Planning, policies and Forecasting-measurement of profit Interest – Rent.

UNIT V

Business Cycle and business policies – Economic forecasting for business – Input output analysis – National income - accounting and measurement.

REFERENCES :

1. Joel Dean, Managerial Economics – Prentice Hall, New York.
2. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi.
3. Varshney and Maheswari - Managerial Economics - Sultan Chand and Sons, New Delhi.
4. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai.
6. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi.
7. Cauvery, SudhaNayak and Others - Managerial Economics - S. Chand and Sons, New Delhi.
8. H. Craig Petersen, W. Cris Lewis, Managerial Economics, 4th Edition, Pearson Education.

CORE COURSE IV
ORGANISATIONAL BEHAVIOUR

OBJECTIVE :

To make the students understand the basics of individual behaviour and group behaviour of people at work and enable them to gain knowledge relating to overall development of the organisation

(Theory only)

UNIT I

Organisational Behaviour – Meaning – Characteristics – Disciplines contributing to OB – Relationship with other Social Sciences – Approaches to OB – Hawthorne Experiments.

UNIT II

Perception: Process – Factors influencing perception - Distortion in Perception – Learning: Theories of Learning – Attitudes: Factors influencing Attitude.

UNIT III

Personality: Theories of Personality – Determinants – Types - Emotional Intelligence – Features - Group Dynamics: Formal and Informal Groups – Group Cohesiveness – Stress Management: Causes and Effects of Stress – Coping strategies for stress.

UNIT IV

Leadership: Theories and styles – Motivation – Theories of Motivation – Communication – Conflict Management: Role Conflict – Goal Conflict and inter personal conflict

UNIT V

Organisation change – Process – causes of resistance to change and Overcoming resistance to change –Organisation Development – OD Process and Techniques – Organisation Culture – Factors influencing organisation culture – Organisational Effectiveness – Process and factors influencing organizational effectiveness.

REFERENCES

1. L.M. Prasad, Organisational Behaviour – Sultan Chand & Sons, Delhi.
2. K. Aswathappa, Essentials of Organisational Behaviour, McGraw Hill, Delhi.
3. Fred Luthans, Organisation Behaviour, McGraw Hill, Delhi
4. Hell Riegel, Slocum and Woodman, Organisation Behaviour, South Western, Thomson Learning, 9th Edition,
5. R.S. Dwivdi, Human Relations and Organizational Behaviour, Mc Millan India Ltd., 5th Edition.
6. Stephen P. Robbins, Organizational Behaviour, 9th Edition, Pearson Education, New Delhi,
7. P.Subba Rao, Essentials of Human Resource Management and Industrial Relations, Himalaya Publishing House.
8. C.S. VenkataRatnam and B.K.Srivastava, "Personnel Management and Human Resources, TMH.
9. P.C. Tripathi, Personnel Management and Industrial Relations ,Sultan Chand & Sons.
10. B.S.Bhatia and G.S.BatraHuman Resource Management — Deep & Deep Publications.

ELECTIVE- I
(A): RURAL DEVELOPMENT

OBJECTIVE :

- To understand the Concept of Rural Development Administration and various Rural Development Programmes.

UNIT I

Rural Development: Concepts – Definition – OBJECTIVEs and Scope- Components – Features of Rural Economy – Approaches to Rural Development in India–Programmes of Rural Development during Five year plans.

UNIT II

Theories of Development: Gandhian Approach to Development – Obstacles to Growth and Development - Millennium Development Goals - Prof. Amarthiasen's Approaches to Development

UNIT III

Resources Centered Issues: Land Reforms–Cropping patterns –Recent Trends in Agricultural and Economic Development, Population: concepts - Causes of Poverty-Development Scheme-IRDP–DWCRA- Water Shed Programme- NREGS

UNIT IV

Infrastructure Centered: Health, Education, Sanitation, Drinking water, Rural Connectivity, Samathuvapuram– Common Property Resources (CPR) - Joint Forest Management(JFM) Ground Level Water Management- PURA Model.

UNIT V

Rural Development Administration: Evolution of Panchayat Raj system- New Panchayat Raj System – OBJECTIVEs – Functions – Three Tier Panchayat Raj System in India- NGO's in Rural Development – Women Empowerment–Peoples Participation in Rural Development - E-Governance

REFERENCES :

1. Vekata Reddy, K. (2000) Rural Development in India- Himalaya Publication House, New Delhi.
2. Maheswari, S.(1985), Rural Development in India- A public Policy Approach, Sage Publication , New Delhi.
3. Lalitha. N(2009) 'Rural Development in India, Sterling, New Delhi.
4. Katar Singh(2010), Rural development: Principles, Policies and Management, Sage Publication, New Delhi.
5. Vasant Desai(2011), Rural development In India, Himalaya Publishing House, New Delhi.

ELECTIVE –I
(B): RURAL SOCIAL INSTITUTIONS

OBJECTIVES:

- To enable the students to conceptualize the structure and functioning of Indian Society.
- To sensitize the students to the diverse dimensions and interconnectedness of Indian Society.
- To enable the students to develop insight into the various facets of nation building in India society.

UNIT-I

Indian society: Conceptualization- Groups and communities-Unityy in diversity, cultural diversity: regional, linguistic, religious and tribal, religious pluralism-religious reform movements.

UNIT-II

Caste in India-Varna and Jati-characteristic of caste system-PCRA SC/ST Atrocities Prevention Act, Theoretical perspectives: Indological G.S.Ghurye, structural functionalism- M.N.Srinivas, S.C.Dube - Marxian perspective- A.R.Desai; Subaltern perspective-B.R.Ambedkar.

UNIT-III

Rural Economy and Religion: Agriculture and Allied Activities - khadi, cottage and village industries- land reforms- Beliefs and practices-village temple festival-change in religious life- Islam, Christianity, Buddhism factors in continuity and change.

UNIT-IV

Marriage and Family–marriage among Hindus, Muslims, Christian changing trends-family - significance, structure characteristics of joint family-changing trends

UNIT-V

Political Organization and leadership: Structure of village administration: tradition and modern-PRIs-changing trends in leadership-aspect at loggerheads.

REFERENCES :

1. Andre Beteille, Caste, (2002) Class and Power, Oxford University Press.
2. Dhanagare, D.N.(1993): Themes and Perspectives in Indian Sociology, JaipurRawat.
3. Dube, S.C.: (1967) The Indian Village, London: Routledge.
4. Hutton,J.H: (1983) Caste in India.Bombay: Oxford University press.
5. Kapadia,K.M, (1966) Marriage and Family In India. Bombay, Oxford University Press, Mencher.Joan, (1978) P.Agriculture and Social Structure in TamilNadu. NewDelhi.
6. Singh, Y. (1973) Modernisation of Indian Tradition, Delhi, Thomson Press.
7. Srinivas,M.N. (1962) Caste in India and other Eassys.Bombay: Asia publishing House,
8. Oommen, T.K. and P.N.Mukherjee, ed.(1986) Indian Sociology: Reflections and Introspections, Popular Prakashan, Bombay.

CORE COURSE V
COOPERATIVE ACCOUNTS AND AUDIT

OBJECTIVE:

- To gain knowledge about Accounting and auditing system in Co-operative Societies.

UNIT I

Cooperative Account Keeping: Evolution-differences between Double Entry book keeping and cooperative account keeping: Cooperative account keeping Vs Single entry system-day book-Ledgers-Statement of receipts and payments-Balance sheet- Final account-distribution of net profit.

UNIT II

Audit: Commercial & Co-operative Audit-Origin-Definition-OBJECTIVEs-Advantages- Nature and Scope of Audit - Differences between Commercial and Cooperative Audit- Rights, Duties and Responsibilities of Commercial Auditor Vs Cooperative Auditor- Audit Programme - Vouching of Cash and Trade Transitions- Routine Checking- Importance of Routine Checking.

UNIT III

Verification and valuation of Assets and Liabilities: meaning of verification-mode of valuation of various assets and liabilities-Depreciation-Definition – OBJECTIVEs- Methods- Auditors duty. Reserve: Meaning-Definition-Various Reserves- Audit of Final Accounts**:** Profits and Loss Account-Balance Sheet-Relationship between them.

UNIT IV

Audit Programme for Selected Co-operatives: Co-operative Credit Institutions (PACS, DCCB and Non-Credit Co-operatives (Marketing Cooperatives, Consumers Co-operatives, Dairy Co-operatives and Industrial Co-operatives) - Audit Classifications- Preparation of Final Audit Memorandum and its Enclosures- Schedule of Audit defects.

UNIT V

Embezzlement and Fraud: Various Methods- Methods of their detection- safeguard in internal checking and internal audit- Recent Trends in Audit-International Standard of Audit (ISA)

REFERENCES:

1. Government of Tamilndu (2012) - Dept. of Cooperation, Cooperative Audit Manual.
2. Cooperative Audit, Krishnaswami O.R,
3. Tandon (2004) Principles & Practice of Auditing, S. Chand &Company
4. Dinker Pagare (2013) Principles & Practice of Auditing, S.Chand & Co.
5. Ravinder & Sharma (2011) Auditing, Principles & Pratices

CORE COURSE VI
FINANCIAL MANAGEMENT

OBJECTIVE :

- To enable the students understand concepts and application of financial management tools.

(Theory & Problem)

UNIT I

Financial Management : Meaning, nature and scope of finance; Financial goal – Profit Vs Wealth Maximisation; Finance functions – investment, financing and dividend decisions.

UNIT II

Fundamental valuation concepts :- Time value of money – Compound value, Present value; Risk and Return – concept, Risk in portfolio context, Relationship between Risk and Return.

Valuation of Securities – Valuation concept –Valuation of Bond – Valuation of PREFERENCEshares, Equity valuation – Dividend valuation approach, Earnings capitalisation approach and Ratio approach.

UNIT III

Cost of capital : Meaning and Significance of cost of capital; calculation of cost of debt, pREFERENCEcapital, equity capital and retained earnings; combined cost of capital (weighted).

Financial Leverage : Meaning, Measurement of leverages; Effect of Operating and Financial Leverage on Profit; Analysing alternate financial plans; combined financial and operating leverages.

UNIT IV

Planning the Capital Structure – Factors influencing capital structure; EBIT-EPS Analysis, Return on Investment Analysis, Cash flow analysis, capital structure policies – Theories. Dividend policy -Factors determining dividend pay-out, Forms of dividend; stability in dividend policy; corporate dividend behaviour

UNIT V

Management of working capital:- Meaning, Significance and Types of working capital; calculating operating cycle period and estimation of working capital requirements; sources of working capital; Management of cash, receivables and inventory.

(Note: Theory: 45 Marks; Problems: 30 Marks)

REFERENCES

1. I.M.Pandey. Financial Management,Vikas Publishing House Pvt ltd, New Delhi.
2. Prasanna Chandra,Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
3. M.Y.Khan&P.K.Jain,Financial Management, Text and Problems. Tata McGraw-Hill Publishing Company Ltd, New Delhi.
4. P.V. Kulkarni & B.G. Sathyaprasad,Financial Management –Himalaya Pulishing House, Mumbai.
5. S.N.Maheswari, "Financial Management principles and practice,"Sultan Chand & Sons, New Delhi.
6. James C. Van Horne & John M. Wachowicz, Jr.Fundamentals of Financial Management- PHI Learning Private Limited, New Delhi.
7. Agarwal & Mishra, "Financial Management "Ramesh Book Depot, Jaipur.
8. Srinivasan, Financial Management, Vijay Nicole, Chennai

CORE COURSE VII
HUMAN RESOURCE MANAGEMENT

OBJECTIVE:

- **To impart knowledge on the concepts and principles of HRM followed in different types of organization. (Theory only)**

UNIT I

Human Resource Management- Meaning – Nature and Scope, OBJECTIVEs - Functions Distinction between HRM and Personnel Management. Personnel Policies: Procedure and Programmes. Organization of HRM Department– Needs - Recent Trends in HRM Practices – Personnel Audit- Human Resource Information System- need and benefits.

UNIT II

Man Power Planning – Characteristics: Need, Process - Job Analysis- Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment- Job Enlargement –Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement - Induction

UNIT III

Training –Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes- Methods - Promotion – Types, Merits- Demotions; Carrier Planning - Transfers,

UNIT IV

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

UNIT V

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre - requisites – Benefits.

REFERENCES :

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi
2. Dr.Ashwathappa, Human Resource Management ,McGraw Hill Education (India) Pvt. Limited, New Delhi.
3. Edwin Phillip, Personnel Management - Tata McGraw Hill, Delhi.
4. L.M. Prasad ,Human Resources Management, Jain Book Agency, New Delhi.
5. DaleYoder& Paul D. Staudohar, Personnel Management, Prentice Hall.
6. S.S. Khanka, Human Resource Management ,S.Chand& Sons, New Delhi.
7. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
8. H.John Bernardin&JoyeeE.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
9. David A. DeCenzo& Stephen P.Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
10. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, NewDelhi.

CORE COURSE VIII
RESEARCH METHODS AND STATISTICS

OBJECTIVES :

Upon completion of the course, the students will be able to:

- identify and formulate a problem for research.
- prepare suitable research design to study a research problem to be formulated
- choose appropriate methods of sampling, tools and techniques of data collection
- process the data collected in the field and to analyse by using appropriate statistical methods
- prepare research report in a professional manner.

UNIT I

Introduction: Research – definition - OBJECTIVEs-types. Research Process- Identifying and prioritizing problems - theoretical framework – review of literature, variables -its types– Hypothesis – formulation and types.

UNIT II

Research design: Explorative, Experimental, descriptive, Case study and survey methods - Content Analysis - Intervention and Interdisciplinary Studies - Mixed methods.

UNIT III

Data collection: Sampling and non-sampling techniques - Data collection methods – interview, schedule, Questionnaire, and observation. Online research methods, psychological tests, projective techniques. Validity and reliability of scales - Research Report - Components and format of research report - Reference materials, quotations, bibliography, footnotes, glossary and appendix, dissemination of findings.

UNIT IV

Descriptive Analysis: Measures of central tendency, dispersion, skewness and kurtosis – Correlation of Analysis, Association of attributes, Multiple regression and correlation analysis, concepts of Factor analysis - Statistical software and its uses.

UNIT V

Inferential Analysis: Basic concepts and Hypothesis testing and Estimation; Steps in hypothesis testing. Tests for Large and small samples – Z test, t-test and F-test, Chi-square test, Mann-Whitney test, and ANOVA

REFERENCES :

1. Gupta S.P.& M.P.Gupta, (2006) Business Statistics, New Delhi:Sultan Chand & Sons,
2. Shajahan Dr. S. (2006) Research Methods for Management (Text and Cases), New Delh: Jaico Publishing House,.
3. Hooda R.P., (2003) Statistics for Business and Economics, New Delhi Macmillan Ltd.,.
4. Vijayalakshmi G. & Sivapragasam C, (2009). Research Methods: Tips and Techniques, Chennai : MJP Publishers,
5. Krishnaswamy O.R, (2002), Methodology of Research in Social Sciences, Himalaya Publishing House, Bombay,
6. Kothari C.R, (2001). Research Methodology, Wishva Prakashan, New Delhi
7. Donald R Cooper and Ramela S. Schindler, (2000), Business Research Methods, Tata McGraw Hill Publishing Company Limited, New Delhi,
8. Uma Sekaran, (2000), Research Methods for Business, John Wiley and Sons lnc., New York,.

ELECTIVE –II
(A) : INVESTMENT MANAGEMENT

OBJECTIVE :

To enable the students understand the investment avenues and evaluation.

UNIT I

Nature and scope of Investment Management Investment objectives – Investment Process – Investment Media Security and Non-security forms of Investment gilt edged securities – Sources of Investment information.

UNIT II

New Issues Market – Methods of Issuing – Parties involved in the new issue market – Secondary market – Stock Exchanges – NSE and BSE – Trading mechanism – online trading – SEBI and Investors production.

UNIT III

Security Analysis – Approaches to Security Analysis – Fundamental Analysis – Technical Analysis – Dow Theory – Random Walk Theory - Efficient Market Hypothesis.

UNIT IV

Portfolio Analysis – Traditional and Modern approach – Rationale of Diversification of Investments – Markovitz theory – Sharpe Index Model - Capital Asset Pricing Model.

UNIT V

Investment companies in India – Types Mutual Fund Operations in India – UTI – SEBI and RBI Guidelines for Mutual Funds.

Note: Theory only

BOOKS FOR REFERENCE :

1. Punithavathy Pandian : Security Analysis and Portfolio Management, (Vikas Publishing House)
2. Dr S Gurusamy –Security Analysis & Portfolio Management –Vijay Nicole Imprints Pvt Ltd, Chennai.
3. Gupta L.C. : Return of Equities – The Indian Experience, (New Delhi OXFORD).
4. Bhalla V.K. : Investment Management and Portfolio Management & (S.Chand & Co. Delhi).
5. Fisher & Jordon : Security Analysis and Portfolio Management.
6. Preeti Singh : Security Analysis, Himalaya Publishing House
7. Avadhani V.A. : Investment and Securities Markets in India.
8. SEBI, 1992.Guidelines
9. Jack dark Francis (1990).Investment : Analysis and Management, McGraw Hill
10. Gara.K.L : Stock Exchanges in India.
11. Yasasway : Equity Investment Strategy.

ELECTIVE –II
(B): QUANTITATIVE TECHNIQUES

OBJECTIVE :

- **To acquaint the students with the Statistical tools and techniques for managerial decisions.**

(Theory & Problems)

UNIT I

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series .

UNIT II

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

UNIT III

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

UNIT IV

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

UNIT V

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables.

Note: 50 marks problem; 25 marks Theory

REFERENCES

1. S.P. Gupta, Statistical Methods - Sultan Chand & Sons, New Delhi – 600 002.
2. S. Gurusamy,Operations Research, Vijay Nicole Imprints Pvt. Ltd, Chennai.
3. D. Joseph Anbarasu,Business Statistics –Vijay Nicole Imprints Pvt. Ltd., Chennai.
4. C.R.Kothari, Quantitative Techniques –Vikas Publishing House, New Delhi.
5. Levin, Richard I. and David S Rubin: Statistics for Management, Prentice Hall, Delhi.
6. Hooda, R.P: Statistics for Business and Economics, Macmilla 3rd edition, New Delhi.
7. Hein, L.W: Quantitative Approach to Managerial Decisions, Prentice Hall, Delhi

CORE COURSE-IX
LEGAL FRAME WORK FOR COOPERATIVES

OBJECTIVE:

- To enable the students to understand the Cooperative Legal Framework and other related Laws with particular reference to Tamilnadu

UNIT-I

Cooperative Legislation: Need for Legal Frame Work for Cooperatives- History of Cooperative Legislation in India- Cooperative Credit Societies Act of 1904- Cooperative Societies Act of 1912 -Model Cooperative Societies Bill 1957 – Model Cooperative Societies ACT 1991-Features of Self Reliant Cooperatives Societies Act 1995 –Multiunit Cooperative Societies Act 2002 –Features.

UNIT-II

The Tamil Nadu Cooperative Societies Act 1983 and Rules 1988: Provisions Relating to Registration, Amendment of Bye Laws, Division-Amalgamation, Qualifications and Disqualification of Members-Management of Cooperatives - Duties and Privileges of Registered Societies -Properties and Funds of a Registered Societies- Net Profit Distribution.

UNIT-III

The Regulatory Provisions Relating to Cooperatives – Audit , Inquiry, Inspection, Surcharge-Supersession of the Board-Winding up of Cooperatives- Settlement of Disputes – State Aid to Registered Cooperatives.

UNIT-IV

The Provisions Relating to Employees of Cooperatives: Common Cadre-Recruitment Bureau-Selection, Placement- Rewarding – Offences and Penalties to Employees – Provisions relating to Appeal -Revision-Review- Cooperative Tribunals.

UNIT-V

Other Laws –Indian Contract Act of 1872 - Essential of Valid Contract - Breach of Contract and its Remedies. Sale of Goods Act 1930- Sale-Agreement to Sell, Transfer of Properties Act 1882- Features, Indian limitation Act 1963 - Meaning– Computation of Period of Limitations, Consumer Protection Act 1986- Definition- Features, Right to Information Act 2005- Features.

REFERENCES :

1. Vidwans M.D., Cooperative Law In India, Sahithya Bhavan Publishers,New Delhi, 1956
2. Government of Tamilnadu, Tamilnadu Cooperative Societies Act of 1983
3. Government of Tamilnadu, Tamilnadu Cooperative Societies Rules of 1988
4. Weerman P.E., The Effect of Cooperatives Law on the Autonomy of Cooperatives In South East Asia, New Delhi,ICA,1989.
5. Weerman P.E.,A Model Cooperatives Societies Law With The Authors Commentary, New Delhi,ICA,1994
6. Government of India, Multi UNIT Cooperative Societies Act 2002.
7. Government of India, Report of the Committee on "Cooperative Law"1987.
8. Government of India, Report of the Committee on "Model Cooperative Act"1991 Planning Commission,1991.
9. Government of India, Indian Limitation Act 1963.
10. Government of India, Consumer Protection Act 1986.
11. Government of India, Right to Information Act-2005 .
12. Aswathappa. K& Ramachandra., Principles Of Business Law,Himalaya Publishing House, New Delhi,1997.
13. Shukla M.C., Manual of Mercantile Laws ,Chand &Co, New Delhi, 1983.
14. Kapoor N.D. and Rajni Abbi, General Laws and Procedures, Sultan Chand&Sons Revised Edition, 2010.
15. Government of India, Report the Committee on Cooperative Law on Democratisation and Professionalisation of Management in Cooperatives, 1985.
16. Goel B.B. "Cooperative Legislation Trends and Dimensions, Deep and Deep Publications Pvt. Ltd. New Delhi (2006)

CORE COURSE X
DYNAMICS OF CO -OPERATION

OBJECTIVES:

- To enable the students to understand the Indian economic resources and the role of cooperatives in Primary, secondary and tertiary sectors
- To enable the students to understand the issues confronted by cooperatives in promotion of Indian Economy.

UNIT I

Indian Economic Resources: Its resource bases- resources optimization for balanced economic growth; integration of primary, secondary and tertiary sectors-the role of cooperatives, and other business enterprises.

UNIT II

Cooperatives in the Primary sector: Constitution, Structure and working Performance of Cooperative Agricultural credit structure, cooperative Farming and allied Cooperatives -Problems and prospects(with reference to Tamil Nadu).

UNIT III

Cooperatives in the Secondary Sector: Constitution, structure and working Performance of milk, sugar, tea and handloom weaving cooperatives - their problems and prospects (with reference to Tamil Nadu).

UNIT IV

Cooperatives in the Tertiary Sector: Constitution, structure and working Performance of banking, marketing and Consumer Cooperatives –their problems and prospects. (with reference to Tamil Nadu)

UNIT V

Issues on Cooperative Development: Cooperative principles Vs practices, State partnership, leadership in Cooperatives, peoples participation, producer & company as alternative model (with reference to Tamil Nadu).

REFERENCES:

1. Dubhashi, P.R (1970), Principles and Philosophy of Cooperation, VAMNICOM, Pune.
2. Government of India (2009), Report of the High Powered Committee on Cooperatives.
3. Hajela T.N (2000), Principles, Problems and Practices of Cooperation, Konark Publishers, New Delhi.
4. Ian Mac Pherson (1995), Cooperative Principles for the 21st Century, ICA, Geneva.
5. Krishnasamy O.R and Kulandaiswamy, V (2000), Cooperation: Concept and Theory, Arudra Academy, Coimbatore.
6. Krishnasamy O.R. (1985), Fundamentals of Cooperation, S.Chand & Co., New Delhi.
7. Mathur B.S. (2000), Cooperation in India, Sahithya Bhavan Publishers, Agra.
8. Paul Lambert (1969), Studies in Social Philosophy of Cooperation, Cooperative Union Ltd., Manchester.
9. Plunkett Foundation (1996), The World of Cooperative Enterprises.
10. Puri, S.S. (1979), Ends and Means of Cooperation, NCUI, New Delhi.
11. Mrutyunjay Sarnagi et. al (2004) Six volumes, "Each for All-All for Each" – A Study of the Impact of Cooperative Movement in Tamil Nadu.

CORE COURSE XI
MARKETING MANAGEMENT

OBJECTIVE:

To enable the student to understand the concepts of modern marketing and various strategies employed in marketing management.

UNIT I

Marketing Definition- Importance- Concepts of Marketing Task- Conventional & Situational Marketing -, Approaches to Marketing, Remarketing, De-Marketing, Synchro-Marketing Concepts- Traditional and Modern Concepts - Marketing Mix - Modern Marketing Functions - Features of Industrial, Consumer and Services Marketing.

UNIT II

Product : Meaning-Classification of Goods- Product Planning and Development- Product Life Cycle - New Product Development- Product Positioning – Diversification – Product Related Strategies – Branding - Brand Image Building- Brand Extension - Brand Celebrity.

UNIT III

Market Segmentation : Bases and Benefits - Consumer Behavior- Factors Influencing Consumer Behavior, Post Purchase Behavior - Marketing Research - Steps In Marketing Research - Sales Forecasting : Techniques and Criteria.

UNIT IV

Pricing : Meaning and OBJECTIVEs - Pricing Policies Strategies- Pricing Methods - Promotion Mix : Purpose of Promotion- Promotion Strategy – Sales Promotion - Levels, Advertising : Kinds of Advertising - Advertising Copy- Advertising Budget - Advertising Agency. Sales Management : Salesmanship – Qualities - Effective Selling - Sales Process

UNIT V

Distribution : Selection of Channels of Distribution - Wholesalers and Retailers – Functions and Importance In Distribution Net Work, Warehousing –Types - Decisions. Management of Physical Distribution.Ethics in marketing.

REFERENCES

1. R.S.N.Pillai&Bagavathi, (2010), Modern Marketing, S.Chand& Co., New Delhi.
2. RajanNair.N.,SanjithR.Nair, (1999),Marketing, Sultan Chand & Sons, New Delhi.
3. Kotler Philip, 15th edition, (2015) Marketing Management, Prentice Hall of India (Pvt) Ltd., New Delhi.
4. Monga & ShaliniAnand, (2000), Marketing Management, Deep & Deep Publications, New Delhi
5. J. Jayasankar , 2nd edition,(2013), Marketing, Margham Publications, Chennai.
6. Dr. L. Natarajan (2013), Marketing, Margham Publications, Chennai.
7. Grewal , 14th edition (2015), Marketing, Tata McGraw Hill management, New Delhi.

CORE COURSE XII
PRACTICAL TRAINING AND INTERNSHIP

OBJECTIVES :

- To impart practical knowledge on the management and working of various types of agricultural and non-agricultural co-operative institutions
- To develop Managerial leadership and initiative to adopt management practices relevant to Cooperatives.

THE FIRST PHASE (PRACTICAL TRAINING)

The First Phase of Training will be visits to and observation study of various types of District, Apex and National level cooperative institutions as furnished below. The Training should be given under the Guidance and Supervision of the staff in charge who should accompany the students. The students should maintain a systematic record for Practical Training. The following Institutions may be considered to provide practical managerial knowledge to students.

DISTRICT LEVEL:

- District Central Co-operative Bank
- District Consumer Cooperative Whole Sale Stores
- District Cooperative Milk Producers Union
- District Cooperative Union
- Circle DRCS Office or JRCS Office
- Urban Cooperative Bank
- Agro-processing units: Cooperative Sugar Factory

APEX LEVEL

- Tamil Nadu State Apex Co-operative Bank,
- Tamil Nadu State Co-operative Agricultural and Rural Development Bank
- Tamil Nadu State Coop. Housing Federation.
- Tamil Nadu State Co-operative Union.
- Tamil Nadu State Co-operative Marketing Federation. (TANFED)
- Tamil Nadu Handloom Weavers Co-operative Society. (Cooptex)
- Tamil Nadu State Urban Cooperative Bank Federation.
- Tamil Nadu State Cooperative Sugar Federation.
- NCDC, NAFED, IFFCO, KRIBHCO – Regional office,
- Tamil Nadu Industrial Cooperative Bank.(TATICO Bank) ,
- Any other State level federations

NATIONAL LEVEL

Visiting inter State Cooperative Organisations, Offices / Branches of various National Level Co-operative Institutions functioning at the State Headquarters.

EVALUATION (FIRST PHASE – 25 MARKS)

Evaluation of Practical Training for 25 marks will be done by the Coordinator/ Staff incharge of the course, on the basis of training records maintained by the students.

SECOND PHASE (INTERNSHIP)

The students are to be assigned with the internship training for a period of two weeks- For this purpose students may be divided into batches. The staff in-charge may check their work by making surprise visits. Any two of the following types of Co-operative institutions may be selected for internship.

1. District Cooperative Union / Central Co-operative Bank / Urban Cooperative Bank / PACS.
2. District Consumers Whole Sale Stores / Supermarket
3. Hand loom / Spinning Mill / Sugar Mills / Tea Factories, INDCOSERVE, SAGOSERVE and other Agro-Processing Co-operatives and Sericulture Cooperatives
4. LAMPS, FSS and Marketing Cooperative Societies
5. Apex Level Co-operative Institutions of Various Types: TNSCB, SARDB, TANFED, AAVIN, COOPTEX, TAICO Bank, Housing Federation.
6. District Cooperative Milk Producers Union Ltd.

EVALUATION (PHASE-II -75 MARKS)

Evaluation of the Phase- II Practical Training (Internship) will be done by the External Examiner and Coordinator/ Staff in-charge of the programme jointly for 75 marks on the basis of internship report submitted by the students and viva voce.

The report is to be evaluated for 50 marks and viva voce for 25 marks

ELECTIVE –III
(A) SERVICES MARKETING

OBJECTIVE :

- To enable students to gain knowledge on marketing of various services.

UNIT I

Services Marketing : Definition – importance – characteristics of services – Growth of Services Marketing – Types of services – Comparative analysis between services and products.

UNIT II

Concept of services marketing : Societal concept – Buyer behaviour concept – Factors influencing buyer behaviour – Decision making process. Delivering quality Service - TQM in services marketing - Quality standards - process and technological requirements to implement quality standards in services marketing.

UNIT III

Services Marketing Mix : Product Strategy – Product Life Cycle concept – Product Strategies during the Product Life Cycle – Product Planning and development – Development of new products – Diversification and elimination.

UNIT IV

Bank Marketing – Insurance Marketing – Transport Marketing.

UNIT V

Tourism and Hotel Marketing - Education Marketing – Communication Services Marketing – Health services.

REFERENCES :

1. S.M.Jha, Services Marketing, Himalaya Publishing House, Mumbai.
2. M.Y.Khan, Services Marketing, Tata McGraw Hill, New Delhi.
3. C.B.Memoria&R.K.Suri,Marketing Management, Kitab Mahal,
4. Kotler -Marketing Management , Sultan Chand & Sons, New Delhi.
5. Cowell.- Marketing of Services, Heinemann Publishers, London.
6. Christopher Lovelock, JochenWirtz&Jayanta Chatterjee – Service Marketing People, Technology, Strategy. Pearson Education.

ELECTIVE –III
(B) EXPORT MARKETING

OBJECTIVE :

To enable the students to understand the functioning and processes involved in export marketing including the export policies and the development agencies functioning in India

UNIT I

Introduction to Export Marketing : Meaning – OBJECTIVEs – scope – Need for and importance of export trade – Distinction between internal trade and international trade – Problems faced by exporters.

UNIT II

Features and Functions of export marketing – Sources of market information – Product planning – Quality control – Export pricing – Export marketing channels – Strategy formulation.

UNIT III

Steps involved in export – Confirmation of order – Production of goods – Shipment – Negotiation – Documents used for export – Commercial documents – Regulatory documents – ISO Certificate.

UNIT IV

Export Policy and Promotion: EXIM Policy – Regulation of export trade - Organisations for promoting export – incentives and assistance – Export Houses – Trading Houses.

UNIT V

Institutions engaged in financing export – ECGC – EXIM Bank – Organisations promoting export – Commodity Board – EPC – STC – MMTC.

REFERENCES :

1. Balagopal, T.A.S., Export Marketing, Himalaya Publishing House.
2. Rathor, B.S., and Rathor, J.S., Export Marketing, HPH.
3. Francis Cherunilam, International Trade and Export Management .

CORE COURSE XIII
COST AND MANAGEMENT ACCOUNTING

OBJECTIVE :

- To make the students understand the techniques and tools of Cost & Management Accounting for decision making.

UNIT I

Cost Accounting : Meaning – OBJECTIVEs – Nature and Scope – Methods – Techniques of Costing – Classification and Coding of Costs – Inventory Control – Stock levels – Inventory Systems – Methods of pricing material issues.

UNIT II

Labour Costs : Direct and Indirect – Importance – Labour Remuneration method. Overheads – Importance – allocation and apportionment of overheads – Overhead cost control – Absorption costing – Activity Based Costing.

UNIT III

Contract Costing : Meaning – Features – Fully Completed Contract – Incomplete Contract – Cost Plus Contracts - Process Costing – Procedure Involved in Process Costing – Inter Process Profit – Joint Products and By Products.

UNIT IV

Management Accounting : Meaning – Nature and Scope – Functions – Tools & Techniques. Distinction between Cost and Management Accounting – Relationship between Cost and Management Accounting. Ratio Analysis – Meaning – Advantages – Limitations – Classification of Ratios.

UNIT V

Budgetary Control : Classification of Budgets - Marginal Costing – Break Even Analysis – Cost Volume Profit Analysis - Standard Costing and Variance Analysis.

(**Theory : 25 Marks Problem:50 Marks)**

Text and Reference Books :(Latest revised edition only)

1. R.K.Sharma & Shashi K.Gupta, "Management Accounting", Kalyani Publisher, New Delhi.
2. S.N.Maheswari, " Management Accounting", Vikas Publications, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, "Management Accounting", Margham Publication, Chennai.
4. S.P.Jain& K.L. Narang, "Cost and Management Accounting", Kalyani Publishers, New Delhi.
5. M.N.Arora, "Cost and Management Accounting", 8th Edition, Vikas Publishing House (p) Ltd, Chennai.
6. Hilton, Mahar and selto, "Cost Management", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
7. B.M. Lall Nigam and I.C. Jain, " Cost Accounting", Prentice Hall of India (P) Ltd, New Delhi.

CORE COURSE XIV
MANAGEMENT INFORMATION SYSTEM

OBJECTIVE :

To enable the students to trace the growing importance of information system, vital role in decision making and applications of computers in the system, development process & approaches.

UNIT I

Information System – Establishing the framework - Business model – information system architecture – Evolution of information systems.

UNIT II

Modern information system – System development Life Cycle – Structured methodologies – Designing computer based method - procedures control and designing structured programs.

UNIT III

Functional areas - Finance, Marketing, Production, Personnel – Levels, Concepts of DSS, EIS, ES – Comparison - concepts and knowledge representation – managing international information system.

UNIT IV

Testing security – Coding Techniques – Detection of Error – Validation – Cost benefit analysis – Assessing the value and risk of information systems.

UNIT V

Software engineering qualities – Design, production, service, software specification, software metrics, software quality assurance – Systems methodology - OBJECTIVEs – Time and Logic, Knowledge and Human dimension – Software life cycle models – Verification and validation.

REFERENCES :

1. Management Information Systems, Management Perspectives, D P Goyal, Second Edition, Macmillan, New York.
2. Management Information Systems, Dr. S.P. Rajagopalan, Margham Publications, Chennai.
3. Gordon B.Davis, Management Information System: Conceptual Foundations, McGraw Hill, U.S.A.

ELECTIVE –IV
(A): STRATEGIC MANAGEMENT

OBJECTIVE :

To enable the students to understand the processer involved in the formulation of business strategies including implementation and control of strategies towards effectiveness

UNIT I

Strategic Management : Definition – Scope – Benefits – Risks – Approaches – Models – Strategic change – Strategic Leadership and Decision making.

UNIT II

Situation Analysis : SWOT Analysis - Environmental Scanning and Industry analysis – Forecasting – Internal Scanning - Mission – objectives – Stakeholder Theory – Cyert and March's Behavioural Theory – Objectives of Non-Profit Organizations – Social Responsibility and Business Ethics.

UNIT III

Strategy Formulation : Business Strategy – Corporate Strategy – Divertional Strategy –Portfolio Analysis – BCG Growth /Share matrix – Strategic choice – Development of policies – Strategic Alliances.

UNIT IV

Strategy Implementation : Organization for action – Staffing – Strategic Leadership – MBO –Total Quality Management – Functional Strategies – Growth Strategies – Diversification, Acquisition and Joint Venture – Recovery – Recession and Diverstment Strategies – Management Buyout.

UNIT V

Strategic Control and Evaluation : Establishing Strategic control – premise control – Implementation control – Strategic Surveillance – Special Alert Control – Evaluation Techniques – Managing change – Strategic issues in Managing Technology and Innovation – Strategic Effectiveness.

REFERENCES :

1. 1. Strategic Management – Strategy Formulation and Implementation – John A.Pearce II, Richard B.Robinson Jr.(A.I.T.B.S. Publishers – J-5,6, Krishnan Nagar, Delhi – 110 051).
2. Strategic Management – Awareness and change – John L.Thompson (Cheapman & Hall 32 Second Main Road CIT East, Chennai – 35).
3. Strategic Management-J.David Hunger and Thomas L.Wheelen (Addision – Wesley Longman) (Available at Higginbotham's Ltd., Chennai).
4. Strategic Management – Gregory G.Dess and Alex Miller.
5. Strategic Management – An Integrated Approach – W.L.Charles and John Gareth,
6. Strategic Management – Concepts and Application – C.Certo and J.Paul Peter.
7. Strategic Management – John H.Barnett and William D. (Available at Atlantic Publishers and Distributors, 4215/1, Ansari Road, Darya Ganj, New Delhi – 110 002).
8. International & Strategic Management – R.N.Srivastava.
9. Strategic Planning for Corporate Success – V.S.Ramaswamy and S.Nanakumari.

ELECTIVE –IV
(B): PROJECT MANAGEMENT

OBJECTIVE :

To enable the students to identify and formulate projects and acquire knowledge about tools and techniques in project planning, implementation and control.

UNIT I

Concepts of Project Management; Project – Meaning – Nature – Types of project and project life cycle – Project management – Nature and scope of project management – Project management as a profession – Role of project manager.

UNIT II

Project Identification and Formation: Project environment – Identification of investment opportunities – Projects screening – Preferability study – Project selection – Project formulation – Stages in project formulation – Project report preparation – Planning Commission's guidelines for project formulation.

UNIT III

Project Appraisal: Objectives, essentials of a project methodology – Market appraisal – Technical appraisal – Financial appraisal – Socio – economic appraisal – Management appraisal.

UNIT IV

Project Planning and Scheduling : Objectives – Process or Planning Components or good planning – Project designing and project scheduling and time estimation – Scheduling to match availability of man power and release of funds – Cost and time trade cost.

UNIT V

Project Execution and Administration – Project contracting: Contract pricing, types – Project organisation: Forms of organisation – Project direction – Project communication – Project co ordination – Factors influencing effective project management – project time monitoring and cost monitoring – Project over runs. Project Control : Control techniques – PERT, CPM - Proper review – Project audit.

References

1. For UNIT II and IV Total project Management The Indian context by PK. Joy – Mac millan India Ltd.,
2. For UNIT I and V Project Management – by R. Panneerselvam and P. Senthil kumar PHI learning India PVT Ltd.,
3. Bhavesh .M Patel, Project Management, Vikas Publishing Hous PVT Ltd.,
4. S. Choudhury, Project Management, Tata Mcgraw Hill Co.
5. Project Management India Edition By CIDO I Clements, Cengage learning.
6. CCI Pfor D.F. Gray and Erik .w Carson, Project Management, Tata Mcgraw Hill Co.
7. Project Management – Management extra series – ANE books
8. P. Gopalakrishnan & VE. Ramamoorthy, Text book of project management, Macmillan India Ltd.,
9. Prasanna Chandra, Projects, Planning, analysis, selection financing, Implementation and Review, Tata Mcgraw Hill Co.

ELECTIVE –V
(A): TOTAL QUALITY MANAGEMENT

OBJECTIVE :

To enable the students to gain knowledge on various tools and techniques of quality control and management.

UNIT I

Introduction to Quality Control : Quality and Cost Considerations - Statistics and its Applications in Quality Control

UNIT II

Sampling Inspection in Engineering Manufacture - Statistical Quality Control by the Use of Control Charts- Methods of Inspection and Quality Appraisal - Reliability Engineering – Value Engineering and Value Analysis

UNIT III

Theory of Sampling Inspection : Standard Tolerancing - ABC Analysis - Defect Diagnosis and Prevention

UNIT IV

Quality Improvement: Recent Technique for Quality Improvement - Zero Defect – Quality Motivation Techniques - Quality Management System and Total Quality Control

UNIT V

Selection of ISO Model ad Implementation of ISO 9000 - Human Resource Development and Quality Circles - Environmental Management System and Total Quality Control

REFERENCES :

1. Dahlgaard Jens J., Kristensen K., Kanji Gopal K, “Fundamentals Of Total Quality Management”, Bross Chapman & Hall, London
2. George, Stephen and Weimerskirch, Arnold, “Total Quality Management - Strategies and Techniques Proven”, Mohit Publications
3. Hakes, Chris (editor), “Total Quality Management: The Key to Business Success”, NY: Chapman and Hall
4. Fox, Roy, “Making Quality Happen. Six Steps to Total Quality Management”, McGraw-Hill
5. Srinivasa Gupta and Valarmathy, Vijay Nicole Imprints Pvt Ltd., Chennai
6. Jain, “Quality Control And Total Quality Management”, Tata McGraw Hill
7. Lal H, “Total Quality Management: A Practical Approach”, New Age International Private Ltd
8. Rao, Ashok, “Total Quality Management: A Cross Functional Perspective”, Wiley & Sons

Elective –V

(B): RETAIL MANAGEMENT

OBJECTIVE:

To gain an in-depth knowledge about Retail Management and strategies employed.

(Theory only)

UNIT I

Retailing : Definition –Concept - Characteristics –Traditional and non-Traditional retailing – Applications of information technology in retail management - E –Retailing.

UNIT II

Global trend in retailing : Indian retail industry –Drivers to the growth of retail –Macro and micro environmental influences –Creativity in retailing -Emerging trends and challenges - FDI in retailing - Rural retailing.

UNIT III

Retail formats : types –Choice of location –Store layout and designs – Positioning of retail shops –Retail store image –Retail service quality Management -Retail Administration: Store Management, HRM, Information systems.

UNIT IV

Merchandise management : Service retailing Vs. Product retailing –Retail branding - Pricing for retail –Promotion –Supply chain and logistics - handling returns –Retail marketing strategies -Retail Communications - Mall Management

UNIT V

Shopping process : Influences of shoppers' attitude, perception, personality and life style in retail shopping behaviour –Handling complaints –Delivering value to retail shoppers - CRM in retailing –Retail research

REFERENCES :

1. Barry Berman, Joel.R.Evans, "Retail Management –A Strategic Approach," Prentice Hall, New York.
2. 2.James R. Ogden, Denise J. Ogden, "Integrated Retail Management,"Biztantra Publisher, New Delhi.
3. SwapanaPradhan ," Retailing Management, Text & Cases," Tata McGraw Hill Publications, New Delhi.
4. 4."Retail Management - A Strategic Approach ",Barry Berman andJoel.R.Evans, Prentice Hall of India.
5. Integrated Retail Management" - James R. Ogden and Denise J. Ogden – Biztantra Publisher, New Delhi.

PROJECT

PROJECT (DISSERTATION AND VIVA-VOCE)

OBJECTIVES :

To facilitate the students to understand the cooperative enterprises systematically and present the research report as per the acceptable format.

The project topics are to be finalised to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various problems and issues pertaining Co-operatives. Each candidate should submit two copies of dissertation as per guidelines to the Controller of Examination and one copy to the department concerned. The project will be evaluated for 100 marks (ie. 80 marks for Dissertation work and 20 marks for Viva-Voce) by Internal (Supervisor) and External Examiners. The average of the Marks of the Internal Examiners (Supervisors) and External Examiners shall be considered as the final marks to be awarded for project. The passing minimum for Dissertation is 40 marks and viva voce examination is 10 marks.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024
M.Com (Financial Management) Course Structure under CBCS
(For the candidate admitted from the academic year 2016-2017 onwards)
(updated on 12.6.2017)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course – I (CC)	Management Concepts	6	4	3	25	75	100
	Core Course – II (CC)	Income Tax Theory Law & Practice	6	4	3	25	75	100
	Core Course – III (CC)	Managerial Economics	6	4	3	25	75	100
	Core Course – IV (CC)	Accounting for Business Decisions	6	4	3	25	75	100
	Elective Course – I (EC)	a) E – Commerce (or) b) Managerial Communication	6	4	3	25	75	100
		TOTAL	**30**	**20**	----			**500**
II	Core Course – V (CC)	Quantitative Techniques for Business Decisions	6	5	3	25	75	100
	Core Course – VI (CC)	Industrial Law	6	5	3	25	75	100
	Core Course – VII (CC)	Fundamentals of Information Technology (Theory & Practicals)	6	5	3	25	75	100
	Core Course – VIII (CC)	Advanced Cost Accounting	6	5	3	25	75	100
	Elective Course – II (EC)	a) Financial markets & Services (or) b) Human Resource Management	6	4	3	25	75	100
		Total	**30**	**24**	----			**500**
III	Core Course – IX (CC)	Project Management	6	5	3	25	75	100
	Core Course – X (CC)	Research Methodology	6	5	3	25	75	100
	Core Course – XI (CC)	Advanced Corporate Accounting	6	5	3	25	75	100
	Core Course – XII (CC)	Advanced Financial Management	6	5	3	25	75	100
	Elective Course – III (EC)	a) Insurance Management (or) b) Brand Management	6	4	3	25	75	100
		TOTAL	**30**	**24**				**500**
IV	Core Course – XIII (CC)	International Finance	5	5	3	25	75	100
	Core Course – XIV (CC)	Entrepreneurial Development	5	5	3	25	75	100
	Elective Course - IV (EC)	a) Strategic Management (or) b) Investment Management	5	4	3	25	75	100
	Elective Course - V (EC)	a) Total Quality Management (or) b) Management Information System	5	4	3	25	75	100
	Core Course – XV (CC)	Dissertation (80 marks) Viva voce (20 marks)	10	4				100
		TOTAL	**30**	**22**	----			**500**
		GRAND TOTAL	**120**	**90**				**2000**

Note:

Project	: 100 Marks	
Dissertation	: 80 Marks	- Passing minimum 40 marks
Viva Voice	: 20 Marks	- Passing minimum 10 marks

Core Papers	-	14
Elective Papers	-	5
Project	-	1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate Passing Minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

CORE COURSE I

MANAGEMENT CONCEPTS

Objective: To impart knowledge on the concepts of management principles and to make students understand the human behaviour & relations in organisations.

UNIT- I

Management – Meaning – Nature of Management - Management and Administration - Function of Management- Levels of Management - Evaluation of Management Thoughts- F.W. Taylor - Hendry Fayol - Elton Mayo, Hendry Gantt- Oliver Sheldon. Scientific Management – Hawthorne Experiments.

UNIT- II

Planning- Meaning – Importance – Nature – Advantages And Limitations of Planning. Process of Planning - Kinds of Planning - Planning Premises – Making Planning Effective. Planning and Decision Making

UNIT- III

Organization – Nature and Importance- Principles- Key Elements in Organization Process. Types of Organization- Authority and Responsibility- Centralization and Decentralization- Delegation of Authority - Span of Control – Committees and Informal Organization.

UNIT- IV

Staffing – Selection- Recruitment, Sources of Recruitments, Selection, Selection Procedure, Training-Need and Importance - Types of Training. Direction- Significance – Leadership - Meaning - Types. Coordination - Determinants of Coordination Needs- Coordination Mechanisms- Techniques of Coordination.

UNIT- V

Control – Meaning – Factors - Control Process - Characteristics of an Ideal Control System. Control Devices - Traditional Devices – Budgetary Control Essentials of Budgetary Control - ZBB, Inventory Control - BEp Analysis - Statistical Quality Control Devices -Profit & Loss Control Technique. Modern Control Devices- ROI, PERT, CPM, MIS, Cybernetics, Management Audit. Recent Trends and New Perspective in Management –Strategic Alliances, Core Competences, Business Process Reengineering, Total Quality Management, Bench marking.

Text and Reference books : (Latest Revised Edition only)

1. Keith Davis, Human Behaviour at work, Tata Mc Graw Hill, New Delhi.
2. Koontz, Harold, Cyril O'Donnell, and Heinz Woihrich; Essentials of Management, Tata McGraw – Hill, New Delhi.
3. VSP Rao & V. Hari Krishna, "Management' Excel Pulishers, New Delhi.
4. KumkumMacharjee, 'Principles of Management and Organisational Behaviour' TataMcGrawHill, New Delhi.
5. Stephen P. Robbins, Marg Coulter NeharisaVohra,"Management" Prentice Hall of Pearson, New Delhi.
6. L.M Prasad; Organizational Behaviour, Sultan Chand & Sons, , New Delhi.
7. Sukla,Madhukar: Understanding Organisations: Organisation Theory and Practice in India, Prentice Hall, New Delhi.
8. Stephen P. Robbins, Organisational Behavior, Prentice Hall, NewDelhi 2005.

CORE COURSE II
INCOME TAX THEORY LAW AND PRACTICE

Objective: To make Students know the latest Income Tax Law and Practices and to enable them to file Income Tax Return.

(Theory & Problem)

UNIT - I

Income Tax Act – Definition – Income – Agriculture Income – Assesse – Previous year – Assessment year – Residential Status – Scope of Total Income – Capital and Revenue – Receipts and Expenditure – Exempted Incomes.

UNIT - II

Computation of Income from Salaries and Income from House Property.

UNIT - III

Computation of Profits and Gains of Business or Profession – Computation of Capital Gain - Computation of Income from other sources.

UNIT - IV

Set-off and Carry Forward of Losses – Deduction from Gross Total Income – Computation of Tax Liability.

UNIT - V

Income Tax Authorities – Procedure for Assessment – Tax Deducted at Source (TDS) – Assessment of Individuals, Hindu Undivided Family, Partnership Firms and Companies.

(Theory: 25 Marks; Problems: 50 Marks)

Note: Questions should be based on Current Assessment year only.

Text and Reference Books :(Latest revised edition only)

1. Gaur &Narang, "Income Tax Law & Practice", DP Kalyani Publishers, Latest Edition, New Delhi.
2. DingarPagare, "Tax Laws", S.Chand&Sons , New Delhi.
3. Vinod K.Singhania, "Direct Taxes", Taxmann's Publications, New Delhi.
4. T.S.Reddy& Hari Prasad Reddy, " Income Tax Theory, Law & Practice", Margham Publications, Chennai.
5. Government of India, Income Tax Manual
6. Dr.H.C.Mehrotra- Income Tax Law and Practice, SahithyaBhavan Publications, Uttar Pradesh.
7. Dr.Bhagawathi Prasad - Law& Practice of Income Tax India, VishwaPrakashan Publishers, Delhi.
8. Dr.N.Hariharan, Income Tax Law & Practice, Vijay Nicole.

CORE COURSE III
MANAGERIAL ECONOMICS

Objective: To make the students realize the usefulness of economic principles, laws and tools in making business decisions.

UNIT - I

Managerial Economics – Meaning, Nature, Scope and Applications – Relationship with other disciplines – Role of Managerial Economist – Demand Analysis – Demand Determinants - forecasting.

UNIT – II

Production Function – Managerial use of production function – Supply analysis - Law of Supply – managerial uses of supply curve. Cost Concepts, classification & determinants – Cost Output relationship – Economies of scale - Cost Control and Cost Reduction.

UNIT – III

Price and Output decisions under different marketing structures - Perfect competition, Monopoly, Oligopoly & Monopolistic Competition – Price discrimination – Pricing Objectives, policies, Strategies and methods - Price differentials – Price forecasting.

UNIT - IV

Profit – Nature & Concept – Profit Planning, policies and Forecasting-measurement of profit Interest – Rent.

UNIT - V

Business Cycle and business policies – Economic forecasting for business – Input output analysis – National income - accounting and measurement.

Text and Reference Books (Latest revised edition only)

1. Joel Dean, Managerial Economics – Prentice Hall
2. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi.
3. Varshney and Maheswari - Managerial Economics - Sultan Chand and Sons, New Delhi.
4. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai.
6. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi.
7. Cauvery, Sudha Nayak and Others - Managerial Economics - S. Chand and Sons, New Delhi.
8. H. Craig Petersen, W. Cris Lewis, Managerial Economics, 4th Edition, Pearson Education.

CORE COURSE IV
ACCOUNTING FOR BUSINESS DECISIONS

Objective: To familiarise the students with the various accounting concepts, tools and techniques for managerial decisions in business.

(Theory & Problem)

UNIT - I

Introduction to Financial, Cost and Management Accounting- Generally accepted accounting principles, Conventions and Concepts Balance sheet and related concepts- Profit and Loss account and related concepts - Introduction to inflation accounting- Introduction to human resources accounting.

UNIT - II

Meaning of Company -Maintenance of Books of Account Statutory Books- Profit or Loss Prior to incorporation- Final Accounts of Company. Employees stock option- Buyback of securities.

UNIT - III

Analysis of financial statements – Financial ratio analysis, cash flow (as per Accounting Standard 3) and funds flow statement analysis.

UNIT - IV

Cost Accounts - Classification of manufacturing costs - Accounting for manufacturing costs. Cost Accounting Systems: Job order costing - Process costing- Activity Based Costing. Costing and the value chain- Target costing

UNIT - V

Marginal costing including decision making - Budgetary Control & Variance Analysis - Standard cost system.

Note: Theory - 30 marks; Problem – 45 marks.

Text and Reference Books :(Latest revised edition only)

1. Jain &Narang, “Advanced Accounting”, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, “Advanced Accounting”, Sultan Chand & Sons. New Delhi.
3. Jain &Narang, “Cost and Management Accounting”, Kalyani Publishers, New Delhi.
4. M.N.Arora, “Cost and Management Accounting”, 8th Edition, Vikas Publishing House (p) Ltd, New Delhi.
5. Hilton, Mahar and selto, “Cost Management”, 2nd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
6. B.M. Lall Nigam and I.C. Jain, “ Cost Accounting”, Prentice Hall of India (P) Ltd.

ELECTIVE COURSE I
(A) E - COMMERCE

Objective: To make the students understand E - Commerce in the modern net working world.

UNIT - I

Introduction to E-Commerce – Electronic Commerce Frame work – Electronic commerce and Media convergence –anatomy of E-Commerce applications – Components of the IWay – Network Access Equipment – Global Information Distribution Networks – Internet Terminology – NSFNET : Architecture and Components - National Research and Educational Network.

UNIT - II

Electronic Commerce and World Wide Web: Architectural Frame work for E-Commerce – WWW Architecture – Hypertext Publishing – Consumer Oriented Applications – Mercantile Process Models – Consumer's Perspective – Merchant's Perspective – Electronic Payment Systems (EPS) – Types - Designing EPS - Smart Cards and EPS – Credit Cards and EPS.

UNIT - III

Electronic Data Interchange (EDI) : Applications – Security and Privacy Issues – Software Implementations – Value Added Networks – Internal Information System – Work-flow Automation and Coordination – Customization – Supply Chain Management.

UNIT - IV

Marketing on the Internet: Advertising on the Internet – Charting the On-Line Marketing Process – E-Commerce Catalogs or Directories – Information Filtering – Consumer-Data Interface: Emerging Tools.

UNIT - V

Multimedia and Digital Video: Concepts – Digital Video and E-Commerce – Video Conferencing – Frame Relay – Cell Relay – Mobile Computing Frame Work – Wireless Delivery Technology – Cellular Data Communication Protocols – Mobile Computing Applications.

Text and Reference Books :(Latest revised edition only)

1. Frontiers of Electronic Commerce - Ravi Kalakota, Andrew Winston, Himalaya Publishing House, Mumbai.
2. E-Commerce- A Managerial perspective - P.T.Joseph, Prentice-Hall of India Pvt. Ltd. New Delhi.
3. Designing Systems for Internet Commerce- G.WinfieldTreese& Lawrence C.Stewart,Addison-Wesley Publisher, New York.
4. E-Commerce The Cutting Edge Of Business - Kamelesh K Bajaj, Debjani Nag, Tata Megraw-Hill, New Delhi
5. E Business Road Map for Success - Dr.RaviKalakota, Marcia Robinson, Addison-Wesley Publisher, New York.
6. E – Commerce –SrinivasaVallabhan .S.V.Tata Megraw-Hill, New Delhi.

ELECTIVE COURSE I
(B) MANAGERIAL COMMUNICATION

Objective : To impart knowledge on the theory of communication and to educate the communication technique to be used in organisations.

UNIT – I

Communication and Management - Concept of Management – Evaluation and Growth - Functions – Principles - Objectives – Communication as Management Tool, as a Process- as a Social Process. Exploring the Nature of Human Communication Process - Oral Communication - Written Communication - Filtering and Distortion of Message - Perception of Interpersonal Communication.

UNIT-II

Communication Process and Organization - Self Confidence - Essentials for Effective Communication - Barriers – Measures to Overcome Barriers. Group Communication Net Work- Wheel Pattern - Y-Pattern- Chain Pattern- Cycle Pattern and Free Flow pattern.

UNIT-III

Non Verbal Communication- Introduction, Kinesics, Para-language, Proxemics, Signals. Listening- Importance, Process- Types - Barriers to Effective Listening- Steps in Better Listening.

UNIT-IV

Business Correspondence – Importance - Functions-Characteristics - Structure of Business Letters - Common Errors in Letter Writing. All types of Business Letters.

UNIT-V

Group Communication – Group and Team Interactions - Team Briefing – Introduction – Process – Sample - Benefits- Format-Pre-requisites for Successful Briefing- Internal Communication – Memos / Circulars / Notes. Company Meetings – Agenda - Minutes.

Text and Reference Books :(Latest revised edition only)

1. Media & Communication Management, Dr. C.S. Raydu
2. Organizational Communication, Wofford, E. Gerloff
3. Process Of Communication, Berlo, David
4. Managerial Communication, Iillico, T. Michael
5. Business Communication, Sunder & Kamaraj
6. Business Communication, Ramachandran K.K

CORE COURSE V
QUANTITATIVE TECHINIQUES FOR BUSINESS DECISIONS

Objective: To acquaint the students with the Statistical tools and techniques for managerial decisions.

UNIT - I:

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series.

UNIT - II:

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

UNIT - III:

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

UNIT - IV:

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

UNIT - V:

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables.

Theory 25 Marks ***Problems : 50 Marks***

Text and Reference Books (Latest revised edition only)

1. S.P. Gupta, Statistical Methods - Sultan Chand & Sons, New Delhi – 600 002.
2. S. Gurusamy, Operations Research, Vijay Nicole Imprints Pvt. Ltd, Chennai.
3. D. Joseph Anbarasu, Business Statistics –Vijay Nicole Imprints Pvt. Ltd., Chennai.
4. C.R.Kothari, Quantitative Techniques –Vikas Publishing House, New Delhi.
5. Levin, Richard I. and David S Rubin: Statistics for Management, Prentice Hall, Delhi.
6. Hooda, R.P: Statistics for Business and Economics, Macmilla 3rd edition, New Delhi.
7. Hein, L.W: Quantitative Approach to Managerial Decisions, Prentice Hall, Delhi

CORE COURSE VI

INDUSTRIAL LAW

Objective : To provide an overview of various Industrial legislation and their impact on business.

UNIT - I

The Factories Act, 1948- object, amendments, definitions, approval, licensing and registration of factories, health, safety and welfare, provisions relating to hazardous processes employment of women and children.

UNIT - II

The Trade Unions Act, 1926 -definition, object- certain acts to apply to registered trade union - registration of trade unions -cancellation of registration and appeal- rights and privileges -duties and liabilities amalgamation of trade unions-dissolution. The Industrial Disputes Act, 1947 -definitions - authorities under the Act, reference of disputes arbitration -award and settlement -lay-off and retrenchment -strikes and lock-outs closure -special provisions relating to them.

UNIT - III

The Workmen's Compensation Act, 1923 -objects -definitions -employer's liability for compensation -amount of compensation -method of calculating compensation, distribution of compensation -notice and claim -return as to compensation -The Minimum Wages Act, 1948 - objects -definitions.

UNIT - IV

The Employees State Insurance Act, 1948 -objects -definitions - administration of the scheme - general provisions of the corporation committee and council- contributions various benefits. The Payment of Wages Act, 1936-definition - rules for payment of wages -deductions from wages -registers and records -inspection.

UNIT - V

The Payment of Bonus Act, 1965 -objects -definitions -eligibility and disqualifications for bonus- determination of bonus -determination of surplus -payment of bonus linked with production or productivity. The Employees Provident Fund and Miscellaneous Provisions Act, 1952- object -definition -employees provident fund schemes -employees family pension scheme and fund.

Text and Reference Books (Latest revised edition only)

1. N.D.Kapoor, Handbook of Industrial Law, Sultan Chand, New Delhi.
2. D.P.Jain, Industrial Law, Konark Publishers, Delhi.
3. S.N.Misra, Labour and Industrial Laws, Sangam Law Agency, Allahabad.
4. S C. Srivastava, Industrial Relations and Labour Laws, VikasPulishing House, Delhi.
5. P.M.S.Abdul Saffoor, Industrial Law, Vijay Nicole, Chennai-97.

CORE COURSE VII
FUNDAMENTALS OF INFORMATION TECHNOLOGY

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks

University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*

Examination Duration : Theory 2 Hours ; Practical 2 Hours

Objective: To enable the students to acquire knowledge in computers, Information Technology and to develop skills in Computerized Accounting System both theory and in practical.

(Theory & Practical) (Theory 45 Marks)

UNIT - I

Introduction to Computers – Classification of Computers – Generations of Computer – Memory Units – Auxiliary Storage Devices – Input and Output Devices - Computer Software – Operating System – Programming Languages.

UNIT - II

Fundamentals of Computerized Accounting – Computerized Accounting Vs Manual Accounting - Procedure for Creating a new company – Groups Creation - Ledger Creation.

UNIT - III

Vouchers creations – Payment voucher – Receipts voucher – Sales voucher – Purchase voucher – Journal voucher – Contra voucher.

(PRACTICAL – 30 Marks)

UNIT - IV

Creation of a new company – Groups Creation – Multiple Groups and Single Groups - Creation of ledgers – Multiple Ledgers and Single Ledgers.

UNIT - V

Vouchers creations – Voucher entry – Payment vouchers – Receipt vouchers – Sales vouchers – Purchase vouchers – Journal voucher and Contra vouchers.

Text and Reference Books (Latest revised edition only)

1. Dr.S.V.SrinivasaVallabhan - Computer Applications in Business, Sultan Chand, New Delhi
2. Alexis Leon and Mathews Leon by Fundamentals of Information Technology.Vikas Publishing Company, New Delhi
3. Deepak Bharihoke, Fundamentals of Information Technology, Excel Publications, New Delhi.

CORE COURSE VIII
ADVANCED COST ACCOUNTING

Objective: To facilitate and understand the advanced concepts and practices in Cost Accounting.

UNIT - I

Introduction – Evolution of cost Accounting – Scope and importance of Cost Accounting – Functions and objectives of Cost Accounting – Evaluation of Cost Accounting – Installation of a Costing System – Classification of Costs – Methods and Techniques of Costing– Marginal Costing vs. Absorption Costing.

UNIT - II

Cost Recording: Non Integral Accounting – Reconciliation of Cost and Financial Accounting – Integral Accounting – Activity Based Costing – Life Cycle Costing and Target Costing.

UNIT - III

Cost Accumulation: Specific order Costing – Job Order Costing – Batch Costing – Contract Costing.

UNIT - IV

Cost Accumulation: Operation Costing – Unit or output Costing –Process Costing including concept of Equivalent Production – Joint products and By Products Costing - Inter-Process Profit.

UNIT - V

Cost Reporting: Performance Measurement and Reporting – Divisional Performance Analysis – Product Pricing and Transfer Pricing – Uniform Costing and Inter-firm comparison – Cost Audit.

Theory : 30 Marks ; Problems : 45 Marks

Text and Reference Books (Latest revised edition only)

1. Jain &Narang, “Advanced Cost Accounting”, Kalyani Publishers, Chennai.
2. S.N.Maheswari, “Studies in Advanced Cost Accounting”, Sultan Chand & Sons, Delhi.
3. B.M. Lall Nigam and I.C. Jain, “ Cost Accounting”, Prentice Hall of India (P) Ltd.
4. P.C.Tulsian, “Cost Accounting”, S.Chand& Co. Delhi.
5. Kanna, Ajuga, Pandy, Arora “Cost Accounting”, Sultan Chand & Sons, Delhi.

ELECTIVE COURSE II
A) FINANCIAL MARKETS AND SERVICES

Objective: To acquaint the students about various constituents of Financial Markets and Services.

UNIT - I

Financial Markets – Role – Functions – Constituents – Money Market - Characteristics – Objectives – Importance- Functions - Call Money Market – Features – Benefits - Commercial Paper Market – Features – Commercial Bill Market – Importance – Shortcomings.

UNIT - II

Certificate of Deposit Market – Features – CD Scheme - Treasury Bill Market –Benefits – Features - Gilt-edged Securities Market – Ready Forward Contract –Repo Accounting - Capital Market –Rejuvenation – Reactivation - Capital Market Instruments – Types.

UNIT - III

Capital Market Reforms – Primary Market – Secondary Market - Public Issue of Securities – Dip Guidelines – Due Diligence – Central Listing Authority - New Issues Market – Methods – SEBI Guidelines - New Issues Market An Evaluation – Poor Performance – Revival - Debt Market –Price Determination – Guidelines for issue.

UNIT - IV

Foreign Exchange Market – Risk Management Tools – SWAPS - Global Financial Markets – Off Shore Banking – Tax Havens - Pension Market – PFRDA – Global Pension Market - Derivatives Market – Factors – Functions –Risks – Prospectus – Contents - Regular Prospects – Mis-statements.

UNIT - V

Company Deposits – Quantum Deposits – Penalty for fraud -Inter Corporate Loans and Investments – Defaulting Company - Clearing Corporation of India Limited – Settlement Method- Modern Technology - Credit Rating and Information Services of India Limited – Range of Services – Strategic Alliance - Credit Information Bureau of India Limited – Credit Assessment - Benefits – Information safety – Suit-filed Accounts.

Text and Reference Books :(Latest revised edition only)

1. Financial Markets and Institutions , Dr. S. Gurusamy, Vijay Nicole Imprints Pvt. Ltd., Chennai.
2. Khan M.Y Financial Services, Tata McGraw Hill,Delhi.
3. Varshney, P.N. Indian Financial System, Sultan Chand &Sons, Delhi.
4. Vasant Desai, The Indian Financial system, Himalaya Publishing House , Mumbai.
5. Gorden and Natarajan, Financial Markets and Services, Himalaya Publishing House, Mumbai.
6. Sontomero and Bastel, Financial Markets, Instruments and Institutions, McGraw Hill, Delhi.

ELECTIVE COURSE II
(B) HUMAN RESOURCE MANAGEMENT

Objective: To impart knowledge on the concepts and principles of HRM followed in different types of organization.

UNIT - I

Human Resource Management- Meaning – Nature and Scope, Objectives - Functions - Distinction between HRM and Personnel Management. Personnel Policies: Procedure and Programmes. Organization of HRM Department– Needs - Recent Trends in HRM Practices – Personnel Audit- Human Resource Information System- need and benefits.

UNIT - II

Man Power Planning – Characteristics: Need, Process - Job Analysis- Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment- Job Enlargement –Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement - Induction

UNIT - III

Training – Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes- Methods. - Promotion – Types, Merits- Demotions; Carrier Planning - Transfers,

UNIT - IV

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

UNIT - V

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre - requisites – Benefits.

Text and Reference Books :(Latest revised edition only)

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi
2. Ashwathappa, Human Resource Management ,McGraw Hill Education (India) Pvt. Limited, New Delhi.
3. Edwin Phillip, Personnel Management - Tata McGraw Hill, Delhi.
4. L.M. Prasad ,Human Resources Management, Jain Book Agency, New Delhi.
5. DaleYoder& Paul D. Staudohar, Personnel Management, Prentice Hall.
6. S.S. Khanka, Human Resource Management ,S.Chand & Sons, New Delhi.
7. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
8. H.John Bernardin&JoyeeE.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
9. David A. DeCenzo& Stephen P.Robbins, Personnel/Human Resource Management, Thirdedition, Pearson.
10. VSP. Rao, Human Resource Management : Text and cases, First edition, Excel Books, New Delhi.

CORE COURSE – IX

PROJECT MANAGEMENT

Objective: To make the students understand the process involved in project formulation, execution and control and help the students to identify project and prepare project reports for the various projects related to promotion and service activities.

UNIT - I

Concepts of Project Management; Project – Meaning – Nature – Types of project and project life cycle – Project management – Nature and scope of project management – Project management as a profession – Role of project manager.

UNIT - II

Project Identification and Formation: Project environment – Identification of investment opportunities – Projects screening – Preferability study – Project selection – Project formulation – Stages in project formulation – Project report preparation – Planning Commission's guidelines for project formulation.

UNIT - III

Project Appraisal: Objectives, essentials of a project methodology – Market appraisal – Technical appraisal – Financial appraisal – Socio – economic appraisal – Management appraisal.

UNIT - IV

Project Planning and Scheduling: Objectives – Process or Planning Components or good planning – Project designing and project scheduling and time estimation – Scheduling to match availability of man power and release of funds – Cost and time trade cost.

UNIT - V

Project Execution and Administration: Project contracting: Contract pricing, types – Project organisation: Forms of organisation – Project direction – Project communication – Project co ordination – Factors influencing effective project management – project time monitoring and cost monitoring – Project over runs. Project Control : Control techniques – PERT, CPM - Proper review – Project audit.

Recommended Text books

1. For Unit II and IV Total project T Management The Indian context by PK. Joy–Macmillan India Ltd.,
2. For Unit I and V Project Management – by R. Panneerselvam and P. Senthil kumar PHI learning India PVT Ltd.,
3. Project Management By Bhavesh .M Patel, Vikas Publishing Hous PVT Ltd.,
4. Project Management By S. Choudhury Tata Mcgraw Hill Co.
5. Project Management India Edition By CIDO I Clements, Cengage learning.
6. Project Management by CCI Pfor D.F. Gray and Erik .w Carson – Tata Mcgraw Hill Co.
7. Project Management – Management extra series – ANE books
8. Text book of project management by P. Gopalakrishnan & VE. Ramamoorthy Macmillan India Ltd.,
9. Projects, Planning, analysis, selection financing, Implementation and Review by Prasanna Chandra – Tata Mcgraw Hill Co.

CORE COURSE – X

RESEARCH METHODOLOGY

Objective : To familiarise the students on the Research Methods and Methodology

UNIT – I

Research in Management: An Introduction – Definition, meaning and nature – Scope and objects of Research. Types of Research: Experimental Research – Survey Research – Case Study methods – Ex Post Facto Research.

UNIT – II

Research Design – Defining Research Problem and Formulation of Hypothesis – Experimental Designs.

UNIT – III

Research Process – Steps in the process of Research, Data Collection and Measurement: Sources of Secondary data – Methods of Primary data collection – Questionnaire construction – Attitude measurement and Scales – Sampling and Sampling Designs – Philosophy and Pre-testing.

UNIT – IV

Data presentation and Analysis – Data Processing – Methods of Statistical analysis and interpretation of Data – Testing of Hypothesis and theory of inference.

UNIT – V

Report writing and presentation –steps in Report writing – Substance of Reports – Formats of Reports – Presentation of a Report.

Note : Only Theory

BOOKS FOR REFERENCE:

1. V.P.Michael : Research Methodology in Management, Kitib Mohan Publications, Allahabad.
2. C.R.Kothari : Research Methodology, Wiley Eastern Ltd, New Delhi
3. P.Saravanavel, Research Methodology, Kitab Mahal, Allahabad.
4. O.R. Krishnaswami : Methodology of Research in Social Science
5. D.Amarchend : Research Methods in Commerce.
6. R. Prabhu & T Raju – Research Methods in Management – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – XI (CC)
ADVANCED CORPORATE ACCOUNTING

Objective : To make the students understand the advanced methods of corporate accounting

UNIT – I

Valuation of Goodwill and Shares – Liquidation. - Inflation Accounting.

UNIT –II

Amalgamation by merger and Amalgamation by purchases - External Reconstruction of Companies and alteration of Share Capital .

UNIT – III

Holding Company Accounts (including inter - company holdings) Bank Accounts – NPA – Classification of investments.

UNIT – IV

Insurance Company Accounts – Double Account System.

UNIT –V

Human Resource Accounting – Definition, Objectives, Valuation Methods – Advantages – Accounting Standards, with reference to depreciation, inventory valuation. (Theory only)

(Theory 25 Marks; Problems- 50 Marks).

BOOKS FOR REFERENCE:

1. M.C.Shukla, T.S.Grewall & S.C.Gupta – Advanced Accountancy - II
2. S.P.Jain and K.L. Narang – Advanced Accountancy
3. Dr R Palaniappan & Dr N Hariharan, Corporate Accounting, Vijay Nicole Imprints Pvt. Ltd.,
4. R.L.Gupta and M.L.Radhaswamy – Advanced Accountancy
5. Mukherjee and Hanif – Modern Accountancy – II
6. Reddy & Murthy – Advanced Accounts

CORE COURSE – XII (CC)
ADVANCED FINANCIAL MANAGEMENT

Objective : To help students understand the techniques and tools of financial management

UNIT - I

Introduction to Financial Management : Objectives, Functions, Scope, Evolution, Interface of Financial Management with other Areas, Environment of Corporate Finance.
Time value of Money : Future Value of Single Cash Flow, Multiple Cash flow, Annuity, Sinking Fund Factor. Present value of single cash flow, Multiple cash flow, Annuity, Annuity Dues, Perpetuities. Comparison of Rates.

UNIT - II

Leverage : Operating Leverage, Financial Leverage, Total Leverage.
Sources of Long-term Finance : Equity, Preference Capital, Debentures, Term Loans and Deferred Credit, Government Subsides, Sales Tax Deferments and Exemptions, Leasing and Hire purchase.
Cost of Capital : Cost of debentures, Term Loans, Equity and Retained Earnings, Weighted Average cost of capital, systems of weighting.

UNIT - III

Capital Structure: Introduction, Factors Affecting Capital structure, Features of an optimal capital structure, capital structure theories: Traditional Approach, MM Approach.
Dividend Policy : Traditional Approach, Walter Model, Gordon Model, MM Position, Rational Expectations Model.

UNIT - IV

Corporate Valuation : Discounted Cash flow Approach, Adjusted book Value Approach, Approaches to Facilitate Value Based Management: Marakon Approach, Alcar Approach, McKinsey Approach, Agency Consideration and Minimising agency Costs.

UNIT - V

Divisional performance Measurement and Control : Organizational Segmentation by Responsibility, Measures of Performance, Problems of Transfer pricing, Innovative Budgetary Control Systems, Management Reporting Systems.
EVA and Divisional Performance Measurement : EVA and MVA, EVA and NPV, EVA and Executive Compensation, EVA, TQM and Shareholders Wealth, Improving EVA.

(Theory – 30 Marks Problem - 45 Marks)

Reference:

1. Prasanna Chandra, Financial Management: Theory and Practice, 5th Ed., Tata McGraw Hill, 2001.
2. Ross, Westerfield, Jaffe, Corporate Finance, 5th Ed., McGraw Hill, 1999.
3. Brigham, Gapenski, Ehrhardt, Financial Management: Theory and Practice, 9th Ed., Dryden Press, 1999.
4. Pandey, I.M., Financial Management, Vikas Publishing House.
5. Dr P Periyasamy – Financial Management – Vijay Nicole Imprints Pvt. Ltd., Chennai
6. Vishwanath, S.R. Corporate Finance : Theory and Practice, Response Books, 2000.
7. R. Ramachadran & R. Srinivasan - Financial Management

ELECTIVE COURSE – III (EC)

A) INSURANCE MANAGEMENT

Objective : To make students familiar on the principles and practices of Insurance Management

UNIT – I

Insurance Management-definition-meaning-scope-objectives-purpose and need for insurance management-principles of insurance-globalization of insurance business.

UNIT – II

Risk and Insurance-risk management by individuals and corporations-insurance industry in India-regulation of Indian Insurance Industry-Role of IRDA-public and private participation in the insurance sector.

UNIT – III

Life Insurance-practical aspects of life insurance-introduction to General Insurance-fire, marine, health, rural, social and miscellaneous insurances.

UNIT – IV

Procedure for becoming an Agent: Prerequisites for obtaining a license-fair practice code-unfair practices-Appointment-Termination-Revocation-suspension of Agents.

UNIT – V

Functions and Organization of Insurers-product design and development-underwriting-claims management-insurance pricing - acturial science - insurance marketing-reinsurance-information technology in insurance.

Text Books Recommended:

1. Dr.P.K.Gupta-Insurance and Risk Management-Himalaya Publishing House.
2. Dr P Periyasamy, Risk & Insurance Management, Vijay Nicole Imprints Pvt. Ltd., Chennai
3. Nalini Prava Tripathy and Pabir Pai-Insurance, Theory and Practice-Prentice Hall.
4. M.N.Mishra-Insurance Principles and Practices-S.Chand.
5. Mark S. Dorfman-Introduction to Risk Management and Insurance-Prentice Hall.
6. IRDA 1999.

ELECTIVE COURSE – III (EC)
B) BRAND MANAGEMENT

Objective : To help students understand the concepts and practices of Brand Management

UNIT – I

Concept of a brand – Evolution, perspectives, anatomy, types of brand names, brand name associations, Brands Vs Products, Advantages of Brands to consumers & firms. Brand elements: Components & choosing brand elements, Branding challenges & opportunities.

UNIT – II

Brand positioning – Basic concepts – alternatives – risks – Brands & consumers – Strategies for positioning the brand for competitive advantage – Points of parity – Points of difference - Buying decision perspectives on consumer behaviour, Building a strong brand – Method & implications.

UNIT – III

Brand Image, image dimensions, brand associations & image, Brand identity – perspectives, levels, and prisms. Managing Brand image – stages – functional, symbolic & experiential brands. Brand Equity – Sources of Equity. Brand Equity models, Brand audits. Brand Loyalty & cult brands.

UNIT – IV

Leveraging Brands – Brand extensions, extendibility, merits & demerits, Line extensions, line trap – Co-branding & Licensing Brands. Reinforcing and Revitalisation of Brands – need, methods, Brand Architecture – product, line, range, umbrella & source endorsed brands. Brand Portfolio Management.

UNIT – V

Brand valuation – Methods of valuation, implications for buying & selling brands. Applications – Branding industrial products, services and Retailers – Building Brands online. Indianisation of Foreign brands & taking Indian brands global – issues & challenges.

Reference:

1. Kevin Lane Keller, Strategic Brand Management, PHI/Pearson, New Delhi.
2. Kapferer, Strategic Brand Management, Kogan Page, New Delhi.
3. Harsh Varma, Brand Management, Excell Books, New Delhi.
4. Majumdar, Product Management in India, PHI.
5. Sengupta, Brand Positioning, Tata McGraw Hill.
6. Rameshkumar, Managing Indian Brands, Vikas.
7. Chandrasekar, Product Management, Himalaya.
8. A Anandan & Prasanna Mohan Raj – Brand Management – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – XIII
INTERNATIONAL FINANCE

Objective: To facilitate the students to learn concepts of international finance, foreign exchange exposure and international project appraisal and understand the risks involved in foreign exchange market.

UNIT - I Financial Management in a Global Perspective:

Globalisation: Trends in International Trade and Cross Border Financial Flows - India in the Global Economy- Challenges of International Financial Management- International Monetary System and Financial Markets- Balance of Payments- International Monetary system. An overview of International Financial Markets - Exchange Rate Determination and Forecasting- Purchasing Power Parity, Theory - The Fishers' Effect, Interest Rate Parity.

UNIT - II The Foreign Exchange Market:

Structure and the Participants, Types of Transactions, Mechanics of Currency Dealing - Exchange Rate quotations - Arbitrage, Forward Rates- Evolution of Exchange Control and the Foreign Exchange Market in India- Exchange Rate Computations. Currency Derivatives: Currency Futures, Currency Options

UNIT - III Foreign exchange Exposure and Risk:

Economic Exposure, Transaction Exposure, Translation Exposure, Management of Exposures.

UNIT - IV Working Capital Management in a Multinational Context:

Short-term Borrowing and Investment, Centralised Vs. Decentralised Cash Management - Cash Transmission. International Equity Investment: Risk and Return, The International CAPM, Equity Financing in the International Markets. Long-term Borrowing in International Capital Markets: The Major Market Segments, the International Financing Decision, International Leasing.

UNIT - V International Project Appraisal:

Review of NPV Approach - Adjusted Present Value Framework, Project appraisal in the International Context, Exchange Rate Risk and Cost of Capital, International Joint Ventures. An Introduction to Financial Swaps: Major Types, Motivations Underlying Swaps, Application of Swaps, Valuation of Swaps, International Accounting and Taxation: Accounting for Foreign Currency Transactions, Accounting for Foreign Operations.

Reference:

1. Apte, P.G., International Financial Management, 2nd Ed., Tata Mc Graw Hill, 1998
2. Jeff Madura, International Financial Management, 6th Ed., South-Western, 2000
3. Cheol S.Eun, Bruce G.Resnick,. International Financial Management, Irwin McGraw Gill.1998.
4. Maurice D.Levi, International Finance, 3rd Ed., McGraw Hill, 1996.
5. Alan C.Shapiro, Multinational Financial Management. Prentice Hall India.

CORE COURSE – XIV
ENTREPRENEURIAL DEVELOPMENT

Objective: To enable the students understand the concept of Entrepreneurial Development, Project Identification, Entrepreneurial assistance provided by the Govt. and to make them to become Entrepreneurs.

UNIT – I

Entrepreneur –Meaning – Definition – Characteristics – Functions – Role of Entrepreneurs in the economic development – Classification of entrepreneurs – Factors affecting entrepreneurial growth.

UNIT – II

Entrepreneurship – Concept – Distinction between Entrepreneur and Entrepreneurship - Entrepreneurship Development Programmes – Objectives - Stages in EDP- Pre-training Stage – Training phase – Post Training – Evaluation and Feedback of EDP.

UNIT - III

Project Identification - Sources of ideas – Preliminary evaluation and testing of ideas – Constraints - Project formulation – Stages- Feasibility study and Feasibility Report – Selection Criteria.

UNIT – IV

Project Report - Project Appraisal – Technical – commercial appraisal – Financial appraisal– Sources of finance – Steps to start an industrial unit.

UNIT – V

Incentives and subsidies of State and Central Govt. – Aims – Backward areas – Industrial Estates –Role of DIC,SISI, TCO in entrepreneurial growth

Books Recommended:

1. P.N. Singh – Developing Entrepreneurship for Economic Growth
2. Raj Shankar, Entrepreneurship – Theory & Practice – Vijay Nicole Imprints Pvt. Ltd., Chennai
3. Guide to Entrepreneurs – Industrial Development – Govt. of Tamil Nadu – SIPCOT
4. Gupta & N. Srinivasan – Entrepreneurship Development

ELECTIVE COURSE - IV
(A) STRATEGIC MANAGEMENT

Objective : To enable the students understand the strategic management, concept and formulation.

UNIT – I

Strategic Management: Definition – Scope – Benefits – Risks – Approaches – Models – Strategic change – Strategic Leadership and Decision making.

UNIT –II

Situation Analysis – SWOT Analysis - Environmental Scanning and Industry analysis – Forecasting – Internal Scanning - Mission – objectives – Stakeholder Theory – Cyert and March's Behavioural Theory – Objectives of Non-Profit Organizations – Social Responsibility and Business Ethics.

UNIT – III

Strategy Formulation – Business Strategy – Corporate Strategy – Divertional Strategy –Portfolio Analysis – BCG Growth /Share matrix – Strategic choice – Development of policies – Strategic Alliances.

UNIT – IV

Strategy Implementation – Organization for action – Staffing – Strategic Leadership – MBO –Total Quality Management – Functional Strategies – Growth Strategies – Diversification, Acquisition and Joint Venture – Recovery – Recession and Diverstment Strategies – Management Buyout.

UNIT – V

Strategic Control and Evaluation – Establishing Strategic control – premise control – Implementation control – Strategic Surveillance – Special Alert Control – Evaluation Techniques – Managing change – Strategic issues in Managing Technology and Innovation – Strategic Effectiveness.

Books for Reference :

1. Strategic Management – Strategy Formulation and Implementation – John A.Pearce II, Richard B.Robinson Jr. (A.I.T.B.S. Publishers – J-5,6, Krishnan Nagar, Delhi – 110 051).
2. Strategic Management – Awareness and change – John L.Thompson (Cheapman & Hall 32 Second Main Road CIT East, Chennai – 35).
3. Strategic Management-J.David Hunger and Thomas L.Wheelen (Addision – Wesley Longman) (Available at Higginbotham's Ltd., Chennai).
4. Strategic Management – Gregory G.Dess and Alex Miller.
5. Strategic Management – An Integrated Approach – W.L.Charles and John Gareth,
6. Strategic Management – Concepts and Application – C.Certo and J.Paul Peter.
7. Strategic Management – John H.Barnett and William D. (Available at Atlantic Publishers and Distributors, 4215/1, Ansari Road, Darya Ganj, New Delhi – 110 002).
8. International & Strategic Management – R.N.Srivastava.
9. Strategic Planning for Corporate Success – V.S.Ramaswamy and S.Nanakumari.

ELECTIVE COURSE - IV
(B) INVESTMENT MANAGEMENT

Objective : To enable the students understand the investment avenues and evaluation.

UNIT – I

Nature and scope of Investment Management Investment Objectives – Investment Process – Investment Media Security and Non-security forms of Investment gilt edged securities – Sources of Investment information.

UNIT – II

New Issues Market – Methods of Issuing – Parties involved in the new issue market – Secondary market – Stock Exchanges – NSE and BSE – Trading mechanism – online trading – SEBI and Investors production.

UNIT – III

Security Analysis – Approaches to Security Analysis – Fundamental Analysis – Technical Analysis – Dow Theory – Random Walk Theory - Efficient Market Hypothesis.

UNIT – IV

Portfolio Analysis – Traditional and Modern approach – Rationale of Diversification of Investments – Markovitz theory – Sharpe Index Model - Capital Asset Pricing Model.

UNIT – V

Investment companies in India – Types of Mutual Fund Operations in India – UTI – SEBI and RBI Guidelines for Mutual Funds.

Note: Theory only

BOOKS FOR REFERENCE:

1. Punithavathy Pandian : Security Analysis and Portfolio Management (Vikas Publishing House)
2. Dr S Gurusamy –Security Analysis & Portfolio Management –Vijay Nicole Imprints Pvt Ltd, Chennai.
3. Gupta L.C. : Return of Equities – The Indian Experience (New Delhi OXFORD).
4. Bhalla V.K. : Investment Management and Portfolio Management (S.Chand & Co. Delhi).
5. Fisher & Jordon : Security Analysis and Portfolio Management.
6. Preeti Singh : Security Analysis (Himalaya Publishing House).
7. Avadhani V.A. : Investment and Securities Markets in India.
8. SEBI : Guidelines 1992.
9. Jack dark Francis Investment : Analysis and Management (McGraw Hill 1990).
10. Gara.K.L : Stock Exchanges in India.
11. Yasasway : Equity Investment Strategy.

ELECTIVE COURSE - V
A) TOTAL QUALITY MANAGEMENT

Objective : To enable the students understand the concept of Total Quality Management and acquaint with the implementation of 9000 series.

UNIT - I

Introduction to Quality Control - Quality and Cost Considerations - Statistics and its Applications in Quality Control

UNIT - II

Sampling Inspection in Engineering Manufacture- Statistical Quality Control by the Use of Control Charts- Methods of Inspection and Quality Appraisal - Reliability Engineering – Value Engineering and Value Analysis

UNIT - III

Theory of Sampling Inspection - Standard Tolerance - ABC Analysis - Defect Diagnosis and Prevention

UNIT - IV

Quality Improvement: Recent Technique for Quality Improvement - Zero Defect – Quality Motivation Techniques - Quality Management System and Total Quality Control

UNIT - V

Selection of ISO Model and Implementation of ISO 9000 - Human Resource Development and Quality Circles - Environmental Management System and Total Quality Control

Note : Theory Only

Book References

1. Srinivasa Gupta and Valarmathy, Vijay Nicole Imprints, Chennai – 91.
2. Dahlgaard Jens J., Kristensen K., Kanji Gopal K, "Fundamentals Of Total Quality Management", Bross Chapman & Hall, London
3. George, Stephen and Weimerskirch, Arnold, "Total Quality Management - Strategies and Techniques Proven", Mohit Publications
4. Hakes, Chris (editor), "Total Quality Management: The Key to Business Success", NY: Chapman and Hall
5. Fox, Roy, "Making Quality Happen. Six Steps to Total Quality Management", McGraw-Hill
6. Jain, "Quality Control And Total Quality Management", Tata McGraw Hill
7. Lal H, "Total Quality Management: A Practical Approach", New Age International Private Ltd
8. Rao, Ashok, "Total Quality Management: A Cross Functional Perspective", Wiley & Sons

ELECTIVE COURSE - V
B) MANAGEMENT INFORMATION SYSTEM

Objective : To enable the students understand the concept Management Information system and implementation.

UNIT - I Introduction To Business Systems:

Need for IS in Business – fundamentals of IS – System concepts – Components of IS – IS resources Activities – Overview of IS – Operation Support Systems, Management Support Systems, Other Classification – System approach to Problem solving – Global business scenario – trends in technology and applications.

UNIT - II Information Systems for Business Operations:

Business Information Systems – Marketing Information Systems – Manufacturing Information Systems – Human Resource Information Systems – Accounting Information Systems, Financial Information Systems – Transaction Processing System.

UNIT - III Information Systems for Managerial Decision Support:

Management Information & Decision Support Systems – Management Information Systems – Expert Systems – Examples, Executive Information Systems – Artificial Intelligence Technologies.

UNIT - IV Information Systems for Strategic Advantage:

Strategic roles of IS-Breaking Business Barriers – Reengineering Business Processes Improving Business Quality – Creating Virtual Company – Building knowledge Creating Company – Using Internet Strategically – Challenges of Strategic IS – Enterprise – wide systems and E-Business applications.

UNIT - V Managing Information Systems:

Enterprise Management – Information Resource Management – Strategic Management, Operational Management – Resource Management Technology Management – Distributed Management. Organizing Planning – IS planning methodologies – Critical Success Factors – Business Systems Planning – Computer Aided Planning Tools. Security & Ethical Challenges; IS controls – Facility Controls – Procedural Controls – Computer Crime – Privacy Issues.

Recommended Text books

1. Information Systems Today, By Leonard Jessup and Joseph VALACICH INDIAN Edition, PHI learning PVT Ltd.,
2. Management Information System, M Azam, Vijay Nicole Imprints Pvt. Ltd., Chennai-91.
3. Management Information system, By EFF OZ, Indian Edition, Cengage learning.
4. Management of Information systems by S.A. Kelkar, PHI learning PVT Ltd.,
5. Management Information systems Indian Edition, Gordon B. Davis and Margrethe H. Olson, Tata Mcgraw Hill.
6. Introduction to Information Systems by Alexis Leon and Mathews Leon Tata Mcgrawhill Co.

PROJECT

PROJECT (DISSERTATION AND VIVA-VOCE)

OBJECTIVE :

To facilitate the students to understand the Business enterprises systematically and present the research report as per the acceptable format.

The project topics are to be finalised to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various problems and issues pertaining to Commerce and Financial Management. Each candidate should submit two copies of dissertation as per the guidelines to the Controller of Examination and one copy to the department concerned. The project will be evaluated for 100 marks (ie. 80 marks for Dissertation work and 20 marks for Viva-Voce) by Internal (Supervisor) and External Examiners. The average of the Marks of the Internal Examiners (Supervisors) and External Examiners shall be considered as the final marks to be awarded for project. The passing minimum for Dissertation is 40 marks and viva voce examination is 10 marks.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPALLI – 620 024

M.Com – Revised Course Structure under CBCS

(For the candidate admitted from the academic year 2016–2017 onwards)

(updated on 7-12-2017)

Semester	Course	Course Title	Ins. Hrs/ Week	Credit	Exam Hrs	Marks		Total
						Int	Ext	
I	Core Course – I (CC)	Managerial Economics	6	4	3	25	75	100
	Core Course – II (CC)	Services Marketing	6	4	3	25	75	100
	Core Course – III (CC)	Corporate Laws	6	4	3	25	75	100
	Core Course – IV (CC)	Income Tax Theory Law & Practice	6	4	3	25	75	100
	Elective Course – I (EC)	a) Insurance Management (or) b) Retail Management	6	4	3	25	75	100
		Total	**30**	**20**				**500**
II	Core Course – V (CC)	Advanced Financial Management	6	5	3	25	75	100
	Core Course – VI (CC)	Quantitative Techniques for Business Decisions	6	5	3	25	75	100
	Core Course – VII (CC)	Human Resources Management	6	5	3	25	75	100
	Core Course–VIII (CC)	Fundamentals of Information Technology (Theory & Practicals)	6	5	3	25	75	100
	Elective Course–II (EC)	a) Organizational Behaviour (or) b) Advanced Managerial Communication	6	4	3	25	75	100
		Total	**30**	**24**				**500**

III	Core Course – IX (CC)	Total Quality Management	6	5	3	25	75	100
	Core Course – X (CC)	Advanced Corporate Accounting	6	5	3	25	75	100
	Core Course – XI (CC)	Research Methodology	6	5	3	25	75	100
	Core Course – XII (CC)	Strategic Management	6	5	3	25	75	100
	Elective Course–III(EC)	a) Export Marketing (or) b) Brand Management	6	4	3	25	75	100
		Total	**30**	**24**				**500**
IV	Core Course – XIII (CC)	Investment Management	5	5	3	25	75	100
	Core Course – XIV (CC)	Advanced Cost & Management Accounting	5	5	3	25	75	100
	Elective Course-IV (EC)	a) E-Commerce (or) b) Customer Relationship Management	5	4	3	25	75	100
	Elective Course-V (EC)	a) Project Management (or) b) Management Information System.	5	4	3	25	75	100
	Project	Project Work Dissertation (80 marks) Viva voce (20 marks)	10	4				100
		Total	**30**	**22**				**500**
		GRAND TOTAL		90				2000

Note:

Project :100 Marks

Dissertation : 80 Marks - Passing minimum 40 marks

Viva Voice : 20 Marks - Passing minimum 10 marks

Core Papers - 14

Elective Papers - 5

Project - 1

Note:

1. Theory Internal 25 marks External 75 marks
2. Separate Passing Minimum is prescribed for Internal and External
   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

CORE COURSE - I
MANAGERIAL ECONOMICS

Objective : To make the students to realize the usefulness of economic tools, principles & laws in making business decisions.

UNIT I

Managerial Economics – Meaning, Nature, Scope and Application – Relationship with other discipline – Role of Managerial Economist – Demand Analysis – Demand Determinants - forecasting and techniques.

UNIT II

Production Function – Managerial use of production function – Supply analysis - Law of Supply – managerial uses of supply curve. Cost Concepts, classification & determinants – Cost Output relationship – Economies of scale - Cost Control and Cost Reduction.

UNIT III

Price and Output decisions under different marketing structures - Perfect competition, Monopoly, Oligopoly & Monopolistic Competition – Price discrimination – Pricing Objectives, policies, Strategies and methods - Price differentials – Price forecasting.

UNIT IV

Profit – Nature & Concept – Profit Planning, Policies and Forecasting-profit theories - Measurement of profit - Interest – Rent and theories.

UNIT V

Business Cycle and policies – Economic forecasting of business – Input Output Analysis – National Income - Accounting and Measurement.

Text and Reference Books (Latest revised edition only)

1. Joel Dean, Managerial Economics – Prentice Hall, New York.
2. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi.
3. Varshney and Maheswari - Managerial Economics - Sultan Chand and Sons, New Delhi.
4. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai.
6. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi.
7. Cauvery, SudhaNayak and Others - Managerial Economics - S. Chand and Sons, New Delhi.
8. H. Craig Petersen, W. Cris Lewis, Managerial Economics, 4th Edition, Pearson Education.

CORE COURSE – II

SERVICES MARKETING

Objective : To enable students to gain expert knowledge on marketing of various services.

UNIT I

Services Marketing – Definition – importance – characteristics of services – Growth of Services Marketing – Types of services – Comparative analysis between services and products.

UNIT II

Concept of services marketing – Societal concept – Buyer behaviour concept – Factors influencing buyer behaviour – Decision making process. Delivering Quality Service - TQM in services marketing - Quality standards - process and technological requirements to implement Quality Standards in services marketing.

UNIT III

Services Marketing Mix – Product Strategy – Product Life Cycle concept – Strategies during the Product Life Cycle – Product Planning Strategy – Development of new products – Diversification and elimination.

UNIT IV

Bank Marketing – Insurance Marketing – Transport Marketing.

UNIT V

Tourism and Hotel Marketing - Education Marketing – Communication Services Marketing – Health services.

Text and Reference Books :(Latest revised edition only)

1. S.M.Jha, Services Marketing, Himalaya Publishing House, Mumbai.
2. M.Y.Khan, Services Marketing, Tata McGraw Hill, New Delhi.
3. C.B.Memoria&R.K.Suri,Marketing Management, Kitab Mahal,
4. Kotler -Marketing Management , Sultan Chand & Sons, New Delhi.
5. Cowell.- Marketing of Services, Heinemann Publishers, London.
6. Christopher Lovelock, JochenWirtz&Jayanta Chatterjee – Service Marketing People, Technology, Strategy. Pearson Education.

CORE COURSE – III

CORPORATE LAWS

Objective: To make the students understand the legal framework with reference to Companies in India.

UNIT I

Provisions of Companies Act 1956 relating to Company Administration – Board of Directors – Managing Director – Provisions relating to various types of meetings. Latest amendments in Companies Act, 2013 relating to company administration and governance.

UNIT II

Industries (Development and Regulation) Act, 1951 - object – Definitions – Central Advisory Council – Development Council – Regulation of Scheduled Industries – Registration and Licensing – Investigation and takeover of Management of Industrial undertakings of Central Government – Effect of Central Government's order – Management and control of undertakings owned by companies in liquidation – Power to provide relief measures – power to exempt special cases – penalties.

UNIT III

Foreign Exchange Management Act, 1999 – Definitions – Regulation and Management of Foreign Exchange – Authorized person – contravention and penalties – adjudication and penalties – Directorate of Enforcement.

UNIT IV

The Essential Commodities Act, 1955 – Powers of Central Government to Control, effect, seizure and confiscation – Consumer Protection Act 1986 – Definition – Consumer Protection Council – Consumer Disputes Redressel Agencies – District Forum – State Commission – National Commission.

UNIT V

Water (Prevention and Control of Pollution) Act, 1974 - Definition – functions and powers of various Boards - Compliance regarding discharges causing pollution, Penalties and Offences – Air (Prevention and Control of Pollution) Act, 1981 - Definition – Functions and powers of various Boards – Duties of occupier of specified industries to ensure adherence to standard offences by companies.

Text and Reference Books : (Latest revised edition only)

1. Bar Act of all relevant Legislations.
2. Corporate Laws and Secretarial Practice –Sultan Chand and Sons, New Delhi.
3. N.D.Kapoor, Dr.G.K.KapoorCorporate Laws and Secretarial Practice, Premier Book Company, New Delhi.
4. TejpalSheth, Corporate Laws, Taxman Publication, Mumbai.
5. U.K.Chandhary,Economic Legislation – Law & Practice, Sultan Chand & Sons, New Delhi.
6. S.S.Gulshan and G.K.Kapoor,Economic and other Legislations Sultan Chand& Sons, New Delhi.

CORE COURSE – IV

INCOME TAX THEORY LAW AND PRACTICE

Objective: To acquaint Students to know the latest Income Tax Law and enable them to file Income Tax Returns.

UNIT I

Income Tax Act – Definition – Income – Agriculture Income – Assessee – Previous year – Assessment year – Residential Status – Scope of Total Income – Capital and Revenue – Receipts and Expenditure – Exempted Incomes.

UNIT II

Computation of Income from Salaries and Income from House Property.

UNIT III

Computation of Profits and Gains of Business or Profession – Computation of Capital Gain - Computation of Income from other sources.

UNIT IV

Set-off and Carry Forward of Losses – Deduction from Gross Total Income – Computation of Tax Liability.

UNIT V

Income Tax Authorities – Procedure for Assessment – Tax Deducted at Source (TDS) – Assessment of Individuals, Hindu Undivided Family, Partnership Firms and Companies.

Note : Theory 25 Marks : Problems - 50 Marks

Text and Reference Books :(Latest revised edition only)

1. Gaur &Narang, "Income Tax Law & Practice", DP Kalyani Publishers, New Delhi.
2. DingarPagare, "Tax Laws", S.Chand&Sons , New Delhi.
3. Vinod K.Singhania, "Direct Taxes", Taxmann's Publications, New Delhi.
4. T.S.Reddy& Hari Prasad Reddy, " Income Tax Theory, Law & Practice", Margham Publications, Chennai.
5. Government of India, Income Tax Manual
6. Dr.H.C.Mehrotra- Income Tax Law and Practice, SahithyaBhavan Publications, Uttar Pradesh.
7. Dr.Bhagawathi Prasad - Law& Practice of Income Tax India, VishwaPrakashan Publishers, Delhi.
8. Murthy, Income Tax- vijay Nicole, Chennai

ELECTIVE COURSE – I

(A) INSURANCE MANAGEMENT

Objective: To impart knowledge on the theory of insurance and to educate the process of insurance activities in India.

UNIT I

Insurance – Definition – Nature - Principles – Role - Importance – Types of Insurance & Insurance Organization. Insurance Contract. Privatization of Insurance in India – Major Players in Insurance Business – Impact of Privatization of insurance in India

UNIT II

Life Insurance – Nature – Classification of Policies - Annuities - Selection of Risk - Measurement of Risk – Mortality Table- Calculation of Premium- Surrender Value - Cover Note – Policy Conditions - Progress of Life Insurance Business in India.

UNIT III

Fire Insurance – Nature – Fire Insurance Contract – Kinds of Policies - Polic Conditions - Payment of Claims – Reinsurance - Double Insurance.

UNIT IV

Marine Insurance – Nature - Policies – Policy Conditions – Premium Calculation – Marine Losses – Payment of Claims - Progress of Marine Insurance Business in India.

UNIT V

General Insurance – Motor Insurance – Burglary and Personal Accident Insurance – Miscellaneous Forms of Insurance – Employee Liability Insurance – Property Insurance - Cattle Insurance – Crop Insurance - Medi-Claim – Overseas Medi - Claim Policy - Rural Insurance in India. Insurance Regulatory and Development Authority Act,1972 - IRDA Regulations 2000.

Text and Reference Books :(Latest revised edition only)

1. Dr.P.K.Gupta-Insurance and Risk Management-Himalaya Publishing House, Mumbai.
2. NaliniPravaTripathy and Pabir Pai-Insurance, Theory and Practice-Prentice Hall , New York.
3. M.N.Mishra-Insurance Principles and Practices-S.Chand& Sons, New Delhi
4. Mark S. Dorfman-Introduction to Risk Management and Insurance-Prentice Hall, New York.
5. IRDA 1999.

ELECTIVE COURSE – I

(B) RETAIL MANAGEMENT

Objective : To gain an in-depth knowledge about Retail Management.

UNIT I

Retailing - Definition – Concept - Characteristics – Traditional and non-Traditional retailing – Applications of information technology in retail management - E – Retailing

UNIT II

Global trend in retailing – Indian retail industry –Drivers to the growth of retail – Macro and micro environmental influences – Creativity in retailing - Emerging trends and challenges - FDI in retailing - Rural retailing.

UNIT III

Retail formats - types –Choice of location –Store layout and designs – Positioning of retail shops – Retail store image – Retail service quality Management - Retail Administration: Store Management, HRM, Information systems.

UNIT IV

Merchandise management – Service retailing Vs. Product retailing – Retail branding - Pricing for retail – Promotion – Supply chain and logistics - handling returns – Retail marketing strategies - Retail Communications - Mall Management

UNIT V

Shopping process –Influences of shoppers' attitude, perception, personality and life style in retail shopping behaviour – Handling complaints – Delivering value to retail shoppers - CRM in retailing – Retail research

Text and Reference Books :(Latest revised edition only)

1. Barry Berman, Joel.R.Evans, "Retail Management – A Strategic Approach," Prentice Hall, New York.
2. James R. Ogden, Denise J. Ogden, "Integrated Retail Management,"Biztantra Publisher, New Delhi.
3. Swapana Pradhan ," Retailing Management, Text & Cases," Tata McGraw Hill Publications, New Delhi.
4. "Retail Management - A Strategic Approach ",Barry Berman and Joel.R.Evans, Prentice Hall of India.
5. Integrated Retail Management" - James R. Ogden and Denise J. Ogden –Biztantra Publisher, New Delhi.

CORE COURSE - V
ADVANCED FINANCIAL MANAGEMENT

Objective : To enable the students understand concepts and application of financial management tools.

UNIT I

Financial Management: Meaning, nature and scope of finance; financial goal – Profit Vs Wealth Maximisation; Finance functions – investment, financing and dividend decisions.

UNIT II

Fundamental valuation concepts: - Time value of money – Compound value, Present value; Risk and Return – concept, Risk in a portfolio context, Relationship between Risk and Return. Valuation of Securities – Valuation concept – Bond Valuation – Valuation of Preference shares, Equity valuation – Dividend valuation approach, Earnings capitalisation approach and Ratio approach.

UNIT III

Cost of capital: Meaning and Significance of cost of capital; calculation of cost of debt, preference capital, equity capital and retained earnings; combined cost of capital (weighted). Financial Leverage: Meaning, Measurement of leverages; Effect of Operating and Financial Leverage on Profit; Analysing alternate financial plans; combined financial and operating leverages.

UNIT IV

Planning the Capital Structure – Factors influencing capital structure; EBIT-EPS Analysis, Return on Investment Analysis, Cash flow analysis, capital structure policies – Theories. Dividend policy -Factors determining dividend pay-out, Forms of dividend; stability in dividend policy; corporate dividend behaviour

UNIT V

Management of working capital:- Meaning, Significance and Types of working capital; calculating operating cycle period and estimation of working capital requirements; sources of working capital; Management of cash, receivables and inventory.

Note: Theory : 25 Marks : Problems: 50 Marks

Text and Reference Books (Latest revised edition only)

1. I.M.Pandey. Financial Management,Vikas Publishing House Pvt ltd, New Delhi.
2. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, New Delhi.
3. M.Y.Khan&P.K.Jain,Financial Management, Text and Problems. Tata McGraw-Hill Publishing Company Ltd, New Delhi.
4. P.V. Kulkarni & B.G. Sathyaprasad,Financial Management –Himalaya Pulishing House, Mumbai.
5. S.N.Maheswari, “Financial Management principles and practice,”Sultan Chand & Sons, New Delhi.
6. James C. Van Horne & John M. Wachowicz, Jr.Fundamentals of Financial Management- PHI Learning Private Limited, New Delhi.
7. Srinivasan, Financial Management, Vijay Nicole, Chennai

CORE COURSE VI
QUANTITATIVE TECHINIQUES FOR BUSINESS DECISIONS

Objective : To acquaint the students with the Statistical tools and techniques for managerial decisions.

UNIT I:

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series.

UNIT II:

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

UNIT III:

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

UNIT IV:

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

UNIT V:

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables.

Note: Theory 25 Marks : Problems 50 Marks

****EQUAL IMPORTANCE TO BE GIVEN TO ALL UNITS***

Text and Reference Books (Latest revised edition only)

1. S.P. Gupta, Statistical Methods - Sultan Chand & Sons, New Delhi – 600 002.
2. S. Gurusamy,Operations Research, Vijay Nicole Imprints Pvt. Ltd, Chennai.
3. D. Joseph Anbarasu,Business Statistics –Vijay Nicole Imprints Pvt. Ltd., Chennai.
4. C.R.Kothari, Quantitative Techniques –Vikas Publishing House, New Delhi.
5. Levin, Richard I. and David S Rubin: Statistics for Management, Prentice Hall, Delhi.
6. Hooda, R.P: Statistics for Business and Economics, Macmilla 3rd edition, New Delhi.
7. Hein, L.W: Quantitative Approach to Managerial Decisions, Prentice Hall, Delhi

CORE COURSE VII
HUMAN RESOURCE MANAGEMENT

Objective : To impart knowledge on the concepts and principles of HRM followed in different types of organization.

UNIT I

Human Resource Management- Meaning – Nature and Scope, Objectives - Functions - Distinction between HRM and Personnel Management. Personnel Policies: Procedure and Programmes. Organization of HRM Department– Needs - Recent Trends in HRM Practices – Personnel Audit- Human Resource Information System- need and benefits.

UNIT II

Man Power Planning – Characteristics: Need, Process - Job Analysis- Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment-Job Enlargement –Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement - Induction

UNIT III

Training –Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes- Methods.- Promotion – Types, Merits- Demotions; Carrier Planning - Transfers

UNIT IV

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

UNIT V

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre -requisites – Benefits.

Text and Reference Books (Latest revised edition only)

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi
2. Dr.Ashwathappa, Human Resource Management ,McGraw Hill Education (India) Pvt. Limited, New Delhi.
3. Edwin Phillip, Personnel Management - Tata McGraw Hill, Delhi.
4. L.M. Prasad ,Human Resources Management, Jain Book Agency, New Delhi.
5. DaleYoder & Paul D. Staudohar, Personnel Management, Prentice Hall.
6. S.S. Khanka, Human Resource Management ,S.Chand& Sons, New Delhi.
7. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
8. H.John Bernardin&JoyeeE.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
9. David A. DeCenzo& Stephen P.Robbins, Personnel/Human Resource Management, Thirdedition, PHI/Pearson.
10. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, NewDelhi.

CORE COURSE VIII

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Internal Assessment: Theory – 15 Marks; Practical – 10 Marks

University Examinations : *Theory- 45 Marks ; Practical - 30 Marks.*

Examination Duration : Theory 2 Hours ; Practical 2 Hours

Objective : To enable the students to acquire knowledge in computers, Information Technology and to develop skills in Computerized Accounting System both theory and in practical.

(Theory & Practical) (Theory 45 Marks)

UNIT I

Introduction to Computers – Classification of Computers – Generations of Computer – Memory Units – Auxiliary Storage Devices – Input and Output Devices - Computer Software – Operating System – Programming Languages.

UNIT II

Fundamentals of Computerized Accounting – Computerized Accounting Vs Manual Accounting - Procedure for Creating a new company – Groups Creation - Ledger Creation.

UNIT III

Vouchers creations – Payment voucher – Receipts voucher – Sales voucher – Purchase voucher – Journal voucher – Contra voucher.

(PRACTICAL – 30 Marks)

UNIT IV

Creation of a new company – Groups Creation – Multiple Groups and Single Groups - Creation of ledgers – Multiple Ledgers and Single Ledgers.

UNIT V

Vouchers creations – Voucher entry – Payment vouchers – Receipt vouchers – Sales vouchers – Purchase vouchers – Journal voucher and Contra vouchers.

Text and Reference Books (Latest revised edition only)

1. Dr.S.V.Srinivasa Vallabhan - Computer Applications in Business, Sultan Chand, New Delhi
2. Alexis Leon and Mathews Leon by Fundamentals of Information Technology.Vikas Publishing Company, New Delhi
3. Deepak Bharihoke, Fundamentals of Information Technology, Excel Publications, New Delhi.

ELECTIVE COURSE - II

(A) – ORGANISATIONAL BEHAVIOUR

Objectives : To make the students understand the basics of individual behaviour and group behaviour of people at work and enable them to gain knowledge relating to overall development of the organization.

UNIT I

Organisational Behaviour – Meaning – Characteristics – Disciplines contributing to OB – Relationship with other Social Sciences – Approaches to OB – Hawthorne Experiments.

UNIT II

Perception: Process – Factors influencing perception - Distortion in Perception – Learning: Theories of Learning – Attitudes: Factors influencing Attitude.

UNIT III

Personality: Theories of Personality – Determinants – Types - Emotional Intelligence – Features - Group Dynamics: Formal and Informal Groups – Group Cohesiveness – Stress Management: Causes and Effects of Stress – Coping strategies for stress.

UNIT IV

Leadership: Theories and styles – Motivation – Theories of Motivation – Communication – Conflict Management: Role Conflict – Goal Conflict and inter personal conflict

UNIT V

Organisation change – Process – Causes of resistance to change and Overcoming resistance to change –Organisation Development – OD Process and Techniques – Organisation Culture – Factors influencing organisation culture – Organisational Effectiveness – Process and factors influencing organizational effectiveness.

Text and Reference Books

1. L.M. Prasad – Organisational Behaviour – Sultan Chand & Sons, Delhi.
2. K. Aswathappa – Essentials of Organisational Behaviour, **McGraw Hill, Delhi.**
3. Fred Luthans, Organisation Behaviour, McGraw Hill, Delhi
4. Hell Riegel, Slocum and Woodman, Organisation Behaviour, South Western, Thomson Learning, 9th Edition,
5. R.S. Dwivdi, Human Relations and Organizational Behaviour, Mc Millan India Ltd., 5th Edition.
6. Stephen P. Robbins, Organizational Behaviour, 9th Edition, Pearson Education, New Delhi,
7. P.Subba Rao, Essentials of Human Resource Management and Industrial Relations, Himalaya Publishing House.
8. P.C. Tripathi, Personnel Management and Industrial Relations ,Sultan Chand & Sons.
9. B.S.Bhatia and G.S.BatraHuman Resource Management — Deep & Deep Publications.

ELECTIVE COURSE – II
(B) ADVANCED MANAGERIAL COMMUNICATION

Objective : To impart knowledge on the theory of communication and to educate the communication techniques used in business organisations.

UNIT I

Managerial Communication - Concept – Evolution and Growth - Functions – Principles - Objectives – Communication as Management Tool, Process - Social Process. Exploring the Nature of Human Communication Process - Oral Communication - Written Communication - Filtering and Distortion of Message - Perception of Interpersonal Communication.

UNIT II

Communication Process - Self Confidence - Essentials for Effective Communication - Barriers – Measures to Overcome Barriers - Group Communication, Net Work- Wheel Pattern - Y-Pattern- Chain Pattern- Cycle Pattern and Free Flow pattern.

UNIT III

Non Verbal Communication - Kinesics, Para-language, Proxemics, Signals. Listening- Importance, Process- Types - Barriers to Effective Listening- Steps in Better Listening.

UNIT IV

Business Correspondence – Importance - Functions - Characteristics - Structure of Business Letters - Common Errors in Letter Writing - Types of Business Letters.

UNIT V

Group Communication – Group and Team Interactions - Team Briefing – Introduction – Process –Sample - Benefits- Format-Pre-requisites for Successful Briefing - Internal Communication – Memos / Circulars / Notes. Company Meetings – Agenda - Minutes.

Text and Reference Books :(Latest revised edition only)

1. C.S. Raydu, Media & Communication Management, Himalaya Publishing House, Mumbai.
2. Wofford, E. Gerloff, Organizational Communication,
3. Berlo, David , Process Of Communication,
4. Iillico, T. Michael, Managerial Communication,
5. Sunder &Kamaraj, Business Communication.
6. Ramachandran K.K Business Communication.

CORE COURSE – IX

TOTAL QUALITY MANAGEMENT

Objective : To make the students understand the recent concepts of total quality management and their importance in both manufacturing and service organisation.

UNIT I

Introduction to Quality Control - Quality and Cost Considerations - Statistics and its Applications in Quality Control

UNIT II

Sampling Inspection in Engineering Manufacture - Statistical Quality Control by the Use of Control Charts - Methods of Inspection and Quality Appraisal - Reliability Engineering – Value Engineering and Value Analysis

UNIT III

Theory of Sampling Inspection - Standard Tolerance - ABC Analysis - Defect Diagnosis and Prevention

UNIT IV

Quality Improvement: Recent Technique for Quality Improvement - Zero Defect – Quality Motivation Techniques - Quality Management System and Total Quality Control

UNIT V

Selection of ISO Model and Implementation of ISO 9000 - Human Resource Development and Quality Circles - Environmental Management System and Total Quality Control

Note : Only Theory

Book References

1. Dahlgaard Jens J., Kristensen K., Kanji Gopal K, "Fundamentals of Total Quality Management", Bross Chapman & Hall, London
2. George, Stephen and Weimerskirch, Arnold, "Total Quality Management - Strategies and Techniques Proven", Mohit Publications
3. Hakes, Chris (editor), "Total Quality Management: The Key to Business Success", NY: Chapman and Hall 4. Fox, Roy, "Making Quality Happen. Six Steps to Total Quality Management", McGraw-Hill
4. Srinivasa Gupta and Valarmathy, Vijay Nicole Imprints Pvt Ltd., Chennai
5. Jain, "Quality Control And Total Quality Management", Tata McGraw Hill
6. Lal H, "Total Quality Management: A Practical Approach", New Age International Private Ltd
7. Rao, Ashok, "Total Quality Management: A Cross Functional Perspective", Wiley & Sons

CORE COURSE – X

ADVANCED CORPORATE ACCOUNTING

Objective : To enable the students to understand the detailed concepts of corporate accounting methods from different types of companies.

UNIT I

Valuation of Goodwill and Shares – Liquidation - Inflation Accounting.

UNIT II

Amalgamation by merger and Amalgamation by purchases - External Reconstruction of Companies and alteration of Share Capital .

UNIT III

Holding Company Accounts (including intercompany holdings) - Bank Accounts New format – NPA – Classification of investments.

UNIT IV

Insurance Company Accounts(new format) – Double Account System.

UNIT V

Human Resource Accounting – Definition, Objectives, and Valuation Methods – Advantages – Accounting Standards, with reference to depreciation, inventory valuation. (Theory only) - Inflation Accounting - (Theory only).

Note: Theory 25 Marks : Problems 50 Marks

BOOKS FOR REFERENCE:

1. M.C.Shukla, T.S.Grewall & S.C.Gupta – Advanced Accountancy - II
2. S.P.Jain and K.L. Narang – Advanced Accountancy
3. Dr R Palaniappan & Dr N Hariharan, Corporate Accounting, Vijay Nicole Imprints Pvt. Ltd., Chennai
4. R.L.Gupta and M.L.Radhaswamy – Advanced Accountancy
5. Mukherjee and Hanif – Modern Accountancy – II
6. Reddy & Murthy – Advanced Accounts

CORE COURSE – XI

RESEARCH METHODOLOGY
(Theory only)

Objective : To make the students understand the research process and the methods of presenting report.

UNIT I

Research in Management: An Introduction – Definition, meaning and nature – Scope and objects of Research. Types of Research : Experimental Research – Survey Research – Case Study methods – Ex Post Facto Research.

UNIT II

Research Design – Defining Research Problem and Formulation of Hypothesis – Experimental Designs.

UNIT III

Research Process – Steps in the process of Research, Data Collection and Measurement: Sources of Secondary data – Methods of Primary data collection – Questionnaire construction – Attitude measurement and Scales – Sampling and Sampling Designs – Philosophy and Pre-testing.

UNIT IV

Data presentation and Analysis – Data Processing – Methods of Statistical analysis and interpretation of Data – Testing of Hypothesis and theory of inference.

UNIT V

Report writing and presentation –steps in Report writing - types of reports – Substance of Reports – Formats of Reports – Presentation of a Report - Documentation - Foot Note - Bibliography.

BOOKS FOR REFERENCE:

1. V.P.Michael : Research Methodology in Management, Kitib Mohan Publications, Alahabad.
2. C.R.Kothari : Research Methodology, Wiley Eastern Ltd, New Delhi
3. P.Saravanavel, Research Methodology, Kitab Mahal, Allahabad.
4. O.R. Krishnaswami : Methodology of Research in Social Science
5. D.Amarchend : Research Methods in Commerce.
6. R. Prabhu & T Raju – Research Methods in Management – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – XII
STRATEGIC MANAGEMENT

Objective : To make an understanding the concepts and application of strategic management techniques

UNIT I

Strategic Management – Definition – Scope – Benefits – Risks – Approaches – Models – Strategic change – Strategic Leadership and Decision making.

UNIT II

Situation Analysis – SWOT Analysis - Environmental Scanning and Industry analysis – Forecasting – Internal Scanning - Mission – objectives – Stakeholder Theory – Cyert and March's Behavioural Theory – Objectives of Non-Profit Organizations – Social Responsibility and Business Ethics.

UNIT III

Strategy Formulation – Business Strategy – Corporate Strategy – Diversion Strategy –Portfolio Analysis – BCG Growth /Share matrix – Strategic choice – Development of policies – Strategic Alliances.

UNIT IV

Strategy Implementation – Organization for action – Staffing – Strategic leadership – MBO –Total Quality Management – Functional Strategies – Growth Strategies – Diversification, Acquisition and Joint Venture – Recovery – Recession and Divestments Strategies – Management Burnout.

UNIT V

Strategic Control and Evaluation – Establishing Strategic control – premise control – Implementation control – Strategic Surveillance – Special Alert Control – Evaluation Techniques – Managing change – Strategic issues in Managing Technology and Innovation – Strategic Effectiveness.

BOOKS FOR REFERENCE :

1. Strategic Management – Strategy Formulation and Implementation – John A.Pearce II, Richard B.Robinson Jr.(A.I.T.B.S. Publishers – J-5,6, Krishnan Nagar, Delhi – 110 051).
2. Strategic Management – Awareness and change – John L.Thompson (Cheapman & Hall 32 Second Main Road CIT East, Chennai – 35).
3. Strategic Management-J.David Hunger and Thomas L.Wheelen (Addision – Wesley Longman) (Available at Higginbotham's Ltd., Chennai).
4. Strategic Management – Gregory G.Dess and Alex Miller.
5. Strategic Management – An Integrated Approach – W.L.Charles and John Gareth,
6. International & Strategic Management – R.N.Srivastava.
7. 7.Strategic Planning for Corporate Success – V.S.Ramaswamy and S.Nanakumari.

ELECTIVE COURSE – III

(A)EXPORT MARKETING

Objective : To create awareness on the concepts of export and export marketing procedures

UNIT I

Export Marketing - Introduction - Meaning – objectives – scope – Need and importance of export trade – Distinction between internal trade and international trade – Problems faced by exporters.

UNIT II

Features and Functions of export marketing – Sources of market information – Product planning – Quality control – Export pricing – Export marketing channels – Strategy formulation.

UNIT III

Steps involved in export – Confirmation of order – Production of goods – Shipment – Negotiation – Documents used for export – Commercial documents – Regulatory documents – ISO Certificate.

UNIT IV

Export Policy and Promotion: EXIM Policy – Regulation of export trade - Organisations for promoting export – incentives and assistance – Export Houses – Trading Houses.

UNIT V

Institutions engaged in financing export – ECGC – EXIM Bank – Organisations promoting export – Commodity Board – EPC – STC – MMTC.

BOOKS FOR REFERENCE :

1. Export Marketing – Balagopal, T.A.S., Himalaya Publishing House.
2. Export Marketing – Rathor, B.S., and Rathor, J.S.,HPH.
3. International Trade and Export Management – Francis Cherunilam.

ELECTIVE COURSE – III

(B) BRAND MANAGEMENT

Objective : To create an awareness on the concepts and valuation of brand image

UNIT I

Brand- concept – Evolution, perspectives, anatomy, types of brand names, brand name associations, Brands Vs Products, Advantages of Brands to consumers & firms. Brand elements: Components & choosing brand elements, Branding challenges & opportunities.

UNIT II

Brand positioning – Basic concepts – alternatives – risks – Brands & consumers – Strategies for positioning the brand for competitive advantage – Points of parity – Points of difference - Buying decision perspectives on consumer behaviour, Building a strong brand – Method & implications.

UNIT III

Brand Image, image dimensions, brand associations & image, Brand identity – perspectives, levels, and prisms. Managing Brand image – stages – functional, symbolic & experiential brands. Brand Equity – Sources of Equity. Brand Equity models, Brand audits. Brand Loyalty & cult brands.

UNIT IV

Leveraging Brands – Brand extensions, extendibility, merits & demerits, Line extensions, line trap – Co-branding & Licensing Brands. Reinforcing and Revitalisation of Brands – need, methods, Brand Architecture – product, line, range, umbrella & source endorsed brands. Brand Portfolio Management.

UNIT V

Brand valuation – Methods of valuation, implications for buying & selling brands. Applications – Branding industrial products, services and Retailers – Building Brands online. Indianisation of Foreign brands & taking Indian brands global – Issues & Challenges.

Reference:

1. Kevin Lane Keller, Strategic Brand Management, PHI/Pearson, New Delhi.
2. Kapferer, Strategic Brand Management, Kogan Page, New Delhi.
3. Harsh Varma, Brand Management, Excell Books, New Delhi.
4. Majumdar, Product Management in India, PHI.
5. Sengupta, Brand Positioning, Tata McGraw Hill.
6. Rameshkumar, Managing Indian Brands, Vikas.
7. Chandrasekar, Product Management, Himalaya.
8. A Anandan & Prasanna Mohan Raj – Brand Management – Vijay Nicole Imprints Pvt. Ltd., Chennai

CORE COURSE – XIII
INVESTMENT MANAGEMENT

Objective: To make the student to understand the investment opportunities and portfolio management

UNIT I

Investment Management - Nature and scope - Objectives – Process – Investment Media Security and Non-security forms of Investment - gilt edged securities – Sources of Investment information.

UNIT II

New Issues Market – Methods of Issuing – Parties involved in the new issue market – Secondary market – Stock Exchanges – NSE and BSE – Trading mechanism – online trading – SEBI and Investors production.

UNIT III

Security Analysis – Approaches – Fundamental Analysis – Technical Analysis – Dow Theory – Random Walk Theory - Efficient Market Hypothesis.

UNIT IV

Portfolio Analysis – Traditional and Modern approach – Rationale of Diversification of Investments – Markovitz theory – Sharpe Index Model - Capital Asset Pricing Model.

UNIT V

Investment companies in India – Types Mutual Fund Operations in India – UTI – SEBI and RBI Guidelines for Mutual Funds.

Note: Theory only

BOOKS FOR REFERENCE:

1. Punithavathy Pandian : Security Analysis and Portfolio Management (Vikas Publishing House)
2. Dr S Gurusamy –Security Analysis & Portfolio Management –Vijay Nicole Imprints Pvt Ltd, Chennai.
3. Gupta L.C. : Return of Equities – The Indian Experience (New Delhi OXFORD).
4. Bhalla V.K. : Investment Management and Portfolio Management (S.Chand & Co. Delhi).
5. Fisher & Jordon : Security Analysis and Portfolio Management.
6. Preeti Singh : Security Analysis (Himalaya Publishing House).
7. Avadhani V.A. : Investment and Securities Markets in India.
8. SEBI : Guidelines 1992.
9. Jack dark Francis Investment : Analysis and Management (McGraw Hill 1990).
10. Gara.K.L : Stock Exchanges in India.

CORE COURSE – XIV
ADVANCED COST & MANAGEMENT ACCOUNTING

Objective: To create knowledge on various aspects of the braches of cost and management accounting techniques.

UNIT I

Cost Accounting – meaning – objectives – Nature and Scope – methods of costing – techniques of costing - classification and coding of costs – inventory control – stock levels – inventory systems - methods of pricing material issues.

UNIT II

Labour costs – Direct and indirect – importance –Remuneration method – labour performance reports – labour turnover and stability – Overheads – Importance – allocation and apportionment of overheads - overhead cost control

UNIT III

Process costing - normal and abnormal loss and gains - equivalent production - joint product and by product - contract costing.

UNIT IV

Management Accounting – Nature & Scope – Tools and Techniques – Ratio analysis – marginal costing– cost-volume profit analysis – Break-even analysis – utility and limitations of cost volume profit analysis – Financial and profit planning – objectives.

UNIT V

Budget administration – types of budget – advantages – budgeting and budgetary control - Standard Costing, Material, Labour and Overhead variances.

Note: Theory 30 Marks : Problems 45 Marks

BOOKS FOR REFERENCE :

1. S.P Jin and Narang, Csot account and management accounting, Kalyani publications
2. M. N. Arora, "Cost and Management Accounting", 8th Edition, Vikas Publishing House (P) Ltd.
3. Hilton, Maher and Selto, "Cost Management", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.
4. B.M. Lall Nigam and I.C. Jain, "Cost Accounting", Prentice-Hall of India (P) Ltd.
5. Dr A Murthy & Dr S Gurusamy – Cost & Management Accounting, Vijay Nicole Imprints Pvt. Ltd., Chennai

ELECTIVE COURSE - IV

(A) E – COMMERCE

Objective: To educate the importance and usage electronic knowledge in the field of commerce.

UNIT I

Introduction to E-Commerce – Electronic Commerce Frame work – Electronic commerce and Media convergence – The anatomy of E-Commerce Applications – Components of the Iway – Network Access Equipment – Global Information Distribution Networks – Internet Terminology – NSFNET : Architecture and Components - National Research and Educational Network.

UNIT II

Electronic Commerce and World Wide Web: Architectural Frame work for E- – WWW Architecture – Hypertext Publishing – Consumer Oriented Applications – Mercantile Process Models – Consumer's Perspective – Merchant's Perspective – Electronic Payment Systems (EPS) – Types - Designing EPS - Smart Cards and EPS – Credit Cards and EPS.

UNIT III

Electronic Data Interchange (EDI) : Applications – Security and Privacy Issues – Software Implementations – Value Added Networks – Internal Information System – Work-flow Automation and Coordination – Customization – Supply Chain Management .

UNIT IV

Marketing on the Internet: Advertising on the Internet – Chatting the On-Line Marketing Process – E-Commerce Catalogs or Directories – Information Filtering – Consumer-Data Interface: Emerging Tools.

UNIT V

Multimedia and Digital Video: Concepts – Digital Video and E-Commerce – Video Conferencing – Frame Relay – Cell Relay – Mobile Computing - Frame Work – Wireless Delivery Technology – Cellular - Data Communication Protocols.

Books for Reference:

1. Frontiers of Electronic Commerce - Ravi Kalakota, Andrew Winston
2. E-Commerce- A Managerial perspective - P.T.Joseph
3. Designing Systems for Internet Commerce- G.Winfield Treese & Lawrence C.Stewart
4. E-Commerce The Cutting Edge Of Business - Kamelesh K Bajaj, Debjani Nag
5. E Business Road Map for Success - Dr.Ravi Kalakota, Marcia Robinson
6. E-Commerce - Srinivasa Vallabhan .S.V, Vijay Nicole Imprints pvt. Ltd., Chennai

ELECTIVE COURSE - IV

(B) CUSTOMER RELATIONSHIP MANAGEMENT

Objective : To facilitates the students to understand the process of CRM, implementation of CRM strategies and customisation of services

UNIT I

Introduction and Significance - CRM Emerging Concepts; Need for CRM; CRM Applications; CRM Decisions; The Myth of Customer Satisfaction; CRM Model; Understanding Principles of Customer Relationship; Relationship Building Strategies; Building Customer Relationship Management by Customer Retention; Stages of Retention; Sequences in Retention Process; Understanding Strategies to Prevent Defection and Recover Customers.

UNIT II

CRM Process: Introduction and Objectives - an Insight into CRM and e-CRM/ online CRM; The CRM cycle - Assessment Phase; Planning Phase; The Executive Phase; Modules in CRM, 4C's of CRM Process; CRM Process for Marketing Organization; CRM Affiliation in Retailing Sector; Key e-CRM features.

UNIT III

CRM Architecture: IT Tools in CRM; Data Warehousing - Integrating Data from different phases with Data Warehousing Technology; Data Mining: - Learning from Information Using Date Mining Technology like OLAP etc.; Understanding of Data Mining Process; Use of Modelling Tools; Benefits of CRM Architecture in Sales & Productivity; Relationship Marketing and Customer Care, CRM Over Internet.

UNIT IV

CRM Implementation: Choosing the right CRM Solution; Framework for Implementing CRM: a Step-by-Step Process: Five Phases of CRM Projects

UNIT V

Development of Customizations; Beta Test and Data Import; Train and Retain; Roll out and System Hand-off; Support, System Optimization and Follow-up; Client/Server CRM Model; Use of CRM in Call Centers using Computer Telephony Integration (CTI); CTI Functionality; Integration of CRM with ERP System. Case Studies

Reference Books:

1. Mohammed, H. Peeru and a Sagadevan (2004). Customer Relationship Management. Vikas Publishing House, Delhi.
2. Paul Greenberge (2005). CRM-Essential Customer Strategies for the 21st Century. Tata McGraw Hill.
3. William, G. Zikmund, Raymund McLeod Jr.; Faye W. Gilbert (2003). Customer Relationships Management. Wiley.
4. Alex Berson, Stephen Smith, Kurt Thearling (2004). Building Data Mining Applications for CRM. Tata McGraw Hill

ELECTIVE COURSE - V

(A) PROJECT MANAGEMENT

Objective : To impart knowledge on the formation of projects to implementation of projects

UNIT I

Project – Meaning – Nature – Types of project and project life cycle – Project management – Nature and scope of project management– Project management as a profession – Role of project manager.

UNIT II

Project Identification and Formation: Project environment – Identification of investment opportunities – Projects screening – Feasibility study – Project selection – Project formulation – Stages in project formulation – Project report preparation – Planning Commission's guidelines for project formulation.

UNIT III

Project Appraisal: Objectives, essentials of a project methodology – Market appraisal – Technical appraisal – Financial appraisal – Socio – economic appraisal – Management appraisal.

UNIT IV

Project Planning and Scheduling : Objectives – Process or Planning Components or good planning – Project designing and project scheduling and time estimation – Scheduling to match availability of man power and release of funds – Cost and time.

UNIT V

Project Execution and Administration – Project contracting: Contract pricing, types – Project organisation: Forms of organisation – Project direction – Project communication – Project co ordination – Factors influencing effective project management – project time monitoring and cost monitoring – Project over runs. Project Control : Control techniques – PERT, CPM–Project audit.

Recommended Text book

1. For Unit II and IV Total project T Management The Indian context by PK. Joy – Mac millan India Ltd.,
2. For UNIT I and V Project Management – by R. Panneerselvam and P. Senthil kumar PHI learning India PVT Ltd.,
3. Project Management By Bhavesh .M Patel, Vikas Publishing Hous PVT Ltd.,
4. Project Management By S. Choudhury Tata Mcgraw Hill Co.
5. Project Management India Edition By CIDO I Clements, Cengage learning.

ELECTIVE COURSE - V
B) MANAGEMENT INFORMATION SYSTEM

Objective : To enable the students understand the concept Management Information system and implementation.

UNIT - I Introduction To Business Systems:
Need for IS in Business – fundamentals of IS – System concepts – Components of IS – IS resources Activities – Overview of IS – Operation Support Systems, Management Support Systems, Other Classification – System approach to Problem solving – Global business scenario – trends in technology and applications.

UNIT - II Information Systems for Business Operations:
Business Information Systems – Marketing Information Systems – Manufacturing Information Systems – Human Resource Information Systems – Accounting Information Systems, Financial Information Systems – Transaction Processing System.

UNIT - III Information Systems for Managerial Decision Support:
Management Information & Decision Support Systems – Management Information Systems – Expert Systems – Examples, Executive Information Systems – Artificial Intelligence Technologies.

UNIT - IV Information Systems for Strategic Advantage:
Strategic roles of IS-Breaking Business Barriers – Reengineering Business Processes Improving Business Quality – Creating Virtual Company – Building knowledge Creating Company – Using Internet Strategically – Challenges of Strategic IS – Enterprise – wide systems and E-Business applications. Internet and GST : Online Registration and filing of returns.

UNIT - V Managing Information Systems:
Enterprise Management – Information Resource Management – Strategic Management, Operational Management – Resource Management Technology Management – Distributed Management. Organizing Planning – IS planning methodologies – Critical Success Factors – Business Systems Planning – Computer Aided Planning Tools. Security & Ethical Challenges; IS controls – Facility Controls – Procedural Controls – Computer Crime – Privacy Issues.

Recommended Text books

1. Information Systems Today, By Leonard Jessup and Joseph VALACICH INDIAN Edition, PHI learning PVT Ltd.,
2. Management Information System, M Azam, Vijay Nicole Imprints Pvt. Ltd., Chennai-91.
3. Management Information system, By EFF OZ, Indian Edition, Cengage learning.
4. Management of Information systems by S.A. Kelkar, PHI learning PVT Ltd.,
5. Management Information systems Indian Edition, Gordon B. Davis and Margrethe H. Olson, Tata Mcgraw Hill.
6. Introduction to Information Systems by Alexis Leon and Mathews Leon Tata Mcgrawhill Co.
7. India GST for Beginners 2nd Edition, by Jayaram Hiregange & Deepak Rao, White Falcone Publishing.

PROJECT

PROJECT (DISSERTATION AND VIVA-VOCE)

OBJECTIVE :

To facilitate the students to understand the Business enterprises systematically and present the research report as per the acceptable format.

The project topics are to be finalised to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various problems and issues pertaining to Commerce. Each candidate should submit two copies of dissertation as per the guidelines to the Controller of Examination and one copy to the department concerned. The project will be evaluated for 100 marks (ie. 80 marks for Dissertation work and 20 marks for Viva-Voce) by Internal (Supervisor) and External Examiners. The average of the Marks of the Internal Examiners (Supervisors) and External Examiners shall be considered as the final marks to be awarded for project. The passing minimum for Dissertation is 40 marks and viva voce examination is 10 marks.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.A. English Syllabus under CBCS

(Applicable to the candidates admitted from the academic year 2016-2017 onwards)

updated on 21-12-2017

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int	Ext.	
I	Core Course – I (CC)	Language and Linguistics	6	4	3	25	75	100
	Core Course – II (CC)	Modern Literature – I (1400 – 1660)	6	4	3	25	75	100
	Core Course – III (CC)	Modern Literature – II (1660 – 1798)	6	4	3	25	75	100
	Core Course – IV (CC)	Indian Writing in English	6	4	3	25	75	100
	Elective Course–I (EC)	Grammar, Rhetoric and Writing	6	4	3	25	75	100
		Total	**30**	**20**				**500**
II	Core Course – V (CC)	Modern Literature – III (1798 – 1832)	6	5	3	25	75	100
	Core Course – VI (CC)	Modern Literature – IV (1832 – 1945)	6	5	3	25	75	100
	Core Course – VII(CC)	Shakespeare	6	5	3	25	75	100
	Core Course – VIII(CC)	Literary Criticism	6	5	3	25	75	100
	Elective Course – II (EC)	Communicative Studies and Mass Media	6	4	3	25	75	100
		Total	**30**	**24**				**500**
III	Core Course - IX (CC)	American Literature	6	5	3	25	75	100
	Core Course – X (CC)	Theory of Comparative Literature and Classics in Translation	6	5	3	25	75	100
	Core Course – XI (CC)	Literary Theory	6	5	3	25	75	100
	Core Course – XII (CC)	Research Methodology	6	5	3	25	75	100
	Elective Course – III (EC)	Asian Literature in English	6	4	3	25	75	100
		Total	**30**	**24**				**500**
IV	Core Course - XIII CC)	New Literatures in English	6	5	3	25	75	100
	Core Course – XIV CC)	Translation: Theory and Practice	6	5	3	25	75	100
	Elective Course IV	Single-Author Study – Rabindranath Tagore	6	4	3	25	75	100
	Elective Course V	* English Literature for UGC Examinations	6	4	3	25	75	100
	Project Work Viva voce 20 marks Dissertation 80 marks		6	4	--	--	--	100
		Total	**30**	**22**	--	--	--	**500**
		Grand Total	**120**	**90**				**2000**

*** Separate Question Paper Pattern for English Literature for UGC Examinations - Refer in syllabus**

Core Papers	-	14
Elective Papers	-	5
Project	-	1

Note:

1. Theory: Internal - 25 marks External - 75 marks
2. Project : 100 marks
   a) Dissertation : 80 marks
   b) Viva voce : 20 marks
3. Separate passing minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% of 75 marks (i.e. 30 marks)
   c) The passing minimum is 50 % in the aggregate

Core Course – I

Language and Linguistics

Objectives:

To provide learners an insight into the nature of language
To familiarise learners with the discourse of linguistics and to expose them to theoretical and practical manifestations of linguistics
To enable learners to understand the nexus between literature and society

Unit-I: Language History and the Process of Language Change

The Origins of Language
Development of Gesture, Sign, Words, Sounds, Speech and Writing
Core Features of Human Language, Animals and Human Language

Unit-II: Nature of Language

Pure Vowels, Diphthongs and Consonants
Language Varieties: Dialects, Idiolect, Pidgin and Creole
Language and Gender, Language and Disadvantage

Unit-III: Linguistic Form

Morphology, Grammar, Syntax
Saussurean Dichotomies: Synchronic and Diachronic Linguistics
Semantics, Pragmatics

Unit-IV: Branches of Linguistics

Structural Linguistics, Sociolinguistics, Psycholinguistics, Neurolinguistics, Applied Linguistics

Unit-V: Applied Linguistics

Stylistics and Discourse Analysis: Relationship between Language and Literature, Style and Function, Poetic Discourse, Narrative Discourse and Dramatic Discourse
Language Disorders: The Brain and Language Organisation, Aphasia, Dyslexia, Dysgraphia, Clinical Syndromes
Lexicography: Monolingual Dictionary, Interlingual Dictionary, Structure and Equivalences, Problems of Intertranslatability, General and Special Purpose Dictionaries

Books for Reference:

Aitchison, J. *Linguistics: An Introduction*. London: Hodder & Stoughton, 1995.
Atkinson,M., Kilby,D. & Rocca,I. *Foundations of General Linguistics*. London: George Allen & Unwin, 1982.
Radford, A.et al. *Linguistics: An Introduction.* UK: Cambridge University Press,1999.
Wardhaugh, R. *An Introduction to Sociolinguistics*. Massachusetts: Blackwell, 1986.
Yule, G. *The Study of Language*. 4th edn. Cambridge: CUP, 2014.

Core Course – II

Modern Literature - I (1400 - 1660)

Objectives:

To introduce learners to the evolution of English poetry – Chaucer's period
To expose learners to the salient features of metaphysical poetry
To introduce learners to the origin of English essays
To make learners understand the features of tragedy, romantic tragedy, revenge play and comedy of humours of Shakespeare's predecessors

Unit – I (Poetry)

Geoffrey Chaucer : "A Scholar from Oxford" from *The Prologue to the Canterbury Tales*
Edmund Spenser : "Epithalamion"

Unit – II (Poetry)

John Donne : "The Flea"
Andrew Marvell : "To His Coy Mistress"
George Herbert : "The Pulley"
Henry Vaughan : "The Retreat"

Unit – III (Prose)

Francis Bacon : "Of Truth," "Of Death," "Of Adversity"
The Bible : Chapters 5 to 7 from the Gospel according to Matthew

Unit – IV (Drama)

Christopher Marlowe : *The Jew of Malta*
John Webster : *The White Devil*

Unit – V (Drama)

Thomas Kyd : *The Spanish Tragedy*
Ben Jonson : *Every Man in His Humour*

Books for Reference:

Bacon, Francis, and F G. Selby. *Bacon's Essays, Ed. with Introductions and Notes*. London: Macmillan, 1927.
Barton, Anne. *Ben Jonson, Dramatist*. Cambridge: Cambridge UP, 1984.
Bennett, Joan. *Five Metaphysical Poets: Donne, Herbert, Vaughan, Crashaw, Marvell*. Cambridge England: UP, 1964.
Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960.
Donne, John, and Frank Kermode. *The Poems of John Donne*. New York: Heritage Press, 1970.
Levin, Harry. *Christopher Marlowe: The Overreacher*. London: Faber, 1961.
Minnis, A J. *The Cambridge Introduction to Chaucer*. N.p., 2014.
O'Neill, Judith. *Critics on Marlowe*. Coral Gables: U of Miami P, 1970.
Reeves, James. *A Short History of English Poetry, 1340-1940*. New York: Dutton, 1962.

Core Course – III

Modern Literature - II (1660 - 1798)

Objectives:

To expose learners to the changing trends in English poetry from Milton to Pre-Romantics

To make learners understand the prose allegory of the Restoration period and varied prose works of the Age of Pope

To make learners know the salient features of anti-sentimental comedy and Restoration comedy

To introduce learners to the emergence of the English novel during the Age of Transition

Unit – I (Poetry)

John Milton : *Paradise Lost* Book I

Unit – II (Poetry)

John Dryden : "Mac Flecknoe"
Alexander Pope : "The Rape of the Lock"
Robert Burns : "The Cotter's Saturday Night"
William Blake : "The Poison Tree"

Unit – III (Prose)

John Bunyan : *The Pilgrims Progress*
Addison and Steele : From *The Spectator*
"Of the Club" (Steele)
"Sir Roger at Church"(Addison)
Jonathan Swift : *Battle of the Books*

Unit – IV (Drama)

Richard Brinsley Sheridan : *The School for Scandal*
William Congreve : *The Way of the World*

Unit – V (Fiction)

Daniel Defoe : *Robinson Crusoe*
Oliver Goldsmith : *The Vicar of Wakefield*

Books for Reference:

Danielson, Dennis R. *The Cambridge Companion to Milton*. Cambridge: Cambridge UP, 1989.

Ford, Boris. *The New Pelican Guide to English Literature: - - a Guide for Readers. - 1984. - 544 S.* Harmondsworth: Penguin Books, 1983.

Humphreys, A R. *The Augustan World: Society, Thought, and Letters in Eighteenth-Century England*. New York: Harper & Row, 1963.

Morwood, James, and David Crane. *Sheridan Studies*. Cambridge: Cambridge UP, 1995.

Walker, Hugh. *English Satire and Satirists*. New York: Octagon Books, 1965.

Willey, Basil. *The Seventeenth Century Background: Studies in the Thought of the Age in Relation to Poetry and Religion*. Garden City: Doubleday, 1953.

Core Course – IV

Indian Writing in English

Objectives:

To enable learners to appreciate the changing trends, from Romantic to realistic, in Indian literature in English from pre to post-Independence era

To make learners aware of Indian sensibility in the representative works

Unit – I (Poetry)

Toru Dutt	: "Our Casuarina Tree"
Kamala Das	: "A Hot Noon in Malabar"
Nissim Ezekiel	: "The Professor"
A. K. Ramanujan	: "Obituary"
Keki. N. Daruwalla	: "The Epileptic"
R. Parthasarathy	: "River, Once"

Unit – II (Prose)

Jawaharlal Nehru	: "Through the Ages" (Chapter V of the *Discovery of India)*
Dr. S. Radhakrishnan	: "The World Community"

Unit – III (Drama)

Girish Karnad	: *The Fire and the Rain*
Mahesh Dattani	: *Tara*

Unit – IV (Fiction)

Mulk Raj Anand	: *Two Leaves and a Bud*
Raja Rao	: *The Cat and Shakespeare: A Tale of India*
R.K. Narayan	: *The Guide*

Unit – V (Fiction)

Kamala Markandaya	: *Nectar in a Sieve*
Anita Desai	: *Cry, the Peacock*
Shashi Deshpande	: *That Long Silence*

Books for Reference:

King, Bruce. *Modern Indian Poetry in English*. Delhi: Oxford UP, 1987.

King, Bruce. *Three Indian Poets: Nissim Ezekiel, A. K. Ramanujan, Dom Moraes*. Madras: Oxford UP, 1991.

McLeod, A L, and R K. Narayan. *R.K. Narayan: Critical Perspectives*. New Delhi: Sterling Publishers Private Ltd, 1994.

Mehrotra, Arvind K., ed. *An Illustrated History of Indian Literature in English*. New Delhi: Permanent Black, 2003.

Mukherjee, Meenakshi. *The Perishable Empire: Essays on Indian Writing in English*. New Delhi: Oxford UP, 2000.

Mukherjee, Meenakshi. *The Twice Born Fiction; Themes and Techniques of the Indian Novel in English*. New Delhi: Heinemann Educational Books, 1971.

Naik, M K. *Aspects of Indian Writing in English: Essays in Honour of Professor K. R. Srinivasa Iyengar*. Delhi: Macmillan, 1979.

Srinivasa, Iyengar K. R. *Indian Writing in English*. London: Asia Pub. House, 1962.

Tharu, Susie J, and K. Lalita. *Women Writing in India: 600 B.C. to the Present*. New York: Feminist P at the City U of New York, 1991.

Elective Course – I

Grammar, Rhetoric and Writing

Objectives:

To enable learners to understand the basics of grammar
To provide learners with the basics of rhetoric
To help learners write effective paragraphs and essays
To expose learners to various forms of discourse

Unit – I

Phrases – Clauses – Kinds of Sentences – Patterns of Sentences – Transformation of Sentences – Vocabulary – Punctuation

Unit – II

Definition of Rhetoric – Three Elements of Rhetoric: Presentative, Representative and Elaborative – Rhetorical Situation: Grammar, Logic, Aesthetics and Ethics – 5 Cannons of Rhetoric: Inventive, Arrangement, Style, Memory and Delivery – Art of Discourse

Unit – III

Topic Sentence, Paragraph Unity: Coherence and Flow, Methods of Developing Paragraphs, Discourse Markers

Unit – IV

Structure of an Essay: Beginning, Middle and Closing, Tight and Loose Organization

Unit – V

Four Kinds of Discourse: Exposition, Argumentation, Description, Narration

Books for Reference:

Boulton, Marjorie. *The Anatomy of Prose*. London: Routledge & Paul, 1954.
Miriam, Joseph, and Marguerite McGlinn. *The Trivium: The Liberal Arts of Logic, Grammar, and Rhetoric: Understanding the Nature and Function of Language*. N.p., 2002.
Weston, Anthony. *A Rulebook for Arguments*. Indianapolis: Hackett Pub, 2009.
Yáñez-Bouza, Nuria. *Grammar, Rhetoric and Usage in English: Preposition Placement, 1500-1900*. Cambridge: Cambridge UP, 2015.

Core Course – V

Modern Literature - III (1798 – 1832)

Objectives:

To familiarize learners with the characteristics of Romantic poetry
To acquaint learners with the unique qualities of the essays of Lamb and Hazlitt
To make learners aware of the characteristics of Scott's and Jane Austen's novels

Unit – I (Poetry)

William Wordsworth	: "Lines Composed a Few Miles above Tintern Abbey"
S.T. Coleridge	: "Kubla Khan"
Walter Scott	: "The Lady of the Lake"

Unit – II (Poetry)

John Keats	: "Ode on a Grecian Urn"
P. B. Shelley	: "The Cloud"
Lord Byron	: "Youth and Age"

Unit – III (Prose)

Charles Lamb	: "A Dissertation upon a Roast Pig"
William Hazlitt	: "On Reading Old Books"

Unit – IV (Drama)

P. B. Shelley	: *Prometheus Unbound*

Unit –V (Fiction)

Jane Austen	: *Emma*
Walter Scott	: *Ivanhoe*

Books for Reference:

Abrams, M H. *English Romantic Poets. Modern Essays in Criticism*. London: Oxford UP, 1967.

Bowra, C M. *The Romantic Imagination*. Cambridge: Harvard UP, 1949.

Butler, Marilyn. *Romantics, Rebels, and Reactionaries: English Literature and Its Background, 1760-1830*. New York: Oxford UP, 1982.

Kettle, Arnold. *An Introduction to the English Novel: Vol. II*. London etc.: Hutchinson's U Library, 1953.

King-Hele, Desmond. *Shelley: His Thought and Work*. Teaneck N.J.: Fairleigh Dickinson UP, 1971.

Kirkham, Margaret. *Jane Austen, Feminism and Fiction*. London: Athlone Press, 1997.

Lamb, Charles, and Ernest D. North. *The Wit and Wisdom of Charles Lamb*. Folcroft: Folcroft Library Editions, 1974.

Prickett, Stephen. *Coleridge and Wordsworth: The Poetry of Growth*. Cambridge: Cambridge UP, 1970.

Reeves, James. *A Short History of English Poetry, 1340-1940*. New York: Dutton, 1962.

Wasserman, Earl R, and John Keats. *The Finer Tone: Keats' Major Poems*. Baltimore: John Hopkins Press, 1953.

Wright, Andrew. *Jane Austen's Novels: A Study in Structure*. New York: Oxford UP, 1953.

Core Course – VI

Modern Literature – IV (1832 - 1945)

Objectives:

To enable learners to understand the spirit of Victorian England and its influence on poetry

To help learners appreciate the revolution brought about through Aesthetic Movement and anti-Victorian Movement in poetry, drama and novel during the Age of Hardy

To expose learners to various aspects of the works of T.S. Eliot

Unit – I (Poetry)

Matthew Arnold	: "The Scholar Gypsy"
Robert Browning	: "Fra Lippo Lippi"
Alfred Tennyson	: "Tithonus"

Unit – II (Poetry)

W. B. Yeats	: "The Second Coming"
G. M. Hopkins	: "The Pied Beauty"
T. S. Eliot	: Section V "What the Thunder Said?" from *The Wasteland*
W. H. Auden	: "The Shield of Achilles"
Wilfred Owen	: "The Strange Meeting"

Unit – III (Prose)

Thomas Carlyle	: "Hero as a Man of Letters"
John Ruskin	: "Of Queens' Gardens"
E. M. Forster	: "Notes on the English Character"

Unit – IV (Drama)

T. S. Eliot	: *Murder in the Cathedral*
G. B. Shaw	: *The Apple Cart*
Harold Pinter	: *The Birthday Party*

Unit – V (Fiction)

Charles Dickens	: *Great Expectations*
Thomas Hardy	: *Far from the Madding Crowd*
D.H. Lawrence	: *The Rainbow*

Books for Reference:

Batho, Edith C, Bonamy Dobrée, and Guy Chapman. *The Victorians and After, 1830-1914*. London: Cresset, 1962.

Cecil, David. *Early Victorian Novelists: Essays in Revaluation*. London: Constable & Co., Ltd, 1934.

Colin Clarke. ed. *D.H. Lawrence: The Rainbow and Women in Love*. London: Macmillan, 1979.

Gassner, John. *An Anthology. Introduction to the Drama*. New York: Holt, Rinehart and Winston, 1963.

Gransden, K W. *E.M. Forster*. New York: Grove Press, 1962.

Leavis, F R, and Q D. Leavis. *Dickens, the Novelist*. New York: Pantheon Books, 1971.

M. Esslin. *The Theater of the Absurd*. London: Eyer & Spottiswoode, 1964.

Malins, Edward G. *A Preface to Yeats*. New York: Scribner, 1974.

Martin, Jay, and T S. Eliot. *A Collection of Critical Essays on "The Waste Land."* Englewood Cliffs: Prentice-Hall, 1968.

R. Corrigan. *Theatre in the Twentieth Century*., New York: Grove Press, 1961.

Smith, Stan. *The Cambridge Companion to W.H. Auden*. Cambridge: Cambridge UP, 2004.

Core Course –VII

Shakespeare

Objectives:

To expose learners to the development of linguistic, social, psychological and existential skills through a few representative plays of Shakespeare

To make learners understand the characterization, dramatic and poetic techniques of Shakespeare

Unit – I

Macbeth

Unit – II

As You Like It

Unit – III

Richard II

Unit – IV

The Tempest

Unit – V

Shakespearean Theatre and Audience
Shakespearean Fools and Clowns
Shakespearean Women
Supernatural Elements in Shakespearean Plays
Shakespearean Soliloquies
Shakespeare as a Sonneteer and a Narrative Poet

Books for Reference:

Bowers, Fredson. *Elizabethan Revenge Tragedy: 1587-1642*. Gloucester: Peter Smith, 1959.

Bradley, A C. *Shakespearean Tragedy: Lectures on Hamlet, Othello, King Lear, Macbeth*. London: Macmillan and Co, 1905.

Charlton, H B. *Shakespearean Comedy*. London: Methuen, 1938.

Ford, Boris. *The Age of Shakespeare*. Harmondsworth: Penguin Books, 1982.

Knight, G W. *The Imperial Theme: Further Interpretations of Shakespeare's Tragedies, Including the Roman Plays*. London: Methuen, 1951.

Core Course – VIII

Literary Criticism

Objectives:

To help learners develop literary sensibility and critical thinking

To make learners understand a wide range of literary texts, literary history and literary criticism

To introduce learners to a variety of critical approaches to perceive the paradigm shift through the critical texts from Plato to T.S. Eliot

Unit I

Plato	: *The Ion* (679-681)
	The Republic (681-685)
Aristotle	: *On Poetics* (686-696)
Horace	: *The Art of Poetry* (696-700)
Longinus	: *On the Sublime* (706-708)
	(Extracts from *The English Critical Tradition* Vol.2 by S. Ramaswami and V. S. Sethuraman)

Unit II

Philip Sidney	: *Apology for Poetry*

Unit III

John Dryden	: *An Essay on Dramatic Poesie*
Dr. Johnson	: *Preface to Shakespeare*

Unit IV

William Wordsworth	: *Preface to the Lyrical Ballads*
S. T. Coleridge	: *Biographia Literaria* Chapter XIV

Unit V

Matthew Arnold	: *The Study of Poetry*
T. S. Eliot	: *Tradition and the Individual Talent*

Books for Reference:

David Daiches: *Critical Approaches to Literature*, 2nd ed., Hyderabad: Orient Longman, 2001.

Enright, D J, and Chickera E. De. *English Critical Texts: 16th Century to 20th Century*. Delhi: Oxford UP, 1983.

Harry Blamires: *A History of Literary Criticism*, Delhi: Macmillan, 2001.

Humphrey House: *Aristotle's Poetics*, Ludhiana: Kalyani Publishers, 1970.

M.A.R. Habib: *A History of Literary Criticism: From Plato to the Present*, Oxford: Blackwell, 2005.

M.S. Nagarajan: *English Literary Criticism & Theory: An Introductory History*, Hyderabad: Orient Longman, 2006.

Patricia Waugh: *Literary Theory & Criticism: An Oxford Guide*, Delhi: OUP, 2006.

S, Ramaswami, and Sethuraman V. S. *The English Critical Tradition: An Anthology of English Literary Criticism*. Vol. 2 Macmillan India Limited, 2000.

Elective Course – II

Communication Studies and Mass Media

Objectives:

To introduce learners to different types of communication
To expose learners to the functions of mass media and mass culture and popular culture
To make learners understand various aspects of mass media

Unit – I

Definition of Communication – Verbal and Non-verbal Communication – Elements of Communication – Models of Communication – Barriers to Communication – 7 Cs of Communication

Unit – II

Differentiation between 'language' (generic) and 'a language' (individual) – Purposes of Language – Persuading, Questioning, Directing, Providing Aesthetic Pleasure, Informing – Context of Communication – Intrapersonal, Interpersonal, Small group, Organization, Academic, Public, Intercultural

Unit –III

Mass Media – Definition and Classification – Functions – Agenda Setting – Reality Defining and Constructing – Social Control – Distribution of Knowledge – Mass Media Theory – Information Age

Unit – IV

Mass Culture and Popular Culture – Mass Communication and Social Change – Mass Communication and Culture – Morals and Decency

Unit – V

The Rise of Mass Media - Media Diversity and Its Benefits – Types of Mass Media – Print Media – Electronic Media – New Age Media (Mobile, Internet) Media and Its Effects – E-Publishing – Photo Journalism – Blog Writing

Books for Reference:

Allan and Barbara Pease. *The Definitive Book of Body Language*, New Delhi: Munjal Publishing House, 2005.

Corner, John, and Jeremy Hawthorn. *Communication Studies: An Introductory Reader*. London: E. Arnold, 1993.

D.M. Silviera. *Personal Growth Companion*. New Delhi: Classic Publishing,1996.

Dan Laughey. *Key Themes in Media Theories*. New Delhi: Rawat Publication, 2008.

De Fleur, M. *Theories of Mass Communication*, 2nd Edition, New York; David Mc Kay, 1970.

J. S. Yadava & Pradeep Mathur. *Issues in Mass Communication*: The Basic Concepts, Kanishka Publishers, Delhi, 2008.

Kumar, Kewal J. *Mass Communication in India*, New Delhi: Jaico Books, 2013.

McQuail, Denis. *Mass Communication Theory: An Introduction*. London: Sage Publications, 1983.

Shymali Bhattacharjee. *Media and Mass Communication: An Introduction*, Kanishka Publishers, Delhi, 2005.

Tubbs, S. L. and Moss, S. *Human Communication: Principles and Contexts*, New York: McGraw Hill, 2007.

Zeuschner, R. *Communicating Today*, Boston: Allyn and Bacon, (Chs. 5, 17), 2002.

Core Course – IX

American Literature

Objectives:

To introduce learners to significant aspects in various genres of American literature

To help learners get acquainted with the richness of American literature through representative works of poets, essayists, playwrights and novelists

Unit – I (Poetry)

Edgar Allan Poe	: "The Raven"
Walt Whitman	: "When Lilacs Last in the Dooryard Bloom'd"
Emily Dickinson	: "Because I Could Not Stop for Death"
Robert Frost	: "Birches"

Unit – II (Poetry)

Hart Crane	: "Poem: To Brooklyn Bridge"
e. e. cummings	: "The Grasshopper"
Wallace Stevens	: "The Emperor of Ice-Cream"
William Carlos Williams	: "Yachts"
Sylvia Plath	: "Daddy"

Unit – III (Prose)

Ralph Waldo Emerson	: "Self-reliance"
Henry David Thoreau	: "Where I Lived and What I Lived for?" from *Walden Pond*
John F. Kennedy	: "Inaugural Address" (Presidential Inauguration of John. F. Kennedy on January 20, 1961 at Washington, D.C)

Unit – IV (Drama)

Eugene O'Neill	: *Emperor Jones*
Arthur Miller	: *All My Sons*

Unit – V (Fiction)

Mark Twain	: *Huckleberry Finn*
Ernest Hemingway	: *For Whom the Bell Tolls*

Books for Reference:

Cunliffe, Marcus. *American Literature to 1900*. New York: P. Bedrick Books, 1987.

Matthiessen, F O. *American Renaissance: Art and Expression in the Age of Emerson and Whitman*. N.p., 1941.

McMichael, George L, and Frederick C. Crews. *Concise Anthology of American Literature*. New York: Macmillan, 1985.

Spiller, Robert E. *Literary History of the United States*. New York: Macmillan, 1963.

Core Course – X

Theory of Comparative Literature and Classics in Translation

Objectives:

To expose learners to the scope, methodology and application of the theories in comparative literature

To help learners understand the thematology and genre studies

To make learners know a few representative classics in translation

Unit – I

Definition and Theory of Comparative Literature – Scope, Methodology, Application – National Literature – Comparative Literature – French and American School

Unit – II

Influence and Imitation – Epoch, Period, Generation – Thematology, Comparing Works on the Basis of Themes – Genres, Comparing Works on the Basis of Form

Unit – III

Literature and Society, Literature and Religion, Literature and Psychology – Comparative Literature in India

Unit – IV

G.U. Pope : Three Chapters from the translation of *Tirukkural*:
"Compassion"
"Veracity"
"Hospitality"

Aesychylus : *Agamemnon*

Goethe : *The Nearness of the Beloved*

Unit – V

Franz Kafka : "Metamorphosis"

Leo Tolstoy : "How much Land Does a Man Require?"

Omar Khayyam : *The Rubaiyat*

Books for Reference:

Bhatnagar, M K. *Comparative English Literature*. New Delhi: Atlantic Publishers and Distributors, 1999.

George, K M. *Comparative Indian Literature*. Trichur: Kerala Sahitya Akademi, 1984.

Pawar S. *Comparative Literary Studies: An Introduction*. Duckworth N.p., 1973.

Weisstein, Ulrich. *Comparative Literature and Literary Theory: Survey and Introduction*. Bloomington: Indiana UP, 1974.

Wellek, René, and Austin Warren. *Theory of Literature*. New York: Harcourt, Brace, 1993.

Core Course – XI

Literary Theory

Objectives:

To introduce learners to literary theory from the beginning of the twentieth century to the present day

To help learners apply theory in the analysis of literary texts

To enable learners to understand a wide range of theoretical perspectives to enhance their appreciation of literary texts

Unit- I

New Criticism, Semiotics, Formalism

Unit-II

Structuralism, Poststructuralism, Deconstruction

Unit-III

Modernism, Postmodernism, New Historicism and Cultural Materialism, Magical Realism

Unit-IV

Feminism, Neo – Feminism, Queer Theory, Ecocriticism, Marxism, Neo – Marxism, Colonialism, Postcolonialism

Unit-V

Intertextuality,
Phenomenology, Hermeneutics, Reader-Response Criticism,
Narratology, Discourse Analysis, Stylistics

Books for Reference:

Abrams M.H, Harphman Geoffrey. *A Handbook of Literary Terms*. New Delhi: Cleanage, 2007.

Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. Manchester: Manchester UP, 2009.

Culler, Jonathan. *Literary Theory*. New Delhi: Oxford UP, 2011.

Said, Edward W. *Orientalism*. London: Vintage Books, 1979.

Showalter, Elaine. *Towards a Feminist Poetics. Twentieth Century Literary Theory*. Ed. K.M. Newton. London: Macmillan, 1988.

Habib, M.A.R, *A History of Literary Criticism: From Plato to the Present,* USA: Blackwell Publishing, 2005.

Core Course – XII

Research Methodology

Objectives:

To expose learners to philosophy of research
To enable learners to use different research sources and document them
To make learners know the format of research and mechanics of writing

Unit I

Definition of Research – Types of Research – Literary and Scientific Research – Philosophy of Research, Preliminary Study, Choosing a Viable Topic, Primary and Secondary Sources

Unit II

The Modern Academic Library, Research Sources: Printed and Electronic Including Web Sources, Digital Library Sources, Identifying the Right Sources, Compiling Working Bibliography. Evaluating the Sources

Unit III

Taking Notes and Collecting Materials
Thesis Statement, Working Outline, Preparing Samples,
Writing Drafts – Revising the Outline and Drafts
The Introduction and the Conclusion – the Main Chapters: Clarity, Unity, Coherence, Emphasis, Interest, Point of view

Unit IV

The Format of the Thesis, Preparing the Final Outline and Final Draft– Organizing Principles and Methods of Development, Plagiarism, Converting the Working Bibliography to List of Works-Cited, Abbreviations, Proof Reading

Unit V

Language and Style of Thesis Writing: General principles – Kinds and Suitability of Style, Style Sheet Conventions, Documentation: Parenthetical Documentation, Foot Notes, End Notes
The Mechanics of Writing: Spelling, Punctuation, Quotations, etc.

Books for Reference:

Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. 7th Edition, 2009.
Moore, Robert H. *Effective Writing*. New York: Holt, Rinehart and Winston, 1965.

Elective Course – III
Asian Literature in English

Objectives:

To familiarize learners with Asian writers in English

To make learners aware of various Asian cultures through representative texts of Asian Literature in English

Unit – I (Poetry)

Bei Dao (Chinese) : "Moon Festival"
Balkrishna Sama (Nepali) : "The Song"
Faiz Ahmed Faiz (Pakistani) : "When Autumn Came"

Unit – II(Prose)

Lafcadio Hearn (Japanese) : "Mosquitoes"
J. Vijayatunga (Sri Lankan) : "Village Goes Town"

Unit – III(Drama)

Frank Chin (Chinese) : *The Year of Dragon*
Zeami Motokiyo (Japanese) : *Hogoromo [The Feather Mantle]*

Unit – IV(**Short Story)**

Sunethra Rajakarunanayake (Sri Lankan) : "SMS"
Lu Hsun (Chinese) : "A Little Incident"
Zawgyi (Myanmar) : "His Spouse"

Unit – V(Fiction)

Kamila Shamsie (Pakistani) : *Kartography*
Kyung-sook Shin (Korean) : *Please Look After Mom*

Books for Reference:

Azim, Firdous, and Niaz Zaman. *Galpa: Short Stories by Women from Bangladesh*. Dhaka: Rachana, Writers.ink, 2006.

Ganesan.S. *Asian Voices: An Anthology of Asian Writings in English.* Chennai: New Century Book House, 2015.

Shamsie, Muneeza. *And the World Changed: Contemporary Stories by Pakistani Women*. N.p., 2008.

Tyler, Royall. Ed. & Trans. *Japanese No Dramas*. London: Penguin Books, 2004.

Wijesinha, Rajiva. *Bridging Connections: An Anthology of Sri Lankan Short Stories*. New Delhi: National Book Trust, 2007.

Core Course – XIII

New Literatures in English

Objectives:

To make learners familiarize with writers of new literatures
To enable learners to appreciate various cultures

Unit – I (Poetry)

David Diop : "Africa"
Wole Soyinka : "Telephone Conversation"
Judith Wright : "Fire at Murdering Hut"
A.D. Hope : "Australia"

Unit – II (Poetry)

Archibald Lampman : "A January Morning"
F.R. Scott : "The Canadian Authors Meet"
Margaret Atwood : "Journey to the Interior"
Leonard Cohen : "If It Were Spring"

Unit – III (Prose)

Stuart Hall : "Cultural Identity and Diaspora"
Chinua Achebe : "Marriage is a Private Affair

Unit – IV(Drama)

Wole Soyinka : *The Swamp Dwellers*
Tomson Highway : *Dry Lips Oughta Move to Kapuskasing*

Unit – V(Fiction)

Adele Wiseman : *Crackpot*
Margaret Laurence : *Stone Angel*

Books for Reference:

Oyekan Owomoyela. *A History of Twentieth-Century African Literatures*. University of Nebraska Press, 1993.

Irele, Abiola. F.*The African Imagination: Literature in Africa and the Black Diaspora*. Oxford University Press, 2001.

David I. Ker. *The African Novel and the Modernist Tradition*. Peter Lang Publishing, 1998.

Parekh, Pushpa Naidu and Siga Fatima Jagne. *Postcolonial African Writers: A Bio-Bibliographical Critical Sourcebook*. Greenwood Press, 1998.

Andrew Taylor. *Reading Australian Poetry*. Queensland: U of Queensland P 1987.

Malcolm Ross. *"Introduction". Poets of the Confederation*. Toronto: McLelland and Stewart, 1960.

John W. Garvin. ed. *"Archibald Lampman". Canadian Poets and Poetry*. Toronto, Ontario: McClelland, Goodchild & Stewart. 1916.

Gary Geddes. ed. *Fifteen Canadian Poets*. Toronto: Oxford University Press, 2001.

Birney, Earle. ed. *Twentieth-Century Canadian Poetry: An Anthology*. Toronto: Ryerson Press, 1953.

Angela, McRobbie. *Stuart Hall, Cultural Studies and the Rise of Black and Asian British Art*. 2016.

Panofsky, Ruth. *The Force of Vocation: The Literary Career of Adele Wiseman.* University of Manitoba Press. 2006.

Core Course – XIV

Translation: Theory and Practice

Objectives:

To familiarize learners with the history and theories of translation

To introduce learners to the techniques involved in translation of literary and non-literary texts

To enhance the employability of the learners as translators

Unit – I

A Brief History of Translation and Translation Theory, Aspects of Translation Theory

Unit – II

Types of Translation Procedure, Communicative and Semantic Translation

Unit – III

Translation Procedures, Translation Process and Synonymy, Translation and the Meta Lingual Function of Translation

Unit – IV

Linguistics and Translation, Theories of Translation, Equivalence in Translation, Problems in Translation – Untranslatability

Unit – V

Translation Practice in Tamil and English – Proverbs and Prose Passages

Books for Reference:

Bassnett, Susan. *Translation Studies*. London: Methuen, 2002.

Malmkjær, Kirsten, and Kevin Windle. *The Oxford Handbook of Translation Studies*. Oxford: Oxford UP, 2011.

Munday, Jeremy. *Translation: An Advanced Resource Book*. Taylor & Francis, 2004.

Newmark, Peter. *Approaches to Translation*. Oxford: Pergamon Press, 1981.

Venuti, Lawrence. *The Translation Studies Reader*. New York: Routledge, 2004.

Elective Course – IV

Single-Author Study – Rabindranath Tagore

Objectives:

To initiate learners into the study of Tagore's works and his narrative techniques

To expose learners to the aspects of Indian civilization and culture with reference to Tagore

Unit – I (Poetry)

Gitanjali– Verses II, VIII, IX, XIX, XXXI, XXXV, XXXVI, XLI, XLV, L, LI, LXII, LXXVI, LXXXVI, XC

Unit – II (Prose)

From *The Religion of Man*

"Man's Universe" (Chapter – I)

"The Creative Spirit" (Chapter – II)

Unit – III (Drama)

Sacrifice

The King and the Queen

Unit – IV (Short Stories)

"Kabuliwala"

"Subha"

"My Lord, The Baby"

Unit – V (Fiction)

Gora

Books for Reference:

Banerjee, Hiranmay. *How Thou Singest of My Spirit! A Study of Tagore's Poetry* 1961.

A.C. Bose. *Three Mystic Poets.* School and College Book Stall, 1945.

Radhakrishnan, S. *A Centenary Volume Rabindranath Tagore 1861-1961*. New Delhi: Sahitya Akademi, 1992.

Dhoomketu. *Gitanjali Bhavanuvad*. Ahmedabad: Gurjar, 2007

Dutta, Krishna and Robinson Andrew.eds. *Rabindranath Tagore: An Anthology*, London: Macmillan Publisher Ltd. 1997.

Ghosh, Sisir Kumar. *Rabindranath Tagore*. New Delhi: Sahitya Akademi, 2005.

Iyengar, Srinivasa. R.K. *Rabindranath Tagore*. Bombay: Popular Prakashan, 1965.

Kripalani, Krishna. *Modern Indian Literature*. Bombay: Niramal Bhatkal. 1968.

Radhakrishnan, S. *The Philosophy of Rabindranath Tagore*. London: MacMillan, 1919.

Elective Course – V

<u>English Literature for UGC Examinations</u>

Objectives:

To help learners have a wide range of knowledge in literature – poetry, prose, drama, short story and novel

To help learners prepare for UGC Eligibility tests for JRF and Assistant Professorship

Unit – I

Chaucer to Shakespeare
Jacobean to Restoration

Unit – II

Romantic Period
Victorian Period

Unit – III

Modern Period
Contemporary Period

Unit – IV

American Literature
New Literatures in English (Indian, Canadian, African, Australian)
English Language Teaching
Translation Studies

Unit – V

Classicism to New Criticism
Contemporary Theory

Books for Reference:

D, Benet E., and Samuel Rufus. *NET. SET..GO… English*. N.p., 2014.

Masih, K. Ivan. et.al. *An Objective Approach to English Literature: For NET, JRF, SLET and Pre-Ph.D. Registration Test*. New Delhi: Atlantic Publishers, 2007.

Paper : English Literature for UGC Examinations
Elective course - V
(Question Paper Pattern)

Time : 3 hrs Max : 75 Marks

There are 75 multiple choice questions. Attempt all the 75 questions (75 x 1 = 75 marks)

Each multiple choice question has 4 alternative responses marked (a), (b), (c), or (d). Tick the right responses against each item.

1. Queen Isabella is a character in _____
   a.Richard II b. Richard III c. Edward II d. none of these

2. One of the following poems is not written by A.K. Ramanujan
   a."The Snakes" b."The Striders" c."Breaded Fish" d."Philosophy"

3. Which metrical foot is the opposite of an iamb?
   a. dactyl b.trochee c.anapaest d.spondee

4. The poem "To Brookiyn Bridge" opens with the image of _____ flying above the girders of the bridge
   a. an eagle b.a sparrow c. a seagull d.a dove

5. Who says that Shakespeare was not of an age but for all time ?
   a. Dr. Johnson b.Dryden c. Ben Jonson d.T.S. Eliot

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI -620024

M.A Sanskrit Syllabus under CBCS

(For the candidate admitted from the academic year 2016-17 onwards)

Semester	Course	Course Title	Ins. Hrs /week	Credit	Exam Hrs	Marks		Total
						Int	Ext	
I	Core Course – I (CC)	Classical Poetry नैषधीयचरितम् (१ सर्गः) of श्रीहर्षः	6	4	3	25	75	100
	Core Course – II (CC)	Classical Prose कादम्बरीसङ्ग्रहः of कृष्णमाचार्यः	6	4	3	25	75	100
	Core Course – III (CC)	Drama पाञ्चरात्रम् of भासः	6	4	3	25	75	100
	Core Course – IV (CC)	Lyrics नारायणीयम् of नारायणभट्टः	6	4	3	25	75	100
	Elective Course – I (EC)	Ayurveda आयुर्वेदोपदेशाः vol. - २ Ed. Rajeshwara Sharma	6	4	3	25	75	100
		Total	**30**	**20**	--	--	--	**500**
II	Core Course – V (CC)	Etymology निरुक्तम् of यास्कः	6	5	3	25	75	100
	Core Course – VI (CC)	Poetics –I प्रतापरुद्रीयम् of विद्यानाथः	6	5	3	25	75	100
	Core Course – VII (CC)	Vedanta –I विवेकचूडामणिः of शङ्कराचार्यः	6	5	3	25	75	100
	Core Course – VIII (CC)	Scientific Literature	6	5	3	25	75	100
	Elec. Course –II (EC)	**Didactic Lyric -** नीतिशतकम् of भर्तृहरिः	6	4	3	25	75	100
		Total	**30**	**24**	--	--	--	**500**
III	Core Course – IX (CC)	Poetics – II काव्यप्रकाशः of मम्मटः	6	5	3	25	75	100
	Core Course – X (CC)	Grammar सिद्धान्तकौमुदी of भट्टोजि दीक्षितः	6	5	3	25	75	100
	Core Course – XI (CC)	Yoga योगसूत्राणि of पतञ्जलिः	6	5	3	25	75	100
	Core Course – XII (CC)	Nyaya तर्कसंग्रह-दीपिका of अन्नंभट्टः	6	5	3	25	75	100
	Elec. Course –III (EC)	Philosophical Traditions षड्दर्शनसमुच्चयः of हरिभद्रसूरिः	6	4	3	25	75	100
		Total	**30**	**24**	--	--	--	**500**

IV	Core Course – XIII (CC)	Samkhya सांख्यकारिका of ईश्वरकृष्णः	6	5	3	25	75	100
	Core Course – XIV (CC)	Poetics –III ध्वन्यालोकः (1,2) of आनन्दवर्धनः	6	5	3	25	75	100
	Elective Course – IV (EC)	Vedanta-II यतीन्द्रमतदीपिका of श्रीनिवासः	6	4	3	25	75	100
	Elective Course – V (EC)	Citra Kavyam & Prosody पादुकासहस्रम् - चित्रपद्धतिः -२० श्लोकाः of वेङ्कटनाथः श्रुतबोधः of कालिदासः	6	4	3	25	75	100
	Project	Dissertation - 80 + Viva -20	6	4	--	--	--	100
		Total	**30**	**22**	--	--	--	**500**
		Grand Total	**120**	**90**				**2000**

Note:

Project :100 Marks
Dissertation : 80 Marks
Viva Voice : 80 Marks

Core Papers - 14
Elective Papers - 5
Project - 1

Note:

1. Theory Internal 25 marks External 75 marks

2. Separate Passing Minimum is prescribed for Internal and External

   a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
   b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
   c) The Passing minimum not less than 50 % in the aggregate

References / Text Books contain the following details :

I. Name of the Author
II. Title of the Book
III. Name of the Publisher
IV. Year

Core Course – I

Classical Poetry - नैषधीयचरितम् (१ सर्गः) of श्रीहर्षः

Objective : To impart good language skill by introducing a tough classical work

Unit- I : Introduction to Mahakavyas, Sri Harsa – verses 1-25

Unit – II : verses 26-50

Unit-III : verses 51-75

Unit- IV : verses 76-100

Unit- V : verses 100-146

Prescribed book: Naishadiiyacaritam of SriHarsa
Pub. Nirnayasagar Press, Bombay 1952

Core Course – II

Classical Prose - कादम्बरीसङ्ग्रहः (Till अच्छोदसरः) of कृष्णमाचार्यः

Objective : To give a good exposure to Classical Prose

Unit- I : Introduction to Prose Romances in Sanskrit, Kadambari of Bana Bhatta आसीदशेषनरपति .... मृगया कोलाहलध्वनिरुदचरत्।

Unit – II : आकर्ण्य च .... उज्जयनी नाम नगरी।

Unit-III : यस्यां च निशि निशि ... द्विगुणतरमुत्सवमकारयत्।

Unit- IV : अतिक्रान्ते च … विह्वला हि राजप्रकृतिः।

Unit- V : आलोक्य तु ... अच्छोदं नाम सरं दृष्टवान्।

Prescribed book: **K**adambarisangraha by Pandit R.V. Krishnamacharya
Published by : Smt. R.P. Rajam, 10, L.I.C. Colony,
Chennai - 85

Core Course – III

Drama - पाञ्चरात्रम् of भासः

Objective : **To provide an introction to simple but innovative plays in Samskrit**

Unit- I : Introduction to Sanskrit plays, Bhasa – date & works, Pancaratram –story in Mahabharatam

Unit – II : Act –I of Pancaratram

Unit-III : Act –II of Pancaratram

Unit- IV : Act –III of Pancaratram

Unit- V : Deviations in story & characters in the play from Mahabharatam

Prescribed book: Pancaratram of Bhasa Samskrita Sahitya Sadana, Mysore.1958

Core Course – IV

Lyrics- नारायणीयम् - दशक १-५ of नारायणभट्टः

Objective : **Aims at proving an insight into a great & popular Samskrit Lyric**

Unit- I : Introduction to Sanskrit Lyrics, Narayaniyam – I Dasakam

Unit – II : Narayaniyam – II Dasakam

Unit-III : Narayaniyam –III Dasakam

Unit- IV : Narayaniyam –IV Dasakam

Unit- V : Narayaniyam –V Dasakam

Prescribed book: Narayaniyam of Narayana Bhatta, Sriram Publishers, Madras, 1964

Elective Course – I
Ayurveda - आयुर्वेदोपदेशाः vol. – २

Objective : To introduce Basic & Practical Ayurvedic Concepts

Unit- I : Introduction to Ayurveda, Ayurvedopadesah – I Dasakam

Unit – II : उपदेशः -1-35

Unit-III : उपदेशः -36-70

Unit- IV : उपदेशः -71-.100

Unit- V : उपदेशः -100-122

Prescribed book: Ayurvedopadesah vol. - 2
Ed. Rajeshwara Sharma, Saraswati Mahal Library, Tanjore, 1998

Core Course – V
Etymology - निरुक्तम् - १,२अध्यायः

Objective : To introduce Word Formation Techniques as per Old Grammatical Tradition

Unit- I : Introduction to Sanskrit Etymology

Unit – II : Niruktam – I half of I chapter

Unit-III : Niruktam – II half of I chapter

Unit- IV : Niruktam – I half of II chapter

Unit- V : Niruktam – II half of II chapter

Prescribed book: Niruktam of Yaska
Chowkhamba Sanskrit Series Office, Varanasi,1979

Core Course – VI

Poetics –I - प्रतापरुद्रीयम् (१&४ प्रकरणः) of विद्यानाथः

Objective : To create an awareness of concepts relating to Literary Criticism

Unit- I : Introduction to Sanskrit poetics, Prataparudriyam – work & author

Unit – II : Prataparudriyam – Nayaka Prakaranam –I half

Unit-III : Prataparudriyam – Nayaka Prakaranam –II half

Unit- IV : Prataparudriyam – Kavya Prakaranam –I half

Unit- V : Prataparudriyam – Kavya Prakaranam –II half

Prescribed book: Prataparudriyam of Vidyanatha
Chowkhamba Sanskrit Series Office, Varanasi,1979

Core Course – VII

Vedanta –I - विवेकचूडामणिः 60 श्लोकाः of शङ्कराचार्यः

Objective : To give an exposure to the Basic Concepts of the Philosophy of Advaita

Unit- I : Vivekacudamani – 1-15 verses

Unit – II : Vivekacudamani – 15-30 verses

Unit-III : Vivekacudamani – 31-40 verses

Unit- IV : Vivekacudamani – 41-50 verses

Unit- V : Vivekacudamani – 51-60 verses

Prescribed book: Vivekacudamani of Shankaracarya Sri Ramakrishna Math, Mylapore, 1998

Core Course – VIII

Scientific Literature

Objective : To Create an awareness about the Contribution of Samskrit to Rudimentary and Advanced Concepts of Science

Unit- I : Introduction to scientific literature in Sanskrit

Unit – II : Mathematics

Unit-III : Astronomy & Astrology

Unit- IV : Medicine

Unit- V : Architecture

Prescribed book: 1. History of Sanskrit Literature by A. B. Keith
Pub: Motilal Banarsidass,
2. A Short History of Sanskrit Literature by T.K. Ramachandra Aiyar Pub: R.S. Vadhyar & sons, Kalpatti, Palghat, Kerala, 2006

Elective Course –II

Didactic Lyric - नीतिशतकम् of भर्तृहरिः

Objective : To give an Exposure to Didactic Literature

Unit- I : Introduction to Sanskrit Lyrics, Nitisatakam– verses- 1-20

Unit – II : Nitisatakam – 21-40

Unit-III : Nitisatakam – verses - 41- 60

Unit- IV : Nitisatakam – verses- 61- 80

Unit- V : Nitisatakam – verses- 81-100

Prescribed book: Nitisatakam of Bhartrhari
Chowkamba sanskrit Series, Varanasi 2003
Samskrta Bhasa Pracarini Sabha, Chitoor, 2001

Core Course – IX

Poetics – II – काव्यप्रकाशः (१,२,४ उल्लासाः) of मम्मटः

Objective : To introduce Techniques of Literary Criticism

Unit- I : Introduction to Sanskrit Poetics

Unit – II : Kavyaprakasa – I ullasa

Unit-III : Kavyaprakasa – II ullasa

Unit- IV : Kavyaprakasa – IV ullasa

Unit- V : Kavyaprakasa – IV ullasa

Prescribed book: Kavyaprakasa of Mammata
Chowkhamba Sanskrit Series Office, Varanasi,1979

Core Course – X

Grammar - सिद्धान्तकौमुदी of भट्टोजि दीक्षितः (पञ्चसन्धि प्रकरणम्)

Objective : To introduce basics of Samskrit Grammar

Unit- I : Introduction to Sanskrit Grammar

Unit – II : SiddhantaKaumudi - अच्सन्धिः

Unit-III : SiddhantaKaumudi - हल्सन्धिः

Unit- IV : SiddhantaKaumudi - विसर्गसन्धिः

Unit- V : SiddhantaKaumudi - स्वादिसन्धिः

Prescribed book: Vaiyakarana-siddhanta-kaumudi of Bhattoji Dikshita
Motilal Banarsidass, Delhi, 2004

Core Course – XI

Yoga - योगसूत्रम् of पतञ्जलिः

Objective : To introduce an important and foremost manual on Yoga

Unit- I : Yoga sutram - Chapter - I sutra -s - 1-40

Unit – II : Yoga sutram - Chapter - I sutra -s - 41-51 & Chapter -II sutra-s - 1-30

Unit-III : Yoga sutram - Chapter - II sutra -s - 31-55 & Chapter -III sutra-s – 1-15

Unit- IV : Yoga sutram - Chapter - III sutra -s – 16 - 55

Unit- V : Yoga sutram - Chapter - IV sutra -s - 1- 34

Prescribed book: Yogasutram of Patanjali
Sri Ramakrishna Math, Mylapore, 2009, B.R. Publishing Corporation, Delhi 2009

Core Course – XII

Nyaya – तर्कसंग्रह-दीपिका (full) of अन्नंभट्टः

Objective : To introduce a basic Text on Indian Logic

Unit- I : Introductio to Indian Logic

Unit – II : Tarkasangraha-dipika - Chapter - I

Unit-III : Tarkasangraha-dipika - Chapter - II

Unit- IV : Tarkasangraha-dipika - Chapter - III

Unit- V : Tarkasangraha-dipika - Chapter - IV

Prescribed book: Tarkasangraha-dipika
Sri Ramakrishna Math, Mylapore, 2009

Elective Course –III

Philosophical Traditions - षड्दर्शनसमुच्चयः of हरिभद्रसूरिः

Objective : To give an exposure to the Six Systems of Indian Philosophy

Unit- I : Introduction to darsana-s

Unit – II : बौद्धमतम्

Unit-III : नैयायिकमतम् & सांख्यमतम्

Unit- IV : जैनमतम् & वैशेषिकमतम्

Unit- V : मीमांसामतम् & चार्वाकमतम्

Prescribed book: Saddarsanasamuccha of Haribadrasuri
Krishnadas Academy, Varanasi,2002

Core Course – XIII

Samkhya - सांख्यकारिका of ईश्वरकृष्णः

Objective : To introduce the Samkhya Philosophy

Unit- I : Introductio to Samkhya Philosophy

Unit – II : karikas 1to10

Unit-III : karikas 11 to20

Unit- IV : karikas 21to30

Unit- V : karikas 31to42

Prescribed book: Samkhyakarika of Ishvarakrishna
Chaukhambha Sanskrit Series, Varanasi,2009
Bharatiya Kala Prakashan, Delhi 2009

Core Course – XIV

Poetics –III – ध्वन्यालोकः (1,2) of आनन्दवर्धनः

Objective : To infuse knowledge on an important Contribution to Poetics

Unit- I : Introductio to Dhvani theory

Unit – II : Dhvanyaloka chapter – I – 1st half

Unit-III : Dhvanyaloka chapter – I – 2st half

Unit- IV : Dhvanyaloka chapter – II – 1st half

Unit- V : Dhvanyaloka chapter – II – 2st half

Prescribed book: Dhvanyaloka of Anandavardhana
Chowkhamba Sanskrit Series, Delhi 1979

Elective Course –IV

Vedanta-II - यतीन्द्रमतदीपिका of श्रीनिवासः

Objective : To introduce the core Concepts of the Philosophy of Visishtadvaita

Unit- I : I & II asvasas

Unit – II : I & II asvasas

Unit-III : I & II asvasas

Unit- IV : I & II asvasas

Unit- V : I & II asvasas

Prescribed book: Yatindramatadipika of Srinivasa
1. Sri Ramakrishna Mutt, Chennai
2. Sudarsanam Publications, Puttur Agraharam, Trichy

Elective Course – V
Citra Kavyam & Prosody

Objective : To introduce Samskrit Prosody and some unique Prosodical Compositions

Unit- I : Padukasahasram - citra paddhati - 4 verses & srutabhoda Chandas

Unit – II : Padukasahasram - citra paddhati - 4 verses & srutabhoda Chandas

Unit-III : Padukasahasram - citra paddhati - 4 verses & srutabhoda Chandas

Unit- IV : Padukasahasram - citra paddhati - 4 verses & srutabhoda Chandas

Unit- V : Padukasahasram - citra paddhati - 4 verses & srutabhoda Chandas

Prescribed books: - **1.** पादुकासहस्रम् - चित्रपद्धतिः of वेङ्कटनाथः -- २० श्लोकाः
Verses – 913, 921, 923, 924, 925, 926, 927, 928, 929, 931, 932, 940, 941,942,943,944
Pub: Sarasakala Nilayam, 8 terku mada vidi, Mylapore, Chennai, 1958

2. श्रुतबोधः of कालिदासः Pub: Chowkhamba Sanskrit Sansthan, Varanasi, 2002

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620 024

M.A. Tamil - Revised Course Structure under CBCS

(For the candidate admitted from the academic year 2016-2017 onwards)

Semester	Course	Course Title	Ins. Hrs/ Week	Credit	Exam Hrs	Marks		Total
						Int.	Ext.	
I	Core Course - I(CC)	இக்கால இலக்கியம் I	6	4	3	25	75	100
	Core Course -II(CC)	இக்கால இலக்கியம் II	6	4	3	25	75	100
	Core Course - III(CC)	சிற்றிலக்கியம்	6	4	3	25	75	100
	Core Course - IV(CC)	தொல்காப்பியம் - எழுத்ததிகாரம் - நச்சினார்க்கினியர் உரை	6	4	3	25	75	100
	Elective Course - I(EC)	கணினித் தமிழ்	6	4	3	25	75	100
		TOTAL	30	20				500
II	Core Course - V(CC)	சமய இலக்கியம்	6	5	3	25	75	100
	Core Course -VI(CC)	காப்பிய இலக்கியம்	6	5	3	25	75	100
	Core Course - VII(CC)	அற இலக்கியம்	6	5	3	25	75	100
	Core Course - VIII(CC)	தொல்காப்பியம் - சொல்- சேனாவரையர் உரை	6	5	3	25	75	100
	Elective Course -II(EC)	ஒப்பிலக்கியம்	6	4	3	25	75	100
		TOTAL	30	24				500
III	Core Course - IX(CC)	சங்க இலக்கியம் -I எட்டுத்தொகை	6	5	3	25	75	100
	Core Course - X(CC)	சங்க இலக்கியம் -II (பத்துப்பாட்டு)	6	5	3	25	75	100
	Core Course - XI(CC)	ஒப்பீட்டு நோக்கில் உலகச் செம்மொழிகள்	6	5	3	25	75	100
	Core Course - XII(CC)	தொல்காப்பியம் - பொருள்(முன்னைந்து இயல்கள்) - நச்சினார்க்கினியர் உரை	6	5	3	25	75	100
	Elective Course -III(EC)	நாட்டுப்புறவியல்	6	4	3	25	75	100
		TOTAL	30	24				500
IV	Core Course - XIII(CC)	இலக்கியத் கொள்கைகளும் திறனாய்வும்	5	5	3	25	75	100
	Core Course - XIV(CC)	தொல்காப்பியம் - பொருள் (பின்னான்கு இயல்கள்) - பேராசிரியர் உரை	5	5	3	25	75	100
	Elective Course - IV(EC)	*சைவமும் தமிழும் வைணவமும் தமிழும் இசுலாமும் தமிழும் கிறித்துவமும் தமிழும்	5	4	3	25	75	100
	Elective Course -V(EC)	*பெண்ணியம் மொழி பெயர்ப்பியல்	5	4	3	25	75	100
	Project		10	4				100
		TOTAL	30	22				500
		GRAND TOTAL		90				2000

*ஏதேனும் ஒரு தாள் மட்டும்

Note:

Project	: 100 Marks
Core Papers	**- 14**
Elective Papers	**- 5**
Project	**- 1**

Theory	Internal 25 marks	External	75 marks

Passing minimum

A candidate shall be declared to have passed in each course if he / she secures not less than 40% of marks in the University Examination and 40% of marks in the Internal Assessment and not less than 50% in the aggregate, taking Continuous assessment and University Examination marks together.

இக்கால இலக்கியம் I கவிதையும் நாடகமும்

அலகு 1: மரபுக்கவிதை

01. பாஞ்சாலி சபதம்
    பாரதியார்
02. ஐயை (முழுவதும்)
    பெருஞ்சித்திரனார்
    தென்மொழி நூல்வெளியீடு விற்பனையகம், சென்னை

அலகு 2: புதுக்கவிதை

01. சொல்லிடில் எல்லை இல்லை
    விக்கிரமாதித்யன்
    நக்கீரன் வெளியீடு, சென்னை
02. குக்கூ
    மீரா
    அகரம், தஞ்சாவூர், 2008

அலகு 3: நாடகம் I (கவிதை நாடகம்)

01. வீரத்தாய்
    பாரதிதாசன் கவிதைகள் (தொகுதி 1)
02. நல்லமுத்துக் கதை
    பாரதிதாசன் கவிதைகள் (தொகுதி 3)
    பாவேந்தம் 7, இளங்கணி பதிப்பகம் (நூல் கிடைக்குமிடம்: தமிழ்மண் பதிப்பகம்), சென்னை.

அலகு 4: நாடகம் II (உரைநடை நாடகம்)

01. தற்காலத் தமிழ் நாடகங்கள்
    வெளி ரங்கராஜன் (தொகு.)
    காவ்யா, சென்னை.

அலகு 5: கவிதையியல்

01. கவிதையியல்
    க. பூரணச்சந்திரன்,
    உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

இக்கால இலக்கியம் II உரைநடை, புனைகதை

அலகு 1: உரைநடை

i. நான் கண்டதும் கேட்டதும்

ii. புதியதும் பழையதும்

உ.வே.சாமிநாததையர்

உ.வே.சா. நூலகம், 2, அருண்டேல் சாலை, பெசண்ட் நகர், சென்னை.

அலகு 2: உரைநடை

தமிழ் உரைநடை வரலாறு

வி. செல்வநாயகம்

குமரன் புத்தக இல்லம், மெய்கை விநாயகர் தெரு, குமரன் காலனி, சென்னை.

அலகு 3: புனைகதை - சிறுகதை

01. உறவு - சிறுகதைத் தொகுப்பு

எம். பாண்டியராஜன்

பாவை பப்ளிகேஷன், 142, ஜானிஜான் கான் சாலை, இராயப்பேட்டை, சென்னை

02. சூடிய பூ சூடற்க

நாஞ்சில் நாடன்

தமிழினி, ராயப்பேட்டை, சென்னை.

அலகு 4: புனைகதை - புதினம்

01. நெடுங்குருதி

எஸ். இராமகிருஷ்ணன்

உயிர்மை, சென்னை

02. எரியும் பனிக்காடு

பி.எச். டேனியல் (தமிழில்: இரா. முருகவேள்)

விடியல் பதிப்பகம், கோயம்புத்தூர்

அலகு 5: நவீனத் தமிழ் இலக்கிய அறிமுகம்

நவீனத் தமிழ் இலக்கிய அறிமுகம்

ஜெயமோகன்

கிழக்குப் பதிப்பகம், 177/103, முதல்தளம், அம்பாள் பில்டிங், லாயிட்ஸ் ரோடு, இராயப்பேட்டை, சென்னை.

சிற்றிலக்கியம்

அலகு 1: சரசுவதி அந்தாதி - முழுவதும்

சகலகலாவல்லி மாலை - முழுவதும்

அலகு 2: திருவரங்கக் கலம்பகம் - முழுவதும்

அலகு 3: சேக்கிழார் பிள்ளைத்தமிழ் - முழுவதும்

அலகு 4: கும்பேசர் குறவஞ்சி - முழுவதும்

அலகு 5: அழகர் கிள்ளை விடுதூது - முழுவதும்

பாடநூல்கள்:

1. சரசுவதி அந்தாதி, சாரதா பதிப்பகம், சென்னை.
2. சகலகலாவல்லி மாலை, கழக வெளியீடு, சென்னை.
3. திருவரங்கக் கலம்பகம், முல்லை நிலையம், சென்னை.
4. சேக்கிழார் பிள்ளைத்தமிழ், கழக வெளியீடு, சென்னை.
5. கும்பேசர் குறவஞ்சி, உ.வே.சா. நூல் நிலையம், சென்னை.
6. அழகர் கிள்ளை விடுதூது, கழக வெளியீடு, சென்னை.

தொல்காப்பியம் - எழுத்ததிகாரம் - நச்சினார்க்கினியர் உரை

அலகு – 1

நூன்மரபு, மொழிமரபு

அலகு – 2

பிறப்பியல், புணரியல்

அலகு – 3

தொகை மரபு, உருபியல்

அலகு – 4

உயிர்மயங்கியல், புள்ளிமயங்கியல்

அலகு – 5

குற்றியலுகரப்புணரியல்

பாட நூல்:

தொல்காப்பியம் - எழுத்ததிகாரம் - நச்சினார்க்கினியர் உரை.

(வாய்ப்புள்ள இடங்களில் தொல்காப்பிய எழுத்ததிகாரத்தை மொழியியல் நோக்கில் அறிமுகப்படுத்த வேண்டும்)

பார்வை நூல்கள்:

1. முத்துச்சண்முகம் - இக்கால மொழியியல்
2. கு. பரமசிவம், இக்கால மொழியியல் அறிமுகம், அடையாளம், புத்தாநத்தம்.
3. செ.வை. சண்முகம், எழுத்திலக்கணக் கோட்பாடு, உலகத்தமிழாராய்ச்சி நிறுவனம், சென்னை.

விருப்பப் பாடம் 1. கணினித் தமிழ்

அலகு 1 கணினியின் கட்டமைப்பும் செயல்பாடும்

கணிப்பொறியின் வரலாறும் வளர்ச்சியும் - கணினியின் வகைப்பாடு - கணினியின் கட்டமைப்பு - மையச் செயலகம் - உள்ளீடகம் - வெளியீட்டகம் - கணினி வன்பொருள் - துணைமை வன்பொருள் - கணினி செயல்படும் விதம் - மென்பொருள் - அமைப்பு மென்பொருள் பயன்பாட்டு மென்பொருள் - கையடக்க மென்பொருள்

அலகு 2 கணினித் தமிழ் அடிப்படையும் பயன்பாடும்

கணிணியும் பயன்பாடும் - கணினியும் தமிழும் - குறியேற்றம் - எழுத்துருக்கள் - தமிழைத் தட்டச்சுச் செய்ய உதவும் மென்பொருள்கள் - தமிழ் தட்டச்சுப் பயிற்சி - தமிழில் விசைப் பலகை - எழுத்துருக்கள் - கணினி அச்சு சார்ந்த சில அடிப்படைகள் - கையடக்கக் கணினியும் திறன்பேசியும்

அலகு 3 தமிழ் மென்பொருள் வகைப்பாடும் வளர்ச்சியும்

தமிழ் மென்பொருள்கள் தோன்றி வளர்ந்த வரலாறு - தமிழ் மென்பொருள்கள் - தொகுப்பு மென்பொருள்கள் - மென்பொருள் ˙நீட்சிகள் - தமிழில் கணினி மொழிகள் - தன்மொழியாக்கம்/இடைமுகப்பு - திறவூற்றும் கட்டற்ற மென்பொருளும் - தமிழ் மொழி ஆய்வுக்கருவிகள் - கணினித் தமிழ் ஆய்வு - கணினித் தமிழ் ஆய்வும் தமிழ் மென்பொருளும் கணினித் தமிழ் ஆய்வுத் திட்டங்கள் - கணினித் தமிழ் ஆய்வு வளர வழி.

அலகு 4 இணையமும் தமிழ்ப் பண்பாடும்

இணையத்தின் பயன்பாடு - இணையத் தொழில்நுட்பத்தின் அடிப்படை - உலாவி - தேடுபொறி - மின்னஞ்சல் - மின் குழுக்கள் - இணையதளம் - வலைப்பூ - மின்நூலகம் - இணைய நூல்அங்காடி - மின்னூல் - ஒலிநூல் - மின்னகராதி - மின் செய்தித்தாள் - மின்னிதழ் - இணைய வானொலி, தொலைக்காட்சி - மின் அரட்டை - மின் ஆளுகை - விக்கிபீடியா - பலகைக்கணினி.

அலகு 5 இணையவழிக் கற்றலும் - கற்பித்தலும்

மின் கற்றல் - கற்றல் கற்பித்தலில் குறுவட்டு, குறுஞ்செயலி கலந்துரையாடல், இணைய நூலகம் வழி கற்றல் - தமிழ் இணையக் கல்விக்கழகம் - செம்மொழி நிறுவனப்பணி - இணையவழிக் கல்வியும் இணையதளமும் - தமிழ்வழிக் கல்வியும் இணையதளமும் - கற்பித்தலுக்கான ஒழுங்குமுறை - கணினித்தமிழ் அமைப்புகளும் செயல்பாடுகளும் - கணினித்தமிழ் விருதுகள் - கணினித்தமிழ் இதழ்கள் - கணினித்தமிழ்க் கல்வியும் பயிற்சியும்

பாடநூல்

1. இல. சுந்தரம், கணினித்தமிழ்(Tamil computing), விகடன் பிரசுரம், சென்னை, 2015.

பார்வை நூல்கள்

01. இராதா செல்லப்பன், தமிழும் கணினியும், கவிதை அமுதம் வெளியீடு, திருச்சி, 2011.
02. துரை. மணிகண்டன், தமிழ்க் கணினி இணையப் பயன்பாடுகள், கமலினி பதிப்பகம், தஞ்சாவூர், 2012.
03. பன்னிருகை வடிவேலன், தமிழ் மென்பொருள்கள், நோக்கு, சென்னை, 2014.

சமய இலக்கியம்

அலகு 1:

திருஞானசம்பந்தர்:

முதல் திருமுறை – திருப்பிரமபுரம் பதிகம் 'தோடுடைய செவியன்' முதல் 11 பாடல்கள்.

மூன்றாம் திருமுறை – திருக்கழுமலப் பதிகம் 'மண்ணில் நல்ல வண்ணம்' முதல் 11 பாடல்கள்

திருநாவுக்கரசர்:

நான்காம் திருமுறை - திருவதிகை வீரட்டானம் பதிகம், 'கூற்றாயினவாறு விலக்ககிலிர்' முதல் 10 பாடல்கள்

ஆறாம் திருமுறை - திருப்புகலூர்ப் பதிகம் 'எண்ணுகேன் என் சொல்லி எண்ணுகனோ' முதல் 10 பாடல்கள்

சுந்தரர்:

ஏழாம் திருமுறை - திருவெண்ணெய் நல்லூர்ப் பதிகம் 'பித்தா பிறைசூடி' முதல் 10 பாடல்கள்

ஏழாம் திருமுறை - திருப்பாண்டிக்கொடுமுடிப் பதிகம் 'மற்றுப்பற்றெனக்கின்றி' முதல் 10 பாடல்கள்

அலகு 2:

மாணிக்கவாசகர்:

எட்டாம் திருமுறை - ஆசைப்பத்து 'கருடக் கொடியோன்' முதல் 10 பாடல்கள்

காரைக்காலம்மையார்:

திரு இரட்டை மணிமாலை 'கிளர்ந்துந்து' முதல் 20 பாடல்கள்

அருணகிரி நாதர்

'முத்தைத் தரு' முதல் 10 பாடல்கள்

அலகு 3:

திருப்பாணாழ்வார்:

அமலனாதிபிரான் - முதல் 10 பாடல்கள்

ஆண்டாள் - திருப்பாவை - 30 பாடல்கள் (முழுவதும்)

அலகு 4

வீரமாமுனிவர்

திருக்காவலூர்க் கலம்பகம் - சமூக உல்லாசம் (16 பாடல்கள்)

கிருட்டிணப்பிள்ளை

இரட்சணிய யாத்திரிகம் - இரட்சணிய மனோகரம் 1-10 பாடல்கள்
விசுவாசக் காட்சி 1 - 10 பாடல்கள்

சதாவதானி செய்குத்தம்பிப் பாவலர் - நபிகள் நாயக மான்மிய மஞ்சரி 1-30 பாடல்கள்

அலகு 5

குணங்குடி மஸ்தான் சாகிபு பாடல்கள்

அகத்தீசர் சதகம் - தவநிலை முதல் 10 பாடல்கள்

தாயுமானவர்

எங்கு நிறைகின்ற பொருள் - அவன் அன்றி ஓரணுவும் - முதல் 11 பாடல்கள்

வள்ளலார்

முதல் திருமுறை – வேட்கை விண்ணப்பம் - 'மன்னே என்றன்' முதல் 10 பாடல்கள்

காப்பிய இலக்கியம்

அலகு 1:

சிலப்பதிகாரம் - மதுரைக் காண்டம் (13 காதைகள்)

மணிமேகலை - 1 முதல் 10 காதைகள்

அலகு 2

சீவகசிந்தாமணி - காந்தருவதத்தையார் இலம்பகம் முழுவதும்

பெருங்கதை - இலாவாண காண்டம் - யூகி போதரவு

யூகி சாக்காடு

யூகி விலாவித்தது

அலகு 3

கம்பராமாயணம் - வாலிவதைப் படலம் முழுவதும்

பெரிய புராணம் - திருநாளைப்போவார் புராணம் முழுவதும்

அலகு 4

திருவிளையாடற் புராணம் - பிட்டுக்கு மண் சுமந்த படலம்

வில்லிபாரதம் - சூது போர்ச் சருக்கம் முழுவதும்

அலகு 5

தேம்பாவணி - வளன் சனித்த படலம்

சீறாப்புராணம் - உடும்பு பேசிய படலம்

அற இலக்கியம்

அலகு 1: திருக்குறள் - அறத்துப்பால் (1-25 அதிகாரங்கள்)

அலகு 2: பழமொழி நானூறு - 26 முதல் 50 வரை 25 பாடல்கள்

அலகு 3: நாலடியார் - நட்புப் பற்றிய பாடல்கள், சுற்றந்தழால் - கூடாநட்பு - நட்பாராய்தல் - நட்பின் பிழை பொறுத்தல்(40 பாடல்கள்)

அலகு 4: திரிகடுகம் (1-20 பாடல்கள்)

நான்மணிக்கடிகை (1-20 பாடல்கள்)

அலகு 5: இனியவை நாற்பது (40 பாடல்கள்) முழுவதும்

பாடநூல்கள்

பாடத்திட்டத்தில் காணப்படும் பதினெண்கீழ்க்கணக்கு நூற்பகுதிகள்

(மர்ரே எஸ் ராஜம் பதிப்பு - மறுஅச்சு என்.சி.பி.எச். - அடிப்படையில்)

தொல்காப்பியம் - சொல்லதிகாரம் - சேனாவரையர் உரை

அலகு 1 :

கிளவியாக்கம்

அலகு 2 :

வேற்றுமையியல், வேற்றுமைமயங்கியல், விளிமரபு

அலகு 3 :

பெயரியல், வினையியல்

அலகு 4 :

இடையியல், உரியியல்

அலகு 5 :

எச்சவியல்

பாடநூல் :

தொல்காப்பியம் - சொல்லதிகாரம் - சேனாவரையர் உரை

(வாய்ப்புள்ள இடங்களில் மொழியியல் நோக்கில் அறிமுகப்படுத்த வேண்டும்)

பார்வை நூல்கள் :

01. முத்துச்சண்முகம் - இக்கால மொழியியல்

02. கு. பரமசிவம், இக்கால மொழியியல் அறிமுகம், அடையாளம், புத்தாநத்தம்.

03. செ.வை. சண்முகம், சொல்லிலக்கணக் கோட்பாடு, உலகத்தமிழாராய்ச்சி நிறுவனம், சென்னை.

04. செ.வை. சண்முகம், தொல்காப்பியத் தொடரியல், உலகத்தமிழாராய்ச்சி நிறுவனம், சென்னை.

ஒப்பிலக்கியம்

அலகு 1:

ஒப்பிலக்கியம் - சொற்பொருள் விளக்கம் - ஒப்பிலக்கியத்தின் பண்பும் பயனும் - மூவகை இலக்கியம் - (தேசிய இலக்கியம், உலக இலக்கியம், பொது இலக்கியம்) ஒப்பியலில் அறிவியல் அணுகுமுறைகள் - ஒப்பாய்வும் மொழிபெயர்ப்பும்.

அலகு 2:

தமிழில் ஒப்பிலக்கியத் தோற்றமும் வளர்ச்சியும் - பண்டைய தமிழ்ப் புலவோர், உரையாசிரியர்கள் முதலியோரின் ஒப்பிலக்கிய நோக்கு - வ.வே.சு. ஐயர், எஸ். வையாபுரிபிள்ளை, தனிநாயக அடிகளார், க. கைலாசபதி முதலியோரின் ஒப்பிலக்கியத் தொண்டு - அண்மைக்கால ஒப்பிலக்கிய வளர்ச்சி.

அலகு 3:

இலக்கிய வகைகள் - வகைக் கொள்கைகள் - வகை நோக்கில் இலக்கிய வளர்ச்சி – அடிக்கருத்தியல் - அடிக்கருத்தும் குறிப்பொருளும் - தொன்மம் - தொன்ம வகைகள்.

அலகு 4:

தொல்காப்பிய மெய்ப்பாட்டியலும் வடமொழி இரசக் கோட்பாடும் - கம்பனும் - வால்மீகியும் - திருக்குறளும் பிறமொழி நீதி இலக்கியங்களும் (குறிப்பாக வடமொழி, இலத்தீன், சீன அற நூல்கள்).

அலகு 5:

தமிழ் வீரயுகப் பாடல்கள் - தமிழ் முல்லைத்திணைப் பாடல்களும் கிரேக்க முல்லைப் பாடல்களும் - சங்கப் பாடல்களும் கிரேக்கத் (லிரிக்) தன்னுணர்ச்சிப் பாடல்களும் - சங்க அகப்பாடல்களும் பழஞ்சீனக் காதற்பாடல்களும் - கம்பனும் மில்டனும் - பாரதியும் ஷெல்லியும் - பாரதியும் விட்மனும் - இளங்கோவும் ஷேக்ஸ்பியரும் - ஐரோப்பியப் புதுக்கவிதைகளும் தமிழ்ப் புதுக்கவிதைகளும் - தற்காலத் தமிழிலக்கியங்களில் மேலைநாட்டுத் தாக்கம்.

பார்வை நூல்கள்

1. ஒப்பிலக்கிய அறிமுகம் - டாக்டர் தமிழண்ணல்
2. ஒப்பியல் இலக்கியம் - டாக்டர் க. கைலாசபதி
3. ஒப்பிலக்கியம் - ஓர் அறிமுகம் - டாக்டர் வை. சச்சிதானந்தம்.
4. ஒப்பிலக்கியக் கொள்கைகள் - டாக்டர் ம. திருமலை
5. ஒப்பிலக்கிய மரபும் திறனும் - டாக்டர் இரா. காஞ்சனா
6. கம்பருக்குக் கதை கொடுத்தவர் வால்மீகியா? – டாக்டர் கு. திருமேனி
7. கம்பனும் மில்டனும் - எஸ். இராமதிருஷ்ணன்
8. கம்பனும் வால்மீகியும் - நாமக்கல் கவிஞர்
9. காப்பிய காலம் - எஸ் வையாபுரிப்பிள்ளை
10. சங்க இலக்கிய ஒப்பீடு (இரண்டு பாகங்கள்) – டாக்டர் தமிழண்ணல்
11. திருக்குறள் நீதி இலக்கியம் - டாக்டர் க.த. திருநாவுக்கரசு
12. பாரதியும் கீட்சும் - பாலா
13. பாரதியும் ஷெல்லியும் - ரகுநாதன்
14. புதுக்கவிதைத் திறனாய்வு – அக்கினி புத்திரன்.

சங்க இலக்கியம் I (எட்டுத்தொகை)

அலகு 1:

நற்றிணை - பாடல் 51 முதல் 75 வரை

குறுந்தொகை - பாடல் 1 முதல் 25 வரை

அலகு 2:

அகநானூறு - மணிமிடை பவளம் - பாடல் 1- 15

அலகு 3

ஐங்குநுறூறு - மருதத்திணை 1- 20 பாடல்கள்

கலித்தொகை - முல்லைக்கலி 1- 10 பாடல்கள்

அலகு 4

பரிபாடல் - செவ்வேள் முதல் 2 பாடல்கள்

வையை - முதல் 2 பாடல்கள்

திருமால் - முதல் 2 பாடல்கள்

அலகு 5

புறநானூறு - கோவூர்கிழார் - 10 பாடல்கள்

(பாடல் எண்கள்:31,32,33,41,44,45,46,47,68,70)

பதிற்றுப்பத்து - 5ஆம் பத்து

பார்வை நூல்:

01. சாமி சிதம்பரனார், எட்டுத்தொகையும் தமிழர் பண்பாடும், அறிவுப் பதிப்பகம், சென்னை.

சங்க இலக்கியம் II (பத்துப்பாட்டு)

அலகு 1

குறிஞ்சிப்பாட்டு முழுவதும்

அலகு 2

முல்லைப்பாட்டு முழுவதும்

அலகு 3

நெடுநல்வாடை முழுவதும்

அலகு 4

சிறுபாணாற்றுப்படை முழுவதும்

அலகு 5

பட்டினப்பாலை முழுவதும்

பார்வை நூல்:

01. மா. இராசமாணிக்கனார், பத்துப்பாட்டு ஆராய்ச்சி, சென்னைப் பல்கலைக்கழகம், சென்னை.

ஒப்பீட்டு நோக்கில் உலகச் செம்மொழிகள்

அலகு 1:

உலகச் செம்மொழிகள் வரலாறு (தமிழ் சமஸ்கிருதம், இலத்தீன் கிரேக்கம், சீனம். அரேபியம் மற்றும் ஈபுரு)

அலகு 2:

உலகச் செம்மொழிகளின் இலக்கியங்கள் (தமிழச் சங்க இலக்கியங்கள் முதல் காப்பியங்கள், அற இலக்கியங்கள், சமஸ்கிருதம், இலத்தீன், கிரேக்கம், சீனம், அரேபியம் மற்றும் ஈபுரு மொழிகளில் மேற்குறித்த செம்மொழி இலக்கியங்களுக்கு இணையான கால அளவிலான நூல்களின் உருவ உள்ளடக்கங்களை விரிவாக அறிமுகப்படுத்துதல்)

அலகு 3:

உலகச் செம்மொழிகளில் தொகையாக்கங்கள் - கால அடிப்படையில் உலகச் செம்மொழிகளில் தொகைப்பாடுகள் - தொகுப்பு முறைகள்.

அலகு 4:

உலகச் செம்மொழி இலக்கியப் பாடுபொருள் விழுமியங்கள் - தமிழ் - (அகம், புறம், அறநெறி, வாழ்வியல் தகைமைகள்) - சமஸ்கிருதம் - (இயற்கை, பக்தி, நீதி, வழிபாட்டு முறைகள்) - கிரேக்கம், இலத்தீன் - (வீரம், காதல், இசைப்பாடல், தன்னுணர்ச்சிப் பாடல்கள்), சீனம் - (காதல்,அரசியல், தத்துவம்) - அரேபியம் - (வாய்மொழிக் கதை மரபுகள்)

அலகு 5:

ஒப்பீட்டு நோக்கில் உலகச் செம்மொழிகள் பொதுப் பண்புகள் - வாய்மொழி மரபு, தன்னுணர்வு மரபு, பதிவுறு மரபு, ஆற்றுப்படை மரபு, வீரயுகமரபு ஆகியன - தொல்காப்பியப் பொருளதிகாரமும், அரிஸ்டாட்டிலின் கவிதையியலும் காப்பிய மரபு - (ஹோமரின் இலியட், ஒடிசி, வர்ஜிலின் காப்பியங்கள்), சிலப்பதிகாரம், மணிமேகலை (தமிழ், சமஸ்கிருதம், கிரேக்கம்) - சீன கன்பூசியசு அறநெறிகளும் திருவள்ளுவரது அறநெறிகளும்.

பாட நூல்கள்:

1. ச. அகத்தியலிங்கம், சங்க இலக்கியம் செவ்வியல் இலக்கியங்களே – மணிவாசகர் பதிப்பகம் சென்னை.
2. க. கைலாசபதி, தமிழ் வீரயுகப் பாடல்கள் (கு.வெ.பா. மொழிபெயர்ப்பு), குமரன் பதிப்பகம், சென்னை
3. செண்பகம் இராமசாமி, கிரேக்க லிரிக் கவிதைகளும் சங்க இலக்கியக் கவிதைகளும், செண்பகம் பதிப்பகம், மதுரை
4. இரா. நடராசன், செம்மொழிகள், ஸ்நேகா பதிப்பகம், சென்னை.
5. அ. அ. மணவாளன், அரிஸ்டாட்டிலின் கவிதையியல், நியூ செஞ்சுரி புத்தக நிறுவனம், சென்னை
6. கு. மோகனராசு, கன்பூசியசும் திருவள்ளுவரும், சென்னைப் பல்கலைக்கழக வெளியீடு.
7. மு. அருணாசலம், பா. ஜெயக்குமார், தமிழும் உலகச் செம்மொழிகளும், பாவை பப்ளிகேசன்ஸ், சென்னை.
8. பயணி (மொழிபெயர்ப்பாளர்), வாரிச்சூடினும் பார்ப்பவர் இல்லை, காலச்சுவடு, நாகர்கோயில்.
9. சோ.ந. கந்தசாமி, சீன இலக்கியம், தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.
10. சோ.ந. கந்தசாமி, கிரேக்க இலக்கியம், தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.
11. க.த. திருநாவுக்கரசு, திருக்குறள் - நீதி இலக்கியம், சென்னைப்பல்கலைக்கழகம், சென்னை.

தொல்காப்பியம் - பொருளதிகாரம் - நச்சினார்க்கினியர் உரை

(முன்னைந்து இயல்கள்)

அலகு 1:

அகத்திணையியல்

அலகு 2 :

புறத்திணையியல்

அலகு 3 :

களவியல்

அலகு 4 :

கற்பியல்

அலகு 5 :

பொருளியல்

பாடநூல் :

தொல்காப்பியம் - பொருளதிகாரம் - நச்சினார்க்கினியர் உரை

பார்வைநூல்கள்

01. தொல்காப்பியம் தமிழிலக்கிய வரலாறு – வெள்ளைவாரணம், அண்ணாமலைப் பல்கலைக்கழக வெளியிடு.
02. தமிழ்க்காதல், வ.சுப. மாணிக்கம்.
03. கு.வெ. பாலசுப்பிரமணியன், சங்க இலக்கியத்தில் புறப்பொருள், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்.
04. சோ.ந. கந்தசாமி, புறத்திணை வாழ்வியல், தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.

நாட்டுப்புறவியல்

அலகு 1 :

நாட்டுப்புறவியல் சொல் விளக்கம் - பொருள் வரையறை - உலக அளவில் நாட்டுப்புறவியல் வரலாறு - இந்திய நாட்டுபுறவியல் வரலாறு - நாட்டுப்புறவியல் வளர்ச்சி முதலியன. தமிழக நாட்டுப்புறவியல் - பழந்தமிழிலக்கியங்களில் - நாட்டுப்புற வழக்காறுகளின் செல்வாக்கு - சங்க இலக்கியங்கள் - பக்தி இலக்கியங்கள் - நீதி இலக்கியங்கள் முதலியன.

அலகு 2 :

நாட்டுப்புற இலக்கியங்கள் - பாடல்கள் - கதைப்பாடல்கள் - கதைகள் - பழமொழிகள் - புதிர்கள் முதலியன. பிறப்பு முதல் இறப்பு வரையிலான வாழ்க்கை வட்டச் சடங்குகள - சடங்குகள் பற்றிய ஆய்வின் தேவை - சகுனம், கண்ணேறு கழித்தல், உள்ளிட்ட நம்பிக்கைகள் - பழக்கவழக்கங்கள் - விளையாட்டுக்கள்.

அலகு 3 :

வழிபாடுகளும் விழாக்களும் - வழிபாட்டு வகைகள் - இயற்கை வழிபாடுகள் - ஆவி வழிபாடு - வீட்டுத் தெய்வ வழிபாடு - குல தெய்வ வழிபாடு - ஊர்த்தெய்வ விழாக்கள் - முதலியன.

அலகு 4 :

நாட்டுப்புறக்கலைகள் - விளக்கம் - வகைப்பாடு, நிகழ்த்துக்கலைகள் - ஏனைய கலைகள் - வகைப்பாடு - கலைகளும் கலைஞர்களும். நிகழ்த்து கலைகள் கதை தழுவியவை, தெருக்கூத்து, நாடகம், உடுக்கடிப்பட்டு - வில்லுப்பாட்டு - பாவைக்கூத்து - வழிபாட்டுக்கூத்துக்கள்.

அலகு 5 :

நிகழ்த்துக்கலைகள் கதை தழுவாதவை, கரகாட்டம், பொய்க்கால் குதிரையாட்டம் - மயில், காளை, புலி, கரடி, முதலிய விலங்குளின் ஆட்டங்கள் - தேவராட்டம் - ஒயிலாட்டம் - தற்காப்புக் கலைகள் - சிலம்பு, களரி முதலியன.

பார்வை நூல்கள் :

1. ஆறு. இராமநாதன்,(பதி.)1991, நாட்டுப்புறவியல் ஆய்வு முறைகள், தமிழ்ப்பல்கலைக்கழகம்.
2. சு. சண்முகசுந்தரம், 1976, நாட்டுப்புற இலக்கியத்தின் செல்வாக்கு, இலக்கிய மாணவர் வெளியீடு, சென்னை
3. அ. மு. பரமசிவானந்தம், 1964, வாய்மொழி இலக்கியம்.
4. சரசுவதி வேணுகோபால்,நாட்டுப்புறவியல் கோட்பாட்டாய்வுகள்.
5. லூர்து. தே., 1976, நாட்டார் வழக்காற்றியல் - அறிமுகம், பாரிவேல் பதிப்பகம், பாளையங்கோட்டை.
6. ஆறு. அழகப்பன், 1973, நாட்டுப்புறப்பாடல்கள் - திறனாய்வு சைவ சித்தாந்த நூற்பதிப்புக்கழகம், சென்னை.
7. லூர்து. தே. ,1988, நாட்டார் வழக்காறுகள். மாணிக்கவாசகர் பதிப்பகம், சிதம்பரம்
8. பெருமாள், ஏ. என். கதைப்பாடல்கள், உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

9. இராமநாதன், ஆறு. 1987, நாட்டுப்புறக்கதைக்களஞ்சியம் (தொகுதிகள்), மாணிக்கவாசகர் பதிப்பகம், சிதம்பரம்.
10. 9. இராமநாதன், ஆறு. 1987, நாட்டுப்புறப் பாடல் களஞ்சியம் (தொகுதிகள்), மாணிக்கவாசகர பதிப்பகம், சிதம்பரம்.
11. மருததுரை,அரு. 1995, நாட்டுப்புறவாழ்வியல், அருணா வெளியீடு, முசிறி.
12. சிவசுப்ரமணியன், ஆ. மந்திரசடங்குகள், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை.
13. இரா. பாலசுப்ரமணியன், நாட்டுப்புறவிளையாட்டுக்கள்.
14. சண்முகசுந்தரம்,ஆ., நாட்டுப்புற விளையாட்டுகள்.
15. சு. சண்முகசுந்தரம், நாட்டுப்புறவியல் ஆய்வுகள், மணிவாசகர் பதிப்பக வெளியீடு.
16. சக்திவேல், சு. நாட்டுப்புறவியல் ஆய்வுகள், மணிவாசகர் பதிப்பக வெளியீடு.
17. பெருமாள்,ஏ.என்.1987, நாட்டுப்புறக்கலைகள், உலகத் தமிழாராய்ச்சி நிறுவனம். வெளியீடு, சென்னை.
18. அறிவுநம்பி, அ. 1986,தமிழகத்தில் தெருக்கூத்து,அமுதன் நூலகம், காரைக்குடி.
19. நவநீதகிருஷ்ணன், கே.ஏ. குணசேகரன், 1982, கரகாட்டம், அகரம், சிவகங்கை.
20. சக்திவேல், சு., நாட்டுப்புறவியல் ஆய்வு, மணிவாசகர் பதிப்பகம். சிதம்பரம்.
21. கே.ஏ. குணசேகரன், நகர்சார் நாட்டுப்புறக் கதைப் பாடல்கள்

இலக்கியக் கொள்கைகளும் திறனாய்வும்

அலகு1:

இலக்கியத் திறனாய்வு - திறனாய்வின் இருவகைப் பணிகள் - திறனாய்வு வகைகள் - திறனாய்வாளரின் தகுதிகள் - இலக்கியமும் வாழ்க்கையும் - இலக்கிய உணர்ச்சிகள் - இலக்கியத்தின் அடிப்படைக் கூறுகள் - உணர்ச்சி - வடிவம் - கருத்து - கற்பனை - சங்க அக, புற இலக்கியங்கள் - வீரயுகம் - வீரயுகம் மருவிய காலம் - செவ்வியற் பண்புகள் - அறம் சார் தொடர்நிலைச் செய்யுள்கள் - காப்பிய உருவாக்கம் போல்வன.

அலகு2:

காப்பியக் கொள்கை - கதை - நிகழ்வுகள் - மாந்தர்கள் - மூலக்கதையும் கிளைக் கதைகளும் - தமிழ் நாடகங்கள் - நாடகக் கூறுகள் - கதைக் கோப்பு - முரண் - காட்சிகள் அமைப்பு முதலியன.

அலகு 3:

பக்தி இலக்கியம் - நாயன்மார்கள் - ஆழ்வார்கள் - பக்தி இலக்கியப் பாடுபொருள்கள் - பக்தி இலக்கியக் கோட்பாடுகள் - வடிவங்கள் - திருப்பள்ளியெழுச்சி - பாவை - தாண்டகம் - திருச்சாழல் - அந்தாதி - பதிகம் போல்வன.

அலகு 4:

புனைகதைகள் (நாவலும் சிறுகதையும்) - இவற்றின் தோற்றத்திற்கான சமூகச்சூழல்கள் கதைப்பின்னல் வகைகள் - பாத்திரப்படைப்பு - பாத்திரப்பேச்சு - பின்னணியும் சூழலும் - எடுத்துரை உத்திகள் - நோக்குநிலை - புனைகதைப் படைப்பில் புதுமை உத்திகள் - நாடகத்திற்கும் நாவலுக்கும் உள்ள வேறுபாடுகள்

அலகு 5:

மரபுக்கவிதைகள் - புதுக்கவிதையின் வடிவங்கள் - படிமம், குறியீடு போன்ற உத்திகள் - தொன்ம ஆட்சி - பல்வேறு இலக்கிய இயக்கங்களின் பாதிப்புகள் - கவிதையும் உரைநடையும் - உரைநடையின் வகைகள் - உரைநடையின் அணிநலன்கள்.

பார்வை நூல்கள்:

1. தமிழில் காப்பியக் கொள்கை - து. சீனிச்சாமி
2. இலக்கியத் திறனாய்வியல் - தா.ஏ. ஞானமூர்த்தி.
3. நாவல் இலக்கியம் - மா. இராமலிங்கம்
4. புதிய உரைநடை - மா. இராமலிங்கம்
5. இலக்கியக் கொள்கைகள் - உலகத் தமிழராய்ச்சி நிறுவன வெளியீடுகள்
6. பக்தி இலக்கியம் - ப. அருணாசலம்
7. காப்பியத் தமிழ் - இரா. காசிராசன்
8. உலகக் காப்பியங்கள் - இரா. காசிராசன்
9. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் - வல்லிக்கண்ணன்
10. இலக்கியத் திறனாய்வு - சு. பாலச்சந்திரன்
11. கதையியல் - க. பூரணச்சந்திரன்
12. கவிதையியல் - க. பூரணச்சந்திரன்
13. இஸங்கள் ஆயிரம் - எம்.ஜி. சுரேஷ்
14. இலக்கிய இஸங்கள் - இ.எஸ்.டி.
15. தமிழ் வீரயுகப் பாடல்கள் - க. கைலாசபதி

தொல்காப்பியம் - பொருளதிகாரம்

(பின்னான்கு இயல்கள் - பேராசிரியர் உரை)

அலகு 1 :

மெய்பாட்டியல்

அலகு 2 :

உவமவியல்

அலகு 3 :

செய்யுளியல் (சூத்திரம் 1 – 119 முடிய 'கட்டுரை வகையான்...'என்பது முடிய)

அலகு 4 :

செய்யுளியல் (சூத்திரம் 120 – 235 முடிய 'அங்கதந்தானே... என்பது முதல் 'செய்யுள் மருங்கின்... என்பது முடிய)

அலகு 5 :

மரபியல்

பாடநூல் :

தொல்காப்பியம் - பொருளதிகாரம் - பேராசிரியர் உரை

பார்வை நூல்கள் :

01. தொல்காப்பியம் தமிழிலக்கிய வரலாறு – வெள்ளைவாரணம், அண்ணாமலைப் பல்கலைக்கழக வெளியிடு.

02. சோ.ந. கந்தசாமி, தமிழ் யாப்பியலின் தோற்றமும் வளர்ச்சியும் தொகுதி 1,2 – தமிழ்ப்பல்கலைக்கழக வெளியீடு, தஞ்சாவூர்.

சைவமும் தமிழும்

அலகு1

இந்தியச் சமயங்கள் - தமிழகச் சமயங்கள் - சைவம் - தோற்றம் - உட்பிரிவுகள் - சிவ வழிபாடு - தொன்மை - காலம்தோறும் சிவழிபாட்டின் வளர்ச்சி - சங்க காலம் முதல் - இக்காலம் வரை.

அலகு 2

சிவன் சொற்பொருள் விளக்கம் - சிவ வடிவங்கள் - சிவத்தலங்கள் - சிவ தத்துவங்கள் - சிவ விரதங்கள் - சிவபுராணங்கள் - சிவனடியார்கள் - சிவசின்னங்கள் - சிவவழிபாட்டுமுறைகள்.

அலகு 3

அருளாளர்களும் படைப்புகளும் - திருஞானசம்பந்தர் திருநாவுக்கரசர் - சுந்தரர் - மணிவாசகர் - காரைக்காலம்மையார் - திருமூலர் - நக்கீரர் - சேக்கிழார் - பரஞ்சோதியார் - தாயுமானவர் - குமரகுருபரர் - சிவப்பிரகாசர் - வள்ளலார்.

அலகு 4

சாத்திரமும் ஆசாரியர்களும் - மெய்க்கண்டார் - அருணந்தி சிவாசாரியார் - மறைஞான சம்பந்தர் - உமாபதி சிவாசாரியார் - சைவ சமயக் கொள்கைகள் - பதிக் கொள்கை - பசுக் கொள்கை - பாசக் கொள்கை - சிவசக்தித் தொடர்பு - ஆன்மா.

அலகு 5

சைவ சமயப் பணிகள் - சைவத் திருமடங்கள் - சைவ சமய நூலாசிரியர்கள் - சைவ சமயமாநாடுகள் - கருத்தரங்குகள் - சைவசமய வெளியீடுகள் - சமய இதழ்கள் - திருவிழாக்கள் - பண்டிகைகள் - சைவ சமய ஆய்வுகள்.

பார்வை நூல்கள்

1. பேராசிரியர் வெள்ளை வாரணனார் - பன்னிரு திருமுறை வரலாறு I & II அண்ணாமலைப் பல்கலைக்கழகம், அண்ணாமலை நகர்.
2. சைவ சமயம் - மு. அருணாசலம், காந்தி வித்தியாலயம், திருச்சிற்றம்பலம்
3. சைவசமயத் தோற்றமும் வளர்ச்சியும் - டாக்டர் டி.பி. சித்தலிங்கையா குருகுலம், வேதாரண்யம்.
4. சைவ ஆதினங்கள் - ஊரன் அடிகள்
5. சைவ சமயம் வரலாற்றுப் பார்வை - தருமையாதின வெளியீடு, 2002.
6. சைவ சமயம் - மா. இராசமாணிக்கனார் செல்வி பதிப்பகம், காரைக்குடி.
7. தமிழர் சமயம் - ந.சி. கந்தையா, அமிழ்தம் பதிப்பகம், சென்னை.
8. சைவ சமயம் - திரு.வி.க. மணிவாசகர் பதிப்பகம், சென்னை – 108
9. சைவத்தமிழ் இலக்கிய வரலாறு - ஔவை சு. துரைசாமிப்பிள்ளை, அண்ணாமலைப் பல்கலைக்கழகம் வெளியீடு.
10. சைவசமய வரலாறும் பன்னிரு திருமுறை வரலாறும் - வைத்தியநாதன், திருவாவடுதுறை ஆதின வெளியீடு, திருவாவடுதுறை.
11. திருத்தலங்களும் விரதங்களும் - சிவ. திருச்சிற்றம்பலம் இராஜேசுவரி புத்தக நிலையம், சென்னை.
12. சைவத்தமிழ் - மா.சா. அறிவுடை நம்பி, கருமணிப் பதிப்பகம், மதுரை.

வைணவமும் தமிழும்

அலகு 1

வரலாற்று முறையில் வைணவம் - ஆறு வழிபாட்டு மரபுகள் - வைணவ வேதங்கள் - உபநிடதங்கள் - கல்வெட்டுகள் - இதிகாசங்களில் மகாபாரதம் - பகவத்கீதை - இராமாயணம் - புராணங்கள் போன்றன.

அலகு 2

பண்டைய நூல்களில் திருமால் வழிபாடு - தொல்காப்பியம் -பத்துப்பாட்டு - கலித்தொகை - அகநானூறும் புறநானூறும் - நற்றிணை - பதிற்றுப்பத்து - பதினெண் கீழ்க்கணக்கு - திருக்குறள் - நாலடியார் - நான்மணிக்கடிகை முதலியன.

அலகு 3

வைணவ தத்துவங்கள் - தத்துவங்கள் - இதம் - புரு'ார்த்தம் - சித்துவிளக்கம் - ஆன்மா வகைகள் - அசித்து விளக்கம் - சுத்த தத்துவம் - மிச்சத்துவம் - அண்டங்கள் - சத்துவ சூனியம் - ஈசுவரன் விளக்கம் - இறைவனுடைய திருமேனிகள் - ஐந்து நிலைகளின் விளக்கம் - எட்டு அங்கங்கள் முதலியன்.

அலகு 4

வைணவ மந்திரங்கள் - திருமந்திரம் - திருமந்திரம் தோன்றிய வரலாறு - திருமந்திரத்தின் பெருமை - பதப்பிரிவு எழுத்துக்கள் - பிரணவத்தின் விளக்கம் - துவயம் - துவயத்தின் பொருள் - ஸ்ரீ என்பதன் பொருள் - நாராயணபதத்தின் பொருள் போன்றன.

அலகு 5

வைணவ இலக்கியங்கள் - நாலாயிரத் திவ்வியப் பிரபந்தம் - திவ்வியப் பிரபந்தங்கள் - திருவாய்மொழியின் சிறப்பு - பிரபந்தம் தொகுக்கப் பெற்ற வரலாறு - ஸ்ரீவைணவக் குரவர்கள் - ஆழ்வார்கள் 12 - ஆசாரியார்கள் - அடியார்கள் முதலியன.

பார்வை நூல்கள்:

1. முனைவர் ந.சுப்புரெட்டியார், வைணவச் செல்வம், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்.
2. முனைவர் ந.சுப்புரெட்டியார், வைணவமும் தமிழும், கழகப் பதிப்பு - 2008.
3. முனைவர் ப.அருணாசலம், வைணவ சமயம், முல்லை நிலையம் - 2002.
4. சுவீரா ஜெயஸ்வால், வைணவத்தின் தோற்றமும் வளர்ச்சியும், என்.சி.பி.எச்., சென்னை.

இசுலாமும் தமிழும்

அலகு.1 ஐம்பெரும் கடமைகள்

கலிமா - தொழுகை - நோன்பு - ஜக்காத் - ஹஜ் இஸ்லாம் தோற்றப் பின்புலம் - இசுலாமிய அடிப்படைக் கொள்கைகள் - திருக்குர்ஆன் - நபிமொழி.

அலகு.2 இசுலாமிய வாழ்க்கை நடைமுறைகள்

இசுலாமிய ஒழுக்கம் - பழக்க வழக்கங்கள் - நேர்ச்சை - நம்பிக்கைகள் - சகுனம் - சடங்குகள் - சட்டங்கள் - திருக்குர்ஆன் கூறும் ஏவல் விலக்கல்கள்.

அலகு.3 இசுலாமியக் காப்பியங்கள்

சீறாப்புராணம் - இராஜ நாயகம் - குத்பு நாயகம் - கனகாபிஷேக மாலை இன்னும் பிற.

அலகு.4 இஸ்லாமியச் சிற்றிலக்கியங்களும் மெய்ஞ்ஞான இலக்கியங்களும்

படைப்போர் - முனாஜாத்து - கிஸ்ஸா - மஸ்அலா - நாமா இன்னும் பிற., குணங்கு மஸ்தான் சாகிபு - தக்கலை பீர்முகம்மது - தென்காசி ரசூல் பீவி கீழக்கரை ஆசியா உம்மா - செய்குத்தம்பி பாவலர்.

அலகு.5 தற்கால இஸ்லாமிய இலக்கியங்கள்

புதினம் - சிறுகதை - புதுக்கவிதை - நாடகம் - உரைநடை.

பார்வை நூல்கள்

1. குர்ஆன் மஜீத் மூலமும், தமிழ் உரையும்.
2. அல்ஹாஜ் குலாம் ரசூல் - நபி மொழிகள்.
3. எஸ்.எச். எம் இஸ்மாயில் ஸலபி - இஸ்லாமிய ஒழுக்கவியல்.
4. ‘அஷ்ஷெய்க் முஹம்மது ஆபூபக்கா சித்திக் - நோன்பு ஓர் அரிய வாய்ப்பு
5. எச் ∴பரீதுல் ∴பர்ஸானா - நேர்ச்சை.
6. முனைவர் மு. சாயுபு மரைக்காயர் - இஸ்லாம் வளர்த்த தமிழ்.
7. முகம்மது உவைஸ் - இஸலாமும் இன்பத்தமிழும்.
8. முகம்மது உவைஸ் -இஸ்லாமியத் தமிழ் இலக்கிய வரலாற்றுத் தொகுதிகள் 1,2,3
9. ஜெ.ஆர். லெட்சுமி - இஸ்லாமியச் சிற்றிலக்கியங்கள்
10. ஜமால் முகமது கல்லூரி வெளியீடு – தமிழ் இஸ்லாமியப் புனைகதைகள்.
11. பேரா. மு. ஹம்ஸா - இஸ்லாமியத் தமிழ்ச் சிறுகதைகள்.
12. Rev. Ed Ward Sell - The Faith of ISLAM.

கிறித்தவமும் தமிழும்

அலகு 1:

தமிழக்தில் மேலைநாட்டார் வருகையும் கிறித்துவ சமயத் தோற்றமும் - மேலை நாட்டுக் கிறித்துவர்களின் தமிழ்த்தொண்டு - தமிழக கிறித்தவர்களின் தமிழ்ப்பணி - கிறித்தவரல்லாதோரின் கிறித்துவப் பணி - கல்விப் பணியும் பிற பணிகளும்.

அலகு 2:

கிறித்தவக் காப்பியங்கள் - தனித்தன்மைகள் - இலக்கியச் சிறப்புகள் சமயச் சிந்தனைகள் -தேம்பாவணி - இரட்சணிய யாத்திரீகம்

அலகு 3:

கிறித்தவச் சிற்றிலக்கியங்கள் - சிற்றிலக்கிய வடிவங்களும் உள்ளடக்கமும் சிறப்புக் கூறுகள் - சமயச் செய்திகள் - கித்தேரி அம்மான் அம்மானை - திருக்காவவலூர்க் கலம்பகம் - ஜெபமாலை - பெத்லகேம் குறவஞ்சி - சாஸ்திரக்கும்மி - அன்னை வேளாங்கண்ணி பிள்ளைத்தமிழ் - கல்வாரி காவலன் உலா - தேவமாதா அந்தாதி - இவற்றில் காணும் தனித்தன்மைகளும் சிறப்புகளும்

அலகு 4:

கிறித்தவ சமயம் சார்ந்த புதினங்கள், சிறுகதைகள், நாடகங்கள் - அவற்றில் இடம்பெற்றுள்ள கிறித்தவ சமயச் சிந்தனைகள், சமூகச் சிந்தனைகள், இலக்கியத் தன்மைகள்

அலகு 5:

கிறித்தவ கவிதைகள் - புதுக்கவிதைகள் - கீர்த்தனைகள் - புத்தெழுச்சிப் பாடல்கள் - நாட்டுப்புறப்பாடல்கள் - இலக்கியக் கட்டுரைகள் - ஆகியவற்றில் அமைந்துள்ள சமயக் கருத்துக்கூறும் இலக்கியக் கூறும்

பாடநூல்:

01. கிறித்தவ இலக்கிய வரலாறு- இர. ஆரோக்கியசாமி, பூரண ரீத்தா பதிப்பகம், தஞ்சாவூர்.

பார்வை நூல்கள்:

1. ப.ச. ஏசுதாசன், கிறித்தவ இலக்கியக் கட்டுரைகள் - முதல் தொகுதி, சுதா பதிப்பகம், திருச்சி.
2. சூ. இன்னாசி, கிறித்தவத் தமிழ்க்கொடை, தொகுதி 1,2, மணிவாசகர் பதிப்பகம், சென்னை.
3. டேவிட் சித்தையா, நாவல் வளர்ச்சி, கிறிஸ்துவ இலக்கியம், மணிவாசகர் பதிப்பகம், சென்னை.
4. மயிலை சீனி. வேங்கடசாமி, கிறித்தவமும் தமிழும், சாரதா பதிப்பகம், சென்னை.
5. பால் சந்திரமோகன்(பதி.), ஏதேனிலிருந்து கல்வாரி வரை
6. பால் சந்திரமோகன்(பதி.), மந்தையில் சேர்ந்த ஆடுகள்

பெண்ணியம்

அலகு1:

பெண்ணிய விளக்கம் - மேலை நாடுகளில் பெண்ணியம் - பெண்களுக்கு வாக்குரிமை - பெண் விடுதலை இயக்கம்

அலகு 2:

பெண்ணியக் கோட்பாடுகள் - பெண்ணடிமையின் காரணங்கள், பெண்கள் முன்னேற்ற வழிகள் - மிதவாதப் பெண்ணியம் - மார்க்சியப் பெண்ணியம் - சோஷலிசப் பெண்ணியம் - தீவிரவாதப் பெண்ணியம் - ஆன்மீகப் பெண்ணியம் - கலாச்சாரப் பெண்ணியம் - கிறித்துவப் பெண்ணியம் - இந்தியப் பெண்ணியம் - பெரியார் பெண்ணியம்.

அலகு 3:

பெண்ணியம் - இந்தியாவில் தோற்றமும் வளர்ச்சியும் - காலந்தோறும் பெண்மை - பெண்களும் சட்டங்களும் - பெண்களும் அரசுத் திட்டங்களும் - மகளிர் அமைப்புகள்.

அலகு 4:

தமிழிலக்கிய நோக்கில் பெண்கள் - மரபு இலக்கியத்தில் பெண்கள் - பாரதி படைப்புகளில் பெண்ணியம் - பெண் சிறுகதை ஆசிரியர்கள் - பெண் நாவலாசிரியர் - பெண் புதுக் கவிஞர்கள் - மகளிர் இதழ்கள்.

அலகு 5:

இலக்கியமும் மகளிர் மேம்பாடும் - பெண்ணியப் படைப்புகளில் விமர்சனப் பார்வை - பின் நவீனத்துவப் பார்வையில் பெண்ணியம்.

பார்வை நூல்கள்:

1. முத்துச்சிதம்பரம், பெண்ணியம் தோற்றமும் வளர்ச்சியும், தமிழ்ப் புத்தகாலயம், சென்னை, 1997.
2. பிரேமா, பெண் மரபிலும் இலக்கியத்திலும், தமிழ்ப் புத்தகாலயம், சென்னை, 2001.
3. பிரேமா, பெண்ணியம், தமிழ்ப் புத்தகாலயம், சென்னை, 2000
4. ராஜம் கிருஷ்ணன், காலந்தோறும் பெண், தாகம், சென்னை, 2002.
5. குமாரசாமி, பெண்ணிய நோக்கில் பாரதி, தமிழ்ப் புத்தகாலயம், சென்னை, 2001.
6. மங்கையர்க்கரசி, இலக்கிய இயக்கங்கள், நியூ செஞ்சுரி புக் ஹவுஸ், 2004.
7. சா. வளவன், பெண் படைப்பாளர் தம் படைப்புகள், திருமலை தெய்வம் ஆர்ட் பிரிண்டர்ஸ், சென்னை-29.
8. செ. கணேசலிங்கன், பெண்ணியப் பார்வையில் திருக்குறள், குமரன் பப்ளிஷாஸ், சென்னை -26
9. வீ. அரசு, பெண்ணியமும் பாரதியும், அலைகள் வெளியீட்டகம், சென்னை-24
10. சு. சிவகாமசுந்தரி, தமிழகப் பெண்கள் வாழ்வும் வளர்ச்சியும், அன்பு வடிவு, வெளியீட்டகம், தஞ்சாவூர்.
11. ஹரி. விஜயலட்சுமி, ராஜம் கிருஷ்ணன் புதினங்களில் பெண் மாந்தர், என்னெஸ் பப்ளிகேஷன்ஸ், உடுமலைப்பேட்டை.
12. தாயம்மாள் அறவாணன், பெண் இன்று நேற்று அன்று, பச்சைப்பசேல் பதிப்பகம், புதுச்சேரி.
13. ர. விஜயலட்சுமி, தமிழக மகளிர் (தொடக்ககால முதல் ஆறாம் நூற்றாண்டு வரை), சந்தியா பதிப்பகம், சென்னை.

மொழி பெயர்ப்பியல்

அலகு 1

மொழிபெயர்ப்பினைப் பற்றிய பல்வகை விளக்கங்கள் - மூலமொழி, இலக்குமொழி பற்றிய கண்ணோட்டம், மொழிபெயர்ப்பின் தன்மை - தகவல்கள் வெளியிடும் தன்மை - மொழிபெயர்ப்பின் நோக்கம் - பயன் - இன்றியமையாமை - உலக அரங்கில் மொழிபெயர்ப்பின் இன்றைய முக்கியத்துவம் - மொழிபெயர்ப்பின் தோற்றமும் வளர்ச்சியும் - மேலைநாட்டு மொழிகளில் மொழிபெயர்ப்பு முயற்சிகள் - தமிழ்நாட்டில் மொழிபெயர்ப்பு - விவிலிய நூல் மொழிபெயர்ப்பு - குறிப்பிடத்தகுந்த மொழி பெயர்ப்பாளர்கள்.

அலகு 2

மொழிபெயர்ப்பு வகைகள் - சொல் நேர் மொழிபெயர்ப்பு - விரிவான மொழிபெயர்ப்பு, முழுமையான அல்லது சரிநிலை மொழிபெயர்ப்பு - பகுதிநிலை மொழிபெயர்ப்பு - நம்பகநிலை மொழிபெயர்ப்பு - சுருக்கம் - தழுவல் - மொழியாக்கம்.

அலகு 3

மொழிபெயர்ப்பாளர் தகுதிகள் - இருமொழி, பன்மொழி அறிவின் இன்றியமையாமை - இலக்கு மொழி அறிவின் கூறுகளும் மரபுகளும், பண்பாட்டுத் தாக்கம், மொழிகளைப் பற்றிய அறிவு - பிறதுறைகளில் ஆழ்ந்த பயிற்சியும் புலமையும் - மூல நூலாசிரியருக்கு ஒத்த திறன் - மூல நூலின் தோய்வு - படைப்பு மனம் - அறிவியல் பார்வை.

அலகு 4

மொழிபெயர்ப்பின் அடிப்படைகள் - மொழிபெயர்ப்புக் கொள்கைகள் - நிகரன் கொள்கை (Theory of Equivalence) இயங்குநிலை நிகரன்கள் (Dynamic Equivalence) சூழல்கள் ஒத்தமைவு (Contextual consistency) இவற்றின் விளக்கங்கள் மொழி பெயர்ப்பின் பொதுவான சிக்கல்கள். சிக்கல்களுக்கான காரணிகள் - தமிழ் மொழிக்கே உரிய சிக்கல்கள் - சொல்லும் பொருளும் - மரபுச் சொற்கள் - வழக்குச் சொற்கள் - உறவுமுறைச் சொற்கள் - பொருள்கோள் குறிப்புப் பொருள் - பழமொழிகள்.

அலகு 5

படைப்பிலக்கியங்களை மொழிபெயர்க்கும் முறை - கவிமொழிபெயர்ப்பு - சில தமிழ் ஆங்கில மொழிபெயர்ப்புகளை ஒப்புநோக்கல் - புனைகதை மொழிபெயர்ப்பு - அறிவியல் தொழில்நுட்ப இலக்கியங்களை மொழி பெயர்க்கும் முறை, ஆட்சி ஆவணங்களை மொழிபெயர்த்தல்.

பார்வை நூல்கள்:

01. சு. சண்முகவேலாயுதம், மொழிபெயர்ப்பியல், உலகத்தமிழாராய்ச்சி நிறுவனம், சென்னை.
02. சி. சிவசண்முகம், வே. தயாளன், மொழிபெயர்ப்பியல், அன்னம், சிவகங்கை.
03. சேதுமணி பணியன், மொழிபெயர்ப்பியல் கோட்பாடுகளும் உத்திகளும், செண்பகம் வெளியீடு, மதுரை.
04. செ. இராஜேஸ்வரி, மொழிபெயர்ப்பியல் ஆய்வு, , நெல்லையா பதிப்பகம், மதுரை.
05. வை. சச்சிதானந்தன், 'ஒப்பிலக்கியம் ஓர் அறிமுகம்' மொழிபெயர்ப்புப் பற்றி இடம் பெற்றுள்ள கட்டுரைகள் மட்டும் - ஆக்ஸ்போர்டு யுனிவர்சிட்டி பிரஸ்.
06. கா. சிவத்தம்பி, இலக்கியமும் கருத்துநிலையும், மொழிபெயர்ப்புப் பற்றிய கட்டுரை மட்டும், தமிழ்ப்புத்தகாலயம், சென்னை.
07. முனைவர் வளர்மதி, 'மொழிபெயர்ப்புக்கலை' (உலகத் தமிழ் ஆராய்ச்சி சிறுவனம்), திருமகள் புத்தக நிலையம், சென்னை.
08. A. Nida, The Theory and Practice of Translstion.
09. A. Nida, Towards A Science of Translation.
10. Theodore Savory, The Art of Translation.
11. Peter New Mark 'Approaches to Translation.'

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

MASTER OF BUSINESS ADMINISTRATION (MBA) Syllabus under CBCS

(Applicable to the candidates admitted from the academic year 2016-2017 onwards)

Semester	Course	Subject Title	Hours	Credit	Int. Marks	Ext. Marks	Total
I	Core - I	Management concepts	5	5	25	75	100
	Core - II	Managerial Communication	5	5	25	75	100
	Core - III	Mathematics & Statistics	5	5	25	75	100
	Core - IV	Managerial Economics	5	5	25	75	100
	Core - V	Organisational Behaviour	5	5	25	75	100
	Core - VI	Management Accounting	5	5	25	75	100
Total			**30**	**30**	**150**	**450**	**600**
II	Core - VII	Operation Research	5	5	25	75	100
	Core - VIII	Production Management	5	5	25	75	100
	Core - IX	Marketing Management	5	5	25	75	100
	Core - X	Financial Management	5	5	25	75	100
	Core - XI	Human Resource Management	5	5	25	75	100
	Core - XII	Research Methods in Management	5	5	25	75	100
Total			**30**	**30**	**150**	**450**	**600**

III	Core - XIII	Strategic Management	5	5	25	75	100
	Core - XIV	Legal aspects of Business	4	4	25	75	100
	Core - XV	Knowledge Management	4	4	25	75	100
	Elective - I	Course A-I / B-I / C-I / D-I / E-I	5	4	25	75	100
	Elective - II	Course A-II / B-II / C-II / D-II / E-II	5	4	25	75	100
	Elective – III	Course A-III / B-III / C-III / D-III / E-III	5	4	25	75	100
		Managerial Skills	2	2	25	75	100
Total			**30**	**27**	**150**	**450**	**700**
IV	Core - XVI	International Business Environment	5	5	25	75	100
	Core - XVII	Entrepreneurial Development	5	5	25	75	100
	Core – XVIII	Total Quality Management	5	5	25	75	100
	Elective – IV	Course A-IV / B-IV / C-IV / D-IV / E-IV	5	4	25	75	100
	Elective - V	Course A-V / B-V / C-V / D-V / E-V	5	4	25	75	100
	Elective – VI	Course A-VI / B-VI / C-VI / D-VI / E-VI	5	4	25	75	100
Total			**30**	**27**	**150**	**450**	**600**
	Project Work.	(Dissertation 80 + Viva Voce 20). Actual Project during the vacation of III semester and Viva Exam before the IV semester Exam.	**-**	6	**-**	**-**	100
Total			**-**	**6**	**25**	**75**	**100**
Grand Total			**120**	**120**	**650**	**1950**	**2600**

Electives : Choose any one Group							
Semester	**Course**	**Subject Title**	**Hours**	**Credit**	**Int. Marks**	**Ext. Marks**	**Total**
III	**A : Marketing**						
	E-Course-I	Consumer Behaviour	5	4	25	75	100
	E-Course-II	Business to Business Marketing	5	4	25	75	100
	E-Course-III	Sales and Distribution Management	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
IV	E-Course-IV	Advertising and Sales Promotion	5	4	25	75	100
	E-Course-V	Marketing of Services	5	4	25	75	100
	E-Course-VI	Retail Management	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
III	**B : Finance**						
	E-Course-I	Strategic Financial Management	5	4	25	75	100
	E-Course-II	Financial services	5	4	25	75	100
	E-Course-III	Security Analysis & Portfolio Management	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
IV	E-Course-IV	Project Management	5	4	25	75	100
	E-Course-V	Global Financial Management	5	4	25	75	100
	E-Course-VI	Merchant Banking	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
III	**C : Human Resource**						
	E-Course-I	Organisation Development	5	4	25	75	100
	E-Course-II	Compensation Management	5	4	25	75	100
	E-Course-III	Change Management	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
IV	E-Course-IV	Public Relations Management	5	4	25	75	100
	E-Course-V	Managing Interpersonal Effectiveness	5	4	25	75	100
	E-Course-VI	Group Dynamics	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**

III	**D : Systems**						
	E-Course-I	E- Business	5	4	25	75	100
	E-Course-II	Internet Technologies	5	4	25	75	100
	E-Course-III	Management Information Systems	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
IV	E-Course-IV	Software Project Management	5	4	25	75	100
	E-Course-V	Relational Database Management System	5	4	25	75	100
	E-Course-VI	Object Oriented Programming & C++	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
III	**E : Operations**						
	E-Course-I	Supply Chain Management	5	4	25	75	100
	E-Course-II	Advanced Operation Research	5	4	25	75	100
	E-Course-III	Management Control Systems.	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**
IV	E-Course-IV	Material Management	5	4	25	75	100
	E-Course-V	Lean Manufacturing	5	4	25	75	100
	E-Course-VI	World Class Manufacturing	5	4	25	75	100
		Total	**15**	**12**	**75**	**225**	**300**

CORE COURSE I

MANAGEMENT CONCEPTS

Objectives:

This course is designed to expose the students to fundamental concepts of management. To acquaint students with the management process, which includes understanding the theory behind the practical application of management.

Unit I

Management : Definition – Nature – Scope and functions – Evolution of management thought – Relevance of management to different type of organisation like, Insurance, Hospitals, Universities, Hotels, Social Service Organisation.

Unit II

Planning : Nature, importance and strategic considerations in planning – Planning Premises – Components of planning as objectives, policies, strategies, procedures, methods, rules, projects and budgets – Making plans effective – Decision making.

Unit III

Organising : Nature, purpose and kinds of organisation – Structure – Principles and theories of organization – Departmentation – Span of control – Line and staff functions – Authority and responsibility – Centralisation and decentralisation – Committees – Informal organization.

Unit IV

Staffing and Directing : General principles, importance and techniques. Delegation of Authority – Process or Elements of delegation – Advantages – Types – Principles how to make delegation effective.

Unit V

Controlling : Objectives and process of control – Devices of control - Integrated control – Business process reengineering – Total quality management – Bench marking.

Recommended Text Books

1. Principles of Management – P.C. Tripathi and PN Reddy – Tata Mcgraw Hill – www. tata mcgrawhill.com
2. Management Principles and Applications, India edition, Ricky W. Griffin. Cengage Learning – www. cengage.in
3. Management – Principles Processes and Practices – Anil Bhat – Aryakumar – Oxford University Press – www.Oup.com
4. Management concept, Theory and Practice S.N Chand – Atlantic publishers – www.atlantic books.com
5. Management text and cases – A. Satyaraju and A. Parthsarathy PHI learning private ltd., - www. phindia.com

Suggested Readings

1. Introduction to Management science with spread sheets – william J. Stevenson India Edition – Tata mcgraw hill.
2. Management concepts and strategies J.S. Chandan, Vikas publishing Houst Pvt ltd., www. vikaspublishing.com
3. Modern management concepts and skills – samuel C. CERTO & S. Treviscerio, PHI learning private ltd., - India edition.
4. Principles of Management, India Edition – Charles WL Hill and Steven Mc Shane by Tata mcgraw Hill.

CORE COURSE II

MANAGERIAL COMMUNICATION

Objectives:

The course aims to develop all forms of communication skills of the students to enable them to conduct well in any business process without any communication barrier. To train students to enhance their skills in written as well as oral Communication through practical conduct of this course. This course will help students in understanding the principles & techniques of business communication.

Unit I

Communication – Meaning and Significance for Management – Types of Communication – Media – Barriers to Communication – Principles of Effective Communication.

Unit II

Correspondence – Norms for Business Letters – Letter for different kinds of situations – Personalized stand letters, enquiries, customers' complaints, collection letters – Sales promotion letters, Application letters.

Unit III

Non-verbal communication – Personal Appearance Posture – Body Language – Use of Charts, Diagrams & Tables – Visual & Audio Visual Aids for communication – Dyadic communication : Face to Face Communication – Telephonic Conversation.

Listening: Meaning, Importance, Types of listening, Tips for effective listening, Barriers for listening

Unit IV

Report Writing – Structure of Reports – Long & Short Reports – Formal & Informal Reports – Writing Research Reports, Technical Reports – Norms for including Exhibits & Appendices.

Unit V

Conducting Meetings : Procedure – Preparing agenda, Minutes and Resolutions
Conducting Seminars & Conferences : Procedure of Regulating Speech Evaluating Oral Presentation – Group Discussion : Drafting Speech – Negotiation Skills.

Recommended Text books :

1. Business communication – PC Bhatia – Ane books Pvt ltd., - www.anebooks.com.
2. Business communication, principles and methods and Techniques – Nirmal singh, Deep and Deep publications Pvt Ltd., - www.ddpbooks.com
3. Business communication – Sathya swaroop Debaish Bhagabandas – PHI learning private ltd.,
4. Business communication – Meenakshi Raman, Prakash singh, Oxford university press
5. Foundations of Business communication, India Edition – Dona. J. Young Tata mcgraw – Hill.

Suggested Readings :

1. Business communication, Building critical skills – Indian Edition – Kitty O Locker & Stephen KYO KACZMAREK, Tata mcgraw Hill.
2. Business communication – making connections in a Digital world – Indian Edition – Raymond V Lesikar and others – Tata Mcgraw Hill
3. Business communication – Asha kaul – PHI learning private ltd.,
4. Professional communication, Aruna Koneru, Tata mcgraw Hill.

CORE COURSE III

MATHEMATICS & STATISTICS

Objectives :

This course mainly deals with the use of Mathematical and Statistical concepts in the resolution of managerial decision problems. As such the course will deal not only with some of the theoretical concepts in Mathematics and Statistics but will also be concerned with their application.

Unit I

Mathematical basis of managerial decisions : Functions – Appliaion of functions – maxima & Minima – Matrix Algebra – Arithmatical Operations – Properties, Solutions of equations by inverse method, Gauss – Jordan method and Cramer's rule:

Unit II

Linear Programming – Formulation – Graphical methods – Introduction to Probability – Addition & Multiplication theorems – Bayes theorems and its applications. Theory of expectation – EMV.

Unit III

Descriptive Statistics – measures of central tendency – measures of dispersion; Skewness & Kurtosis – Frequency distribution – Histograms – Polygons.

Definition of random variable – Binomial distribution, Poisson distribution, Normal distribution – Applications to Business situations.

Unit IV

Preliminary concept of sampling - Types of samples - Deliberate, Judgement sampling – Quota sampling - Cluster sampling - Probability sampling - Random sampling- Stratified sampling- Systematic sampling- Multistage sampling.

Testing of Hypothesis and Theory of inference – Type I and II errors. Concept of sampling distribution – test of significance for means, proportions and S.Ds. Large samples : Analysis of Variance one way classification.

Unit V

Theory of Correlation and Regression : Meaning of Correlation and regression – Principles of Least squares – Simple Linear Regression – Simple correlation – Co-efficient – Rank Correlation.

Recommended text books :

1. Business statistics – K. Alagar – Tata Mcgraw Hill.
2. Mathematics for Management – M. Ragavachari Tata Mcgraw Hill.
3. Statistics for Management, TN Srivastava and Shailaja Rego – Tata mcgraw Hill.
4. Business mathematics and statistics BM. Aggarwal, Ane books Pvt Ltd.,
5. Statistics for Managers, Indian Edition – Levine, Stephen, Krehbiel and Berenson – PHI learning private ltd.,

Suggested Readings

1. Complete Business statistics, Indian Edition – Aczel and Soundar Pandian, Tata Mcgraw Hill.
2. Applied Statistics in Business and Economics – David P. Doane and Lori E. Seward – Indian Edition. Tata Mcgraw Hill.
3. Business statistics, Bharat Jhunjhunwala – S.Chand.co.
4. Mathematics for Economics and finance – Martin Anthony and Normanbiggs – Low price Edition – Cambridge University press.

CORE COURSE IV

MANAGERIAL ECONOMICS

Objectives:

The course is aimed at building a perspective necessary for the application of modern economic concepts, precepts, tools and techniques in evaluating business decisions taken by a firm. The course will also look at recent developments in business in the context of economic theory.

Unit I

Consumer Preferences – Consumer preference and utility function, utility maximization, indirect utility, compensated (Hicksian) and ordinary (Marshallian) demand functions . Consumer Demand – Normal versus inferior goods, consumers surplus Behaviour under Uncertainty – Expected utility.

Unit II

The theory of Firm Behaviour – Production function, isoquants, elasticity of substitution, returns to scale, profit maximization, factor demand and output supply functions, profit function. Cost Minimization – Conditional factor demands, average and marginal costs, short-run versus long – run costs.

Unit III

Market Equilibrium – short-run equilibrium, entry and exit, long-run equilibrium. Monopoly – Basic model, welfare and output, price discrimination (first degree, second degree, third degree), monopoly regulation. Oligopoly – Basic elements of game theory, quantity, or price leadership model; collusion.

Unit IV

Macroeconomics; micro foundations, aggregation problem, macro economic problems. Micro foundations of Keynesian Models – Microeconomic foundations of consumption function, investment function and liquidity preferences. Macroeconomic Models for India .

Unit V

Indian Economic Development – Understanding the Indian Economy – Growth of GDP and Per Capita Income – Planning for the economy; Monetary Policy –Inflation-Financial Sector Reforms – Role of Central Bank – Credit Policy – Industrial Policy – Industrial Controls and Licensing – Productivity and Growth – Industrial Credit – Industrial Sickness – Foreign Investment – Industrial Reforms -Impact of WTO.

Recommended Text books

1. Managerial Economics By Joel dean Indian Edition, PHI learning India PVT Ltd.,
2. Managerial Economics, MA. Beg and Manoj kumar Dash – Ane books PVT Ltd.,
3. Managerial Economics, An Integrative Approach, Mark Hirschey – India Edition – Cengage Learning.
4. Managerial Economics – Geetika, Piyali Ghosh and Purba Roy Choudhury – Tata Mcgraw hill co.,
5. Managerial Economics, DN Dwivedi Vikas publishing house PVT Ltd.,

Suggested Readings:

1. Managerial Economics, E Narayana Nadar and S. Vijayan, PHI learning Private Ltd.,
2. Managerial Economics – Indian Edition, Christopher R. Thomas and S. Charles Maurice – Tata mcgraw hill.
3. Managerial Economics, A problem solving approach – India Edition – Luke M. Froeb and Brain T. Mccann, Cengage learning.
4. Managerial Economics – Yogesh Maheswari – PHI learning PVT Ltd.,

CORE COURSE V

ORGANISATIONAL BEHAVIOUR

Objectives:

The objectives of the course is to familiarize the participants with the behavioural patterns of human beings at individual and group levels in the context of an Organization.

Unit I

Orgnanizational Behavior – Definition, Need for studying Organizational Behavior, Disciplines involved in the study of Organizational Behavior, -Contributing disciplines and area like psychology, social psychology, economics, anthropology etc. Application of Organizational Behavior in Business.

Unit II

Individual behaviour – personality, perception, learning, attitudes inter-personal behaviour – Group and inter-group behaviour.

Unit III

Group Dynamics – Formal and Informal Group, Group Norms, Group Cohesiveness, Group Behaviour and Group Decision – making.

Unit IV

Motivation and morale, leadership-nature, styles and approaches, development of leadership including laboratory training . Power and Authority – Definition of Power – Types of Power.

Unit V

Management of change-conflict Management- Organisation Health, Development and Effectiveness. Management of culture, Cross Cultural Management.

Recommended Text books

1. Organizational Behaviour, India Edition, Nelson & Quick, Cengage learning.
2. Organisational Behaviour, S. Fayyaz Ahamed and others, Atlantic publisher.
3. Organisation Behaviour, A modern approach – Arun Kumar & N. Meenakshi Vikas publishing House PVT Ltd.,
4. Behaviour in organizations, Indian Edition, Jerald Green Berg and Robert A. Baron – PHI Learning PVT Ltd.,
5. Organisational Behaviour, UMA Sekaran, Tata Mcgraw Hill.

Suggested Readings :

1. Fundamentals Organisational Behaviour, India Edition – Slocum and Hell Riegel by Cengage learning.
2. Culture and organisational Behaviour Jai B.P. Sinha www. sagepublications. com
3. Organizational Behaviour, Special Indian Edition – by Steven L Mcshane, Mary Ann Von Glinow and Radha R. Sharma, Tata Mcgraw hill co.
4. Management of Organizational Behaviour Indian Edition, By Paul Hersey Kenneth. H. Blanchard and Dewey – PHI learning PVT Ltd.,

CORE COURSE VI

MANAGEMENT ACCOUNTING

Objectives :

The purpose of this course is to impart basic knowledge of both financial and cost accounting so that students are able to understand financial statements and reports to make decisions.

Unit I

Purpose and Scope; changing role of Accountant in profession, industry and as a consultant; Basic accounting concepts and postulates and their implications.

Accounts Records and Systems; The journal and other subsidiary books. The Ledger and account, debit and credit, adjusting and closing entries, ruling and balancing accounts. The trial balance.

Construction of Profit and Loss Account and Balance Sheet of joint stock companies as per companies act requirement.

Unit II

Cost concepts, determination of costs, elements of Cost-cost classification- Preparation of cost sheet, tender.

Unit III

Overheads, Allocation, Apportionment, Absorption, Control over Factory, administration, selling and distribution Overheads, valuation of Inventories.

Unit IV

Marginal costing – Distinction between absorption costing and marginal costing- Cost volume profit (CVP) Analysis- Break Even Analysis- Margin of safety.

Unit V

Budget and budgetary control - Objectives- Advantages and limitations- Production budget - Sales budget- Cash budget and Flexible budget.

Recommended Text books

1. Management Accounting – My Khan & P K Jain. Tata Mcgraw hill.
2. Management Accounting – Paresh shaw – Oxford University Press.
3. Management Accounting – A. Murthy and S. Gurusamy – By Tata Mcgraw Hill.
4. Management Accounting – NM Singhvi and Ruzbeh J. Bodhanwala PHI learning PVT Ltd.,
5. Management Accounting, Principles and Applications – HUGH Coombs, David Hobbs and Ellis Jenkuis – By Sage www.sagepublications.com

Suggested Readings

1. Advanced Management Accounting Jawaharlal, S. Chand & Co
2. Managerial Accounting – Indian Edition Ronald W.Hicton, G. Ramesh and M. Jayadev by Tata Mcgraw Hill.

CORE COURSE VII

OPERATION RESEARCH

Objectives:

The objectives of the course is to acquaint the student with the applications of Operations Research to business and industry and help them to grasp the significance of analytical techniques in decision making. Students will be tested on the application of Operations Research to business related problems.

Unit – I

Introduction to Operations Research, scope, phases- merits and limitations – concept of optimization, Theory of simplex methods to solve canonical and general LPP, Primal – dual problem and its properties, dual simplex method, Sensitivity analysis. Concept of Goal Programming.

Unit – II

Transportation problem by Vogel's approximation method ; assignment problem , linear Programming complete enumeration method .

Unit – III

Network analysis – drawing of Arrow diagram – critical path method – calculation of critical path duration, total, free and independent floats, PERT problems; Inventory Theory, Deterministic models – purchase problem without and with shortages, with price breaks, production problem without shortages.

Unit – IV

Decision under risk – expected money value criterion – decision trees – decision under uncertainty – minimax criterion; Theory of Games – pure and mixed Strategies, Principles of dominance, graphical methods, simplex methods.

Unit – V

Queuing theory – M/M/1/FIFO/oc model; Markovian chain, Simulation :- Monte Carlo Method.

Recommended Text books

1 For Unit I, IV and V
Operations Research concepts and cases – Fredrick S. Hiller and Gerald J. Lie Berman – TATA Mcgraw Hill company. Email : mark_pani@mcgrawhill.com

2 For Unit II and III
Operations Research – R. Panneer selvam – PHI learning.
Email : phi@phindia.com

3 Operations Research principles and Applications – G. Srinivasan –PHI learning.

4 Introduction to operations Research – Billy E. Gilett – TATA Mcgraw hill.

Suggested Readings :

1 Operation Research – India Edition – Cengage learning fourth edition by Wayne.L. Winston.
Email : narasimhan.r@cengage.com. www. cengage.co.in
2 Operation Research with C programs by S. Kalavathy Vikas publishing.
Email :p.thanigaimalai@vikaspublishing.com
3 Operation Research – by Rathindra P. Sen, PHI learning India.

CORE COURSE VIII

PRODUCTION MANAGEMENT

Objectives:

To acquaint the students with decision making in Planning, Scheduling and control of Production functions in both manufacturing and services.

Unit - I

Production function – an Introduction – Definitions and types of production systems. Strategic Management – corporate strategies, production strategies, World class manufacturing, demand forecasting for Operations.

Unit – II

Product Design – New product development, process planning and design, value analysis, capacity planning .

Unit – III

Plant location – factors influencing plant location, Plant layout- classification of layout with advantages, layout design procedures, Production planning and control – aggregate planning-nature, Strategies, methods, Master production Plan.

Unit – IV

Quality control-Definition, need, Quality control techniques, control charts, acceptance sampling , six sigma , quality circles. TQM-scope, benefits.JIT.

Unit – V

Flexible Manufacturing Systems. Poka yoke-Characteristics, levels, classification, principles, device. Kaizen-Elements, classification, steps in implementing kaizen.

Recommended Text Books

1. Production and Operations Management By R. Panneerselvam – PHI learning. www. phindia.com
2. Production and Operations management with solution manual by Kanishka bedi, Oxford University press, Chennai. www.oup.com

   Email : v.anand@oup.com

   Production and operations Management by Martin K. Staff – Cengage learning. www.cengage.co.in

   Production & operation & Management By V.K. Khurana – ANE books – Email : anebooks_tnairtelmail.com

   Production and operations management by R.B. Khanna, PHI learning private ltd., www. phindia.com

Suggested Readings :

1. World – class manufacturing – A strategic perspective – B.S. Sahay and others – Macmillan publishers India ltd., www.macmillan publishers india.com.
2. Production and operations management – SN. chary – Tata mcgrawhill.com
3. Production and operations management Everett.E. Adam, Indian Edition – PHI learning.
4. Production and operations management by N.G. Nair, Tata mcgraw hill Co.

CORE COURSE IX

MARKETING MANAGEMENT

Objectives:

The course aims at making students understand concepts, philosophies, processes and techniques of managing the marketing operations of a firm.

Unit - I

Marketing – Concept – Functions – Marketing Planning & Implementing Marketing Programmes – Marketing Environment -Market Segmentation and Consumer Behaviour – Marketing Research and Market Information System.

Unit – II

Product : Meaning – Product Planning – Policies – Positioning – New Product Development – Product Life Cycle – Branding, Packaging, Labeling.

Price : Pricing Objectives – Factors, Methods and Procedure.

Unit – III

Promotion : Promotion Mix – Advertisement –kinds of advertisement- Message – Copy – Advertisement Budgeting – Measuring Advertisement Effectiveness – Media Strategy – Sales Promotion – Personal Selling and Publicity.

Unit – IV

Physical Distribution : Distribution Mix – Managing Channel – Intermediaries – Transport and Warehousing – Distribution Strategies – Distribution Cost Analysis.

Unit – V

Marketing Strategies – Tools for Competitive Differentiation of Product – Strategies for Competitors – Leaders, challenges, follower & niches – Marketing of Services – Consumerism and Consumer Protections, Evaluating & Controlling Marketing Performance. Direct Selling, Direct Marketing.

Recommended Text book

1. Marketing Management by Czinkota Kotabe, India Edition cengage learning, Chennai. E-mail : sriram.b@cengage.com
2. Strategic marketing Management Text and cases by S.L. Gupta – Atlantic publishers (P) Ltd., Chennai. Email : chennai@atlanticbooks.com
3. Marketing Management – VS Ramasamy and S. Namakumari, Macmillan publisher India ltd., Chennai. www.macmillanindia.com
4. Market based Management by Roger J. Best, Indian Edition, PHI learning India PVT Ltd., New Delhi.
5. Principles of Marketing by Kurtz / Boone cengage learning – Chennai.
6. Introduction to marketing – Adrian Palmer, Oxford University Press, Chennai.
7. Marketing Management by Joel.R Evans & Barry Berman – India Edition Cengage Learning, Chennai.
8. Strategic marketing management text and cases, by UCP mathur – Macmillan India Ltd., Chennai.
9. Strategic marketing, India Edition Ferrell & Hartline, by cengage learning chennai.
10. Marketing management, M. Govindarajan, PHI learning India PVT Ltd.,

CORE COURSE - X : FINANCIAL MANAGEMENT

Objectives

The purpose of this course is to acquaint the students with the broad framework of financial decision making in a business unit.

Unit I

Financial Management- meaning, scope, objectives and functions. Financial Analysis and Control; Overview of Indian Financial System- Legal, Regulatory and tax framework.

Unit II

Time value of Money; Instruments of Long Term Finance, Cost of Different Sources of Raising Capital. Cost of Capital - Computation for each source of finance and weighted average cost of capital - EBIT -EPS Analysis - Operating Leverage - Financial Leverage - problems

Unit III

Investment and Capital Structure Decisions - Net Income Approach - Net Operating Income Approach - MM Approach; Valuation and Rates of Return; Method of Capital Budgeting.

Unit IV

Working Capital Management - Definition and Objectives - Working Capital Policies - Factors affecting Working Capital requirements - Forecasting Working Capital requirements (problems) - Cash Management - Receivables Management and - Inventory Management - Working Capital Financing - Sources of Working Capital and Implications of various Committee Reports.

Unit V

Internal Financing and Dividend Policy - Types of Divided Policy - Dividend Policy and share valuation - CAPM. Financial Modeling.

Recommended Text Book :

1. Financial Management by I.M. Pandey Vikas Publishing House PVT Ltd.,. Email : p.thanigaimalai@vikaspublishing.com
2. Financial Management Theory and practice by Prasanna chandra Tata Mcgraw Hill co. Chennai. Email : mark_pani@mcgrawhill.com
3. Financial Management By Rajiv Srivstava & Anil Misra, Oxford University Press, Chennai. Email : v.anand@oup.com
4. Financial management – Preeti singh Ane books – PVT Ltd., Chennai. E-mail : anebooks_tnairtelmail.com.
5. Financial Management By D. Chandra Bose, PHI learning India PVT Ltd., www.phindia.com
6. Financial Management Text and cases – cengage learning – By Brigham & Ehrhardt India edition.
7. Financial Management Text, problem and cases – My.Khan and PK. Jain Tata Mcgraw Hill Co.
8. Financial Management – Bhabatosh Banerjee – PHI Learning PVT Ltd.,
9. Financial Management India Edition, James C.VAN Horne & Joh. M.Wachowfcz, PHI learning Private Ltd.,
10. Financial Management – By P. Periasamy Tata Mcgraw Hill Co.

CORE COURSE XI

HUMAN RESOURCE MANAGEMENT

Objectives:

The course aims at introducing the students to various aspects of human resources management. The important functions of a human resources manager such as recruitment and selection processes interview methods. Performance appraisal, training and development, disciplinary procedures, collective bargaining and employee welfare.

Unit I Perspectives in Human Resource Management

Evolution of Human Resource Management – The Importance of the Human Factor – Objectives of Human Resource Management – Role of Human Resource Manager – Human Resource Policies – Understanding business process in the context of Human Resource Management – Computer Applications in Human Resource Management.

Unit II The concept of Best-fit Employee

Importance of Human Resource Planning – Forecasting Human Resource requirements – Internal and External sources. Selection Process – Screening – Tests – Validation – Interview – Medical Examination – Recruitment. Induction – Importance – Practices Socialization benefits.

Unit III Training and executive Development

Types of training methods – Purpose – Benefits – Resistance. Executive development programmes – Common practices – Benefits – Self Development .

Unit IV Sustaining Employee Interest

Compensation Plans – Rewards – Motivation – Theories of motivation – career Management – Developing Mentor – Portage Relationships.

Unit V Performance Evaluation and Control Process

Methods of Performance Evaluation – Feedback – Industry practices, Promotion, Demotion, Transfer and Separation – Implications of job change. The control process – Importance – Methods – Requirements of Effective Control System. Grievances – causes – Implications – Redressed Methods – Gender Sensitivity.

Recommended Text book :

1. Human Resource Management By MIRZA – S – Saiyadain Tata Mcgraw Hill Co. Email : mark_pani@mcgrawhill.com
2. Human Resource Management by Chitra Atmavam Naik, ANE books PVT Ltd., Chennai.
3. Human Resource Management By P. Jothi and D.N. Venkatesh, Oxford University Press, Chennai.
4. Human Resource Management By K. Aswathappa – Tata Mcgraw Hill Co.
5. Human Resource Management By Biswajeet Pattanayak, PHI learning India PVT Ltd.,
6. Human Resource Management By SK. Sharma Global India Publications PVT Ltd., New Delhi. Email : info@globalindiapublications.com
7. Introduction to Human Resource management by Paul Banfield and Rebecca kay – Oxford University press, Chennai.
8. Managing Human Resource by Fisher, Schoenfeldt and shaw, cengage learning.
9. Managing Human Resources By Wayne.F Cascio, Tata Mcgraw Hill Co.
10. For Unit V: Advanced Human Resource management by SC Gupta, ANE Books, Chennai.
11. Human Resource management in practice, Srinivas R. Kandula PHI learning India PVT Ltd.,
12. Strategic Human Resource Management, By Nayantara – Atlantic publishers (P) Ltd., Chennai. Email : chennai@atlanticbooks.com

CORE COURSE XII

RESEARCH METHODS IN MANAGEMENT

Objectives:

The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision-making.

Unit I: INTRODUCTION

Research – Importance and its types – research approaches – process – problem formulation – development of hypothesis – Research design – determining the sample design – collecting data – analysis of data – identifying research problem.

Unit II: Measurement and its techniques

Measurement in research and its problems – meaning of scaling – tests of sound measurement – types of scaling- Techniques of measurement – Attitude scales – summated rating scale – Equal appearing Interview scale – cumulative scale – Rating scale – Scale constructing Techniques.

Unit III: DATA COLLECTION AND HYPOTHESIS

Classification of data – sources of data – collection of primary and secondary data – Questionnaire method – Guidelines for Questionnaire design – Interview technique – Observation techniques – Processing of data – Editing – Coding – Tabulation – Interpretation of data – Formulation of hypothesis – Test of hypothesis.

Unit IV: Statistical Techniques

Statistical Techniques – Measures of Central Tendency – Arithmetic mean, Median and Mode – Karl Pearson's coefficient of correlation – Regression – Chi-square test – conditions for applying chi-square test – ANOVA – Spearman's Rank Correlation.

Unit V : INTERPRETATION AND REPORT WRITING

Interpretation – Techniques of Interpretation – Significance of Report Writing- Different steps in writing report – layout of research report – types – oral presentation – mechanics of writing a research report – precautions for writing research reports – Role of computers in Research

Recommended Text book :

1. Business Research methods By Dr. T.N. Srivastava and Mrs. Shailaja Rego – Tata Mcgraw Hill. Co Chennai – Email : mark_pani@mcgraw.hill. com
2. Business Research methods, Alan Bryman and Emmabell – Oxford University press. chennai. Email : v.anand@oup
3. Research methodology, By R. Panneer Selvam, phi learning India PVT Ltd., New Delhi. Email : phi@phindia.com
4. Academic writing, A guide for management students and Researchers, By Mathukutty M. Monippally and Badrinarayanan Shankar Pawar – www.sagepublications.com
5. Research methods Indian Edition By Donald H. Mcburney and Theresa – Cengage learning. Email : sriram.b@cengage.com

MANAGERIAL SKILLS

Learning Objective

The learning objective of this course is to enable the students to learn the art of getting things done in the modern business world by learning topics like lateral thinking, decision making, balancing work and life, corporate social responsibility, and work ethics.

UNIT -I

THINKING STRATEGIES

Strategic thinking – meaning – questions- things included in Strategic thinking – Process consideration in Strategic thinking – Strategic thinking competencies – importance of Strategic thinking – characteristics of Strategic Thinkers – Points to be kept in mind in Strategic thinking.

Lateral Thinking – meaning – why Lateral Thinking – when to use Lateral Thinking – Benefits of Lateral Thinking – Techniques used in Lateral Thinking – Who needs Lateral Thinking – How to use Lateral Thinking? – Conventional Vs Lateral Leaders – Questions asked by Lateral Leaders – becoming a Lateral leader

UNIT – II

INTERPERSONAL STRATEGIES

Conflict Resolution – meaning – points to be understood before studying conflict resolution – sources of conflict – common reactions to conflict – role of perception in conflict – steps for Conflict Resolution – Conflict handling matrix – Functional and Dysfunctional outcome of conflict.

Negotiation skills – process – styles – outcome – principles involved – negotiation model – being a negotiator – qualities of a negotiator.

UNIT – III

IMPLEMENTATION STRATEGIES

Facing changes – meaning – characteristics –why changes –pace of changes – impact of resistance –Reasons for resistance – types of people in facing changes – introducing change. Facing challenges – meaning – importance – path to facing challenges – benefits of facing challenges.

UNIT – IV

ACTION BASED STRATEGIES

Risk taking - meaning – factors determining Risk Taking – Risk management – users of Risk Management – Steps in Risk Management.

Effective decision making – meaning – approaches – methods – steps – Decision making at the work place.

UNIT – V

BEHAVIOURAL STRATEGIES

Motivation and Staying motivated – meaning – finding reason for being motivated – staying motivated at work place – staying motivated in negative work environment – staying motivated during crisis.

Balancing work and life – meaning – work satisfaction – gender differences – responsibility of the employers and employees – ways of balancing work and life – handling professional and personal demands – organizing your desk.

TEXT BOOK:

Alex K. (2012) Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi- 110 055.
Mobile No :94425 14814 (Dr. K. Alex)

REFERENCE BOOKS:

(i) Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), P.R. Publishers & Distributors, No, B-20 & 21, V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli- 620 002. (Phone :0431-2702824: Mobile : 94433 70597, 98430 74472)

(ii) Emotional Quotient – Daniel Goleman

(iii) Power of the Plus factor – Norman Vincent Peale.

(iv) The Seven Habits of Highly Effective people – Stephen covey.

CORE COURSE XIII

STRATEGIC MANAGEMENT

Objectives:

To create an awareness of the importance of strategic approach to managerial situations and issues in the context of globalization and liberalization trends.

Unit I

Corporate Strategic planning – Mission – Vision of the firm – Development, maintenance & the role of leader – Hierarchal levels of planning – Strategic planning process. Merits and limitations of Corporate Strategic Planning. Strategic Management in Practice.

Unit II

Environment Analysis & Internal Analysis of Firm :
General environment scanning, competitive environment analysis – to indentify opportunities & threat – Assessing internal environment through functional approach and value chain – indentifying critical success factors – to identify the strength & weakness – SWOT audit – swot matrix – implications core competencies – Port-folio analysis – Stake – holder's expectations, Scenario – Planning

Unit III

Strategy Formulation:
Generic strategies – Grand strategies – Strategies of leading Indian Companies – The role of diversification – limits – means and forms. Strategic management at Corporate level, at Business level and at Functional level with special reference to companies operating in India.

Unit IV

Concepts and tools of Strategy evaluation :

Competitive cost dynamics – experience curve – BCG approach – cash flow implication – IA – BS matrix – A.D. Littles Life – Cycle approach to strategic planning – Assessment of economic contribution of strategy – Cost of equity capital – M/8 model with stationary growth – Assessing market value of a Business – Profitability matrix – divestiture decision – cash flows and selection of proper discount rates.

Unit V

Strategy Implementation & Control :

Various approaches to implementation of strategy – Commander approach – Org – change approach, collaborative approach, Cultural approach, creative approach – Matching organization structure with strategy – 76 model – Strategic control process – Du pant's control model and other Quantitative and quantitative tools – steps – M. Porter's approach for Globalisation – Future of Strategic Management.

Recommended Text books

1. Strategic Management and Business policy by Azar Kazmi, Tata Mcgraw Hill – www. tata mcgraw hill. com
2. An integrated approach to strategic Management, Charles Wl Hill. Gareth R. Jones, Indian Edition, Cengage learning – www.cengage.co.in
3. Strategic management, Theory and Application by Adriar Haberberg & Alison Rieple – Oxford University Press – www.oup.com
4. Strategic Management concepts and cases Indian Edition. By Fred R. David, PHI learning PVT Ltd., www.phindia.com

Suggested Readings:

1. Strategic business management Dr. KNS. Kang, Deep and Deep publishers. www.ddpbooks.com
2. Strategic management, India edition by Ireland, Hoskisson and Hitt, Cengage learning.
3. Strategic management text and cases by Degs, lump kin and Eisner, Indian Edition Tata Mcgraw Hill.
4. Understanding Strategic management by Anthony Henry, Oxford University Press.

CORE COURSE XIV

LEGAL ASPECTS OF BUSINESS

Objectives:

To provide a basic understanding of various statutory provisions that confronts business managers while taking decisions.

Unit I

The Indian Contract Act, 1872

Introduction – Definition of contract – agreement – offer – acceptance – consideration capacity to contract – contingent contract – Quasi contract – performance – Discharge – Remedies to breach of contract.

Unit II

Partnership- essentials of partnership, Rights and duties of partner, types of partners. Dissolution of partnership.

Sale of Goods Act: Sale and Agreement to sell, Conditions and Warrantees, Transfer of property, Finder of goods, Performance of contract of sale, Rights of an unpaid seller.

Unit III

Contract of Agency- Essentials of Contract of Agency – Creation of Agency – Kinds of Agents – Comparison Between an Agent and Servant – Comparison Between an Agent and Independent Contractor – Relationship of Principal and Agent – Duties of an Agent – Rights of an Agent – Duties and Rights of the Principal – Delegation of authority by an Agent – Sub Agent – Position of Principal and Agent in relation to third Parties – Termination of Agency.

Unit IV

Company – Formation – Memorandum – Articles – Prospective Shares – debentures – Directors – appointment – Powers and duties. Meetings – Proceedings – Management – Accounts – audit – oppression & mismanagement – winding up.

Unit V

The Consumer Protection Act, 1986; Object – Rights of Consumers –Important Terms- Consumer Complaint - Consumer Protection Councils – Redressal Machinery – District Forum – State Commission - National Commission. Cyber Law -Need for Cyber laws – Cyber law In India – Information Technology Act – 2000 – Defining Cyber Crime – Types of Cyber Crimes – Preventing of Computer Crime.

Recommended Text books

1. Business legislation for management M.C. Kuchal and Deepa Prakash, Vikas Publish House PVT Ltd.,
2. Legal aspects of Business, Ravinder kumar, Cengage learning.
3. Business law, Sathish B, Matur Tata Mcgraw Hill.
4. Business law, D. Chandra Bose, PHI learning PVT Ltd.,
5. Legal aspects of Business by Akhileshwar Pathak. Tata Mcgraw Hill.
6. Legal aspects of Business by kubendran.

Suggested Readings

1. Law of Business contracts in India by Sairam Bhat, Sage, www. sagepublications.com
2. Company law, Ashok K Bagrial Vikas publishing House.
3. Business Law, chandra Bose, PHI learning India PVT Ltd.

CORE COURSE XV

KNOWLEDGE MANAGEMENT

Objectives:

To make the students realize the importance of capturing knowledge elements and its structures application as a competitive advantage to business.

Unit I

Introduction to KM, History of KM, Importance of KM, Information Management to Knowledge Management, KM Cycle, Industrial Economy to Knowledge Economy

Unit II

Mechanics of Knowledge Management – Tools and Technologies, Communities of Practice and Knowledge conversion, The knowledge Management Matrix.

Unit III

Social Nature of Knowledge, Social Network Analysis, Obstacles to knowledge sharing, Organizational learning & social capital. Knowledge Application – Individual level, Group level & Organization level.

Unit IV

KM Strategy, Knowledge audit, GAP Analysis, Road Map, KM Metrics, Balance Score Card.
KM Tools-Knowledge Capture & creation tools, Knowledge sharing & Dissemination Tools, Knowledge Acquisition & Application tools.

Unit V

KM Team-Roles & Responsibility, Political issues in KM, Ethics in KM
Strategic issues in Knowledge Management, Future of Knowledge Management.

Text Book :Kimiz Dalkir, Knowledge Management in Theory and practice. Elsevier Publication.

Recommended Text books :

1. Knowledge Management By WAMAN JAWADEKAR, Tata Mcgraw Hill Co Chennai. Email : mark_pani@mcgrawhill.com.
2. Knowledge management – An Evolutionary view – BECERRA – Fernandez & Leidner, By PHI learning PVT Ltd.,
3. Knowledge Management – Sudhir Warier by Vikas Publishing House PVT Ltd,
4. Information & Knowledgement by D. Kamala Vijayan – Macmillan India Ltd., Chennai.
5. Knowledge Management Systems Edited by Stuart Barnes, India Edition,Cengage learning www.cengage.co.in
6. Ten steps to maturity in knowledge management, J.K. Suresh and Kavi Mahes Chandos publishing distributed by Ane books – e-mail – anebooks@vsnl.com
7. Knowledge Management – an inter disciplinary Perspective by Sajjad M. JASIMUDDIN, Cambridge University Press, International Edition, ISBN : 978-981-4271-22-6. E-mail :cupdel@cambridge.org.
8. Knowledge Management - Complexity, Learning and Sustainable Innovation By Dr.J.K.MISHRA, year 2009- GLOBAL INDIA BUSINESS Publications, New Delhi. E-mail: info@globalindiapublications.com
9. Information and Knowledge Management Extra Series – By Ane Books Private Ltd, Chennai. E-mail: anebooks_tn@airtelmail.in

CORE COURSE XVI

INTERNATIONAL BUSINESS ENVIRONMENT

Objectives

The primary objectives of this course is to acquaint the students to emerging global trends in business environment.

Unit I

International Business : An overview – Modes of International Business; The External Environment- Economic , Political Environment, technological and Cultural Environment; Its Influence on Trade Investment Patterns; Recent World Trade and Foreign Investment Trends.

Unit II

Foreign Direct Investment-FDI-Types of FDI, Rationale for FDI, Benefits of FDI to Home countries, Benefits of FDI to MNC,s, Threats and Restrictions on MNCs , Adverse effect of FDI on Host countries. Reasons for India seeking FDI, Hurdles for FDI in India.

Unit III

World Financial Environment; Cross-national Co operation and Agreements; Tariff and Non-Tariff Barriers, WTO, Regional Blocks.

Cross Border Mergers& Acquisition-Reasons for mergers & Acquisition, Why do M & A fail?-Stages involved in M & A-Regulations of M & As.

Unit IV

Foreign Exchange Market Mechanism: Determinants of Exchange Rates; Euro-currency Market; Offshore Financial Centers: International Banks; Non-Banking Financial Service Firms; Stock Markets.

Unit V

Global Competitiveness; Export Management; Licensing; Joint Ventures Technology and Global Competition; Globalisation and Human Resource Development; Globalisation with Social Responsibility; Negotiating an International Business, Issues in Asset Protection; Multilateral Settlements.

Recommended Text book

1) International Business Text and cases by Francis Cherunilam / PHI lerning India PVT Ltd., New Delhi. Email : phi@phindia.com
2) For Unit I

   International Business – By Rakesh Mohan Joshi, Oxford University Press, Chennai. Email : v.anand@oup.com

   International Business management- S.C.Gupta (Ane Books Pvt ltd 2010) – II & III Unit.
3) For Unit IV

   International Business, Justin Paul, PHI learning India PVT, Ltd., New Delhi.
4) International Business – S. Shajahan By macmillan India Ltd., Chennai.
5) International Business – Sumati Varma, ANE books PVT Ltd., Chennai.
6) International Business, India Edition, Mike W-Peng, Cengage learning.
7) International Business – Charles WL Hill and Arun K. Jain, Tata Mcgraw Hill Co.,
8) International Business Strategy By Allain Verbeke, Cambridge University Press, Chennai.
9) International Business, Michael R. Czinkota and others cengage learning.
10) For Unit V :

    The International Business Environment – Janet Morrison By Palgrave macmillan – London – ANE Books chennai.

    Email : anebooks_tn@airtelmail.in
11) International Business – By Donald A Ball and others, India Edition By TATA Mcgraw Hill Co.

CORE COURSE XVII

ENTREPRENEURIAL DEVELOPMENT

Objectives:

1. To provide a basic frame-work to start a small / medium scale business / Industrial Unit.
2. Preparation of Project profile / Report on a line of manufacture / business / service unit of actual interest to the participant – bankable project report taking into account technical feasibility, financial viability, requirements of financial institutions / commercial banks etc.,

UNIT I

Entrepreneur - meaning - importance - Qualities, nature, types, traits, culture. Similarities and differences between entrepreneur and intrapreneur. Entrepreneurship and economic development - its importance - Role of entrepreneurship - entrepreneurial environment.

UNIT II

Evolution of entrepreneurs - entrepreneurial promotion: Training and development. mobility of entrepreneurs - entrepreneurial change - occupational mobility - factors in mobility - Role of consultancy organisations in promoting entrepreneurs - Forms of business for entrepreneurs.

UNIT III

Project management: Sources of business idea - Project classifications - identifications - formulation and design - feasibility analysis . Financial analysis - project cost estimate - operating revenue estimate -Ratio analysis - investment Process - B E analysis - Profit analysis - Social cost benefit analysis - Project Appraisal methods . Preparation of Project Report and presentation.

UNIT IV

Project finance: Sources of finance - Institutional finance - Role of IFC, IDBI, ICICI, LIC,SFC, SIPCOT, Commercial Bank - Appraisal of bank for loans. Institutional aids for entrepreneurship development - Role of DICS, SIDCO, NSICS, IRCI, NIDC, SIDBI, SISI, SIPCOT, Entrepreneurial guidance bureau - Approaching Institutions for Assistance .

UNIT V

Steps in setting SSI unit - Problems of entrepreneurs - Sickness in small industries - reasons and remedies - Incentives and subsidies - Evaluating entrepreneurial performance - Rural entrepreneurship - Women entrepreneurship.

Recommended Text book

1) For Unit I and III

   Entrepreneurship By Rajee Roy Oxford University press – Chennai.

   Email : v.anand@oup.com

2) For Unit II, IV, V

   Entrepreneurship Text and cases By P. Narayana Reddy – cengage learning. Email : sriram.b@cengage.com

3) For preparation of Project Report and Filling in Unit V

   Management and Entrepreneurship By Kanishka Bedi Oxford University press.

4) For Better Projects Through SWOT Analysis in Unit V

   Entrepreneurial Management Edited volume by Shivaganesh Bhargava – contributed by N. Mani Mekalai and A. Mohamed Abdullah, Bharathidasan University Trichy. Book published by Sage publications Chennai. Email : chennai@sagepub.insagepublications.com

5) Entrepreneurial Development By Jayshree Suresh, Margam publications, Chennai.

Suggested Readings

1) Entrepreneurship in The New Millenium By Kuralko and Hodgetts – Cengage learning.
2) Entrepreneurship – Robert D Hisrich and others, Tata Mcgraw Hill Co.

CORE COURSE XVIII

TOTAL QUALITY MANAGEMENT

Objectives: This course aims to familiarize the TQM concepts and to develop an insight into the uses of Total Quality Management tools.

Unit I :

Total quality Management – Definition – Scope of TQM. Dimensions and ingredients of quality, Dimensions of product quality, Dimensions of service quality. TQM Framework - Contributions of Deming, Juran and Crosby.

Unit II

Steps in implementing TQM. Advantages , Limitations and barriers to TQM Implementation. TQC-Meaning, factors affecting TQC.

Unit III

Strategic tools for TQM – Bench Marking, Business Process Reengineering, Six sigma, JIT, QFD, Tagichi's quality engineering, Failure mode and Effect analysis. Poka yoke.

Unit IV

Quality Education, process, quality system – quality objectives and quality policy – quality planning – quality information feedback. TQM Culture. Quality circles. Quality audits.

Unit V

The ISO 9000 SERIES, Need for ISO 9000- ISO 9000-2000 , Process of obtaining ISO Certification, Advantages of ISO certification, New version of ISO standards. Documentation, ISO 14000 – Concepts, Requirements and Benefits.

Recommended Text books :

1. Total Quality Management, PN. Mukherjee. PHI learning PVT Ltd.,
2. Total Quality Management, Text and cases by B. Janakiraman and RK. Gopal, PHI learning PVT Ltd.,
3. Total Quality Management, SK. Mandal Vikas Publish House PVT Ltd.,
4. Total Quality Management, James. R. Evans, India Edition, Cengage learning.
5. Principle of Total Quality, Vincent .K Omachonu Joel E. Ross, CRC Press distributed by Ane books PVT Ltd., www.anebooks.com
6. Production and operations Management – PANEERSELVEM R.

Suggested Readings

1. Total Quality Management, L. Suganthi and Anand, A.Samvel, PHI learning
2. Juran's Quality Planning and Analysis for Enterprise Quality, India Edition by Tata Mcgraw Hill Co.
3. Quality Control and Management By Evans and Lindsay India Edition, Cengage learning.

A : MARKETING

ELECTIVE COURSE I : CONSUMER BEHAVIOUR

Objectives: This course aims at enabling students to understand the process of consumer behavior, the various external and internal factors that influence consumer behaviour and to apply this understanding to the development of marketing strategy.

Unit – I CONSUMER BEHAVIOUR – AN INTRODUCTION

Consumer Behaviour – meaning, definition, Significance . Application of consumer behavior principles to strategic marketing. Role of Marketing in Consumer behavior. Market Segmentation and Consumer behavior.

Unit – II CONSUMER AS AN INDIVIDUAL

Consumer needs and motivation, Personality and Consumer Behaviour, Psychographics Consumer Perception, attitudes, attitude formation and change, Learning.

Unit – III CONSUMER IN A SOCIAL & CULTURAL SETTING

Group dynamics and consumer reference groups, Family, Social class and Consumer behaviour, The influence of Culture on Consumer behaviour. Sub – Cultural and Cross Cultural Consumer Analysis.

Unit – IV CONSUMER DECISION MAKING PROCESS:

Personal influence and the opinion leadership. Diffusion of innovation process, Consumer Decision making process, Comprehensive models of consumer decision making. New Product purchase and repeat purchase.

Unit – V CONSUMER BEHAVIOUR APPLICATIONS

Consumer Behaviour applicable to Profit and Non Profit Organizations, Societal Marketing Concept, Marketing Ethics, Consumer movement, Consumer protection in India.

Recommended Text books :

1. Consumer Behaviour – Ramanuj Majumdar PHI learning PVT Ltd.,
2. Consumer Behaviour, CL Tyagi and Arun kumar, Atlantic publishers.
3. Consumer behaviour, India Edition, Jay D. Lindqnist and M. Joseph Sirgy, Cengage learning.
4. Consumer behaviour, concepts, Applications and cases – MS Raju, Dominic Xardel, Vikas publishing House PVT Ltd.,
5. Consumer Behaviour, By David L. LOUDON Albert J. Della Bitta – India Edition Tata Mcgraw Hill. Co

Suggested Readings

1. Consumer Behaviour, Blackwell and others, India Edition, Cengage learning.
2. Consumer Behaviour, Indian Edition – Michael R. Solomon, PHI learning PVT Ltd.,
3. Consumer behaviour, Special Indian Edition, Deli Hawkins Roger J Best and others Tata Mcgraw Hill.
4. Consumer Behaviour and Marketing Strategy By J. Paul Peter and Jerry C. Olson, Special Indian Edition – Tata Mcgraw Hill.

A : MARKETING

ELECTIVE COURSE – II : BUSINESS TO BUSINESS MARKETING

Objectives :

The Course attempts to expose the various concepts of Industrial marketing to students who have had a foundation course in marketing.

Unit I

Basics of Business-to-Business Marketing. – Nature of Industrial Marketing: Industrial Marketing Vs. Consumer Marketing . Industrial Demand & Industrial Customer . Industrial Marketing Operations.

Unit II

Segmentation in Industrial Marketing, Demand concepts for Industrial products, Industrial Marketing Research, Industrial Buyer Behaviour.

Unit III

Product Management – Product line planning – New Product development strategy.

Unit IV

Pricing, Distribution- B2B Channel Strategies, Advertising and Sales Promotion of Industrial Products.

Unit V

Marketing strategy for Industrial Firms – Product Market Management – Developing & Evaluating Strategies – Effective implementation of Strategies.

Recommended Text books :

1. Industrial Marketing Management M. Govindarajan, Vikas publishing House PVT Ltd.,
2. Industrial Marketing by MILIND T. Phadtare - PHI learning PVT Ltd.,

A : MARKETING

ELECTIVE COURSE III

SALES AND DISTRIBUTION MANAGEMENT

Objectives :

The purpose of this paper is to acquaint the student with the concepts which are helpful in developing a sound sales and distribution policy and in organising and managing sales force and marketing channels.

Unit I

Nature and scope of Sales Management; Setting and Formulating Personnel; Developing and Conducting Sales Training Programmes; Designing and Administering Compensation Plans.

Unit II

Supervision of Salesmen; Motivating Sales Personnel; Sales Meetings and Sales Contests; Designing Territories and Allocating Sales Efforts; Objectives and Quotes for Sales Personnel.

Unit III

Developing and Managing Sales Evaluation Programme; Sales Cost and Cost Analysis. An overview of Marketing Channels, their structure, Functions and Relationships.

Unit IV

Channel Intermediaries – Wholesaling and Retailing; Logistics of Distribution; Channel Planning Organisational Patterns in Marketing Channels; Managing Marketing Channels; Marketing Channel Policies and Legal Issues.

Unit V

Information System and Channel Management, Assessing Performance of Marketing Channels including sales force; International Marketing Channels.

Recommended Text books :

1. Sales and Distribution Management - Krishna K. Havaldar and Vasant M Cavale, Tata mcgraw Hill.
2. A practical Approach to Sales Management by Kujnish Vashisht – Atlantic publishers.
3. Sales Management, India Edition, By Joseph F Hair and others, Cengage learning.
4. Sales Management, Analysis and Decision making India Edition by Ingram and others, Cengage learning
5. Sales Management By CL Tyagi and Arunkumar, Atlantic publishers.

Suggested Readings

1. Sales Management, principles, process and practice, Bill DONALDSON by Palgrave macmillan distributed by Ane book PVT Ltd., www. anebooks.com
2. Sales and Distribution management, An Indian perspective Pingalivenugopal sage, www.sagepublication.com
3. Basics of Distribution Management A logistical approach. By Satish. K Kapoor and Purvakansal, PHI learning PVT Ltd.,

B : FINANCE

ELECTIVE COURSE I :

STRATEGIC FINANCIAL MANAGEMENT

Objectives

1.To acquaint the students with concepts of Financial management from strategic perspective

2.To familiarize various Techniques and Models of Strategic Financial Management.

UNIT – I

Financial Policy and Strategic Planning –Strategic Planning Process – Objectives and Goals – Major Kinds of Strategies and Policies – Corporate Planning – Process of Financial Planning – Types of Financial Plan – Financial Models – Tools or Techniques of Financial Modelling – Uses and Limitations of Financial Modelling – Applications of Financial Models – Types of Financial Models - Process of Financial Model Development.

UNIT – II

Investments Decisions under Risk and Uncertainty – Techniques of Investment Decision – Risk Adjusted Discount Rate, Certainty Equivalent Factor, Statistical Method, Sensitivity Analysis and Simulation Method – Corporate Strategy and High Technology Investments.

UNIT – III

Expansion and Financial Restructuring – Corporate Restructuring - Mergers and Amalgamations – reasons for Merger, Benefits and Cost of Merger – Takeovers – Business Alliances – Managing an Acquisition – Divestitures – Ownership Restructuring – Privatisation – Dynamics of Restructuring – Buy Back of Shares – Leveraged Buy-outs (LBOs) – Divestiture – Demergers.

UNIT – IV

Stock Exchanges: Constitution, control, functions, Prudential Norms, SEBI Regulations, Sensitive Indices, Investor Services, Grievance Redressal Measures.

UNIT – V

Financing Strategy - Innovative Sources of Finance – Asset Backed Securities - Hybrid Securities namely Convertible and Non-Convertible Debentures, Deep Discount Bonds, Secured Premium Notes, Convertible Preference Shares – Option Financing, Warrants, Convertibles and Exchangeable Commercial Paper.

Recommended Text books

1.Rajni Sofat & Preeti Hiro, Strategic Financial Management, Phi, Delhi, 2011

2 .Weaver & Weston, Strategic Corporate Finance, Cengage Learning, Delhi, 2001

3.Chandra, Prasanna, Financial Management, Tata McGraw Hill, Delhi. 2007

4.Financial Markets and Institutions, S Gurusamy, Thomson

B : FINANCE

ELECTIVE COURSE – II : FINANCIAL SERVICES

Course Objectives:

This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions and also gives some insights into the operations of the Indian Stock Market.

UNIT 1

Evolution of Financial Services –Indian Financial System – Formal Financial System and Informal Financial System – Financial Institutions –Banking Companies and Non Banking Companies – Classification of Non Banking Companies – Classification of Activities of Non Banking Finance Companies- Fund Based Activities – Fee Based Activities – concepts, growth and trends of fee Based and Fund Based activities

Unit II

Equipment Leasing: Overview, Legal & Tax Aspects, Lease Evaluation, Lease Accounting, Recent Development, International Leasing.

Unit III

Hire Purchase & Consumer : Overview, Legal & Tax Aspects, Financial Evaluation of Hire Purchase, Accounting for Hire Purchase, Consumer Credit.

Unit IV

Accessing Capital Market: Issue Management: Regulatory & Tax Framework, Issue Pricing Models – Equity and Debt Convertible Instruments, Financial Engineering, Raising funds from the International Capital Markets, Assessing Money Markets.

Unit V

Organisation and functions of stock exchanges - regulation and control of stock exchanges - NSE, BSE, OTCEI, regional exchanges.

Recommended Text books

1.Bhalla V.K. Management of Financial Services, Anmol. New Delhi.
2. Financial Services By Dr. S. Gurusamy Tata Mcgraw Hill Co
3. Financial Services, By Nalini Prava Tripathy, PHI learning PVT ltd.,
4. Financial markets, Institutions & Services by NK Gupta and Monika Chopra – Ane books Pvt Ltd., www.anebooks.com
5. Financial services M.Y Khan, Tata mcgraw Hill co.,
6. Financial markets and Institutions by Jeff Madura, India Edition, Cengage learning.

B : FINANCE

ELECTIVE COURSE – III : SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

Objective :

This course provides (a) an understanding of the conceptual framework underlying Security Analysis & Portfolio Management and (b) an appreciation of the regulatory and tax framework circumscribing investment in securities; and (c) some insights into the operations of the Indian Stock Market.

Unit I

Calculation of Bond returns. Valuation of Bonds : Measures of Yield, Duration & Convexity, Measures of Risk, Determinants of Interest Rates and Theories on Term Structure, Bond Swaps.

Unit II

Derivative Securities : Equity Options : Concept, Applications & Valuation, Economic Analysis, Industry Analysis.

Unit III

Valuation of Equity Stocks : Approaches of Equity Stock Valuation, Index features, concept, applications and valuation.

Unit IV

Valuation of Equity Stocks: Company Analysis, Technical Analysis, Efficient Markets Hypothesis.

Unit V

Portfolio Management – The Conceptual Framework: Modern Portfolio Theory, Portfolio Management, Performance Evaluation of Portfolio, Applications of Options & Futures in Portfolio Management.

Recommended Text books :

1. For Unit I and II

   Security Analysis and Portfolio management By Punithavathy Pandian, Vikas publishing House PVT Ltd.,
2. For Unit III, IV and V

   Security Analysis and Portfolio Management with CAPM – By Dr. Sankara Narayanan – ANE Books Chennai – Email : anebooks_tn@airtelmail.com
3. Security Analysis and Portfolio Management by RITTU Ahuja, Atlantic publishing Co.,
4. Portfolio Management By Samir K. BARUA and others, Tata Mcgraw Hill.
5. Security Analysis and Portfolio Management, By S. Kevin, PHI learning PVT Ltd.,
6. Investment Analysis and Portfolio Management By Prasanna Chandra, Tata Mcgraw Hill Co.,

Suggested Readings :

1. Investments, Special Indian Edition by ZVI Bodie and others Tata Mcgraw Hill.
2. Fundamentals of Investment Management Indian Edition, By HIRT and Block Tata Mcgraw Hill Co.,
3. Investment Management, By Vk. Bhalla S.Chand & Co., www.schandgroup.com.

C : HUMAN RESOURCE

ELECTIVE COURSE – I : ORGANISATION DEVELOPMENT

Objectives: To enable the students to understand the philosophical, historical, theoretical, political and practical underpinnings of OD as a core area of practice within HRD and to increase awareness of different tools that are used to diagnose organizations as well as interventions used through hands-on experience, enhance skills in facilitation, OD skills, group process, communication, and collaboration.

Unit I

Introduction to Organization Development :Concept, Nature and Scope of O.D. Historical Perspective of O.D. Underlying Assumptions & Values. Theory and Practice on change and changing. The Nature of Planned Change. The Nature of Client Systems : Group Dynamics, Intergroup Dynamics and Organizations as Systems.

Unit II

Operational Components of O.D. Diagnostic, Action and Process – Maintenance Components Action Research and O.D.

Unit III

O.D. Interventions : Team Interventions, Inter – group Interventions, Personal, Interpersonal and group process interventions, Comprehensive Interventions, Structural Interventions.

Unit IV

Implementation and Assessment of O.D, Implementation – conditions for failure and success in O.D. efforts. Assessment of O.D. and change in Organizational performance, The impact of O.D.

Unit V

Key considerations & Issues in Organizational Development- Issues in consultant – Client relationships, Mechanistic & Organic systems and the contingency approach, The future of O.D, Some Indian experiences in O.D.

Recommended Text books :

1. Organization Development and Change – By Cummings and Worely Cengage learning . www.cengage.co.in
2. Management of Change and Organisation Development, SK Bhatia, Deep and Deep publishers.
3. Organization Development and Transformation, Special Indian Edition by Wendell .L French and others. Tata Mcgraw Hill. Co.
4. Organisation Development Principles, Process and Performance By Amitab Mehta , year 2009 - Global India Business Publications, New Delhi.
   E-mail: info@globalindiapublications.com

C : HUMAN RESOURCE

ELECTIVE COURSE – II : COMPENSATION MANAGEMENT

Objectives: This course gives an introduction to compensation principles and practices. The goal of the course is to give students an opportunity to comprehend the variety of theories and methods used to recruit, retain and reward employees.

Unit I

INTRODUCTION TO COMPENSATION CONCEPTS

Introduction to Compensation, Goals of Compensation System, Compensation Strategy, Monetary & Non-Monetary Rewards, Intrinsic Rewards ,Cafeteria Style Compensation, Employees satisfaction and Motivation issue in compensation design. Establishing Internal, External and individual equally.

Unit II

ESTABLISHING PAY VARIABLES AND WAGE BOARDS

Strategic importance of variable in a day-Determination of Inter and Intra industry compensation differentials. Individual and Group Incentives.

Unit III

ISSUE RELATED TO COMPENSATION

Dearness Allowance Concept-Emergence & Growth in India. Fringe Benefits and Supplementary Compensation- The role of fringe benefits in reward systems, retirement Plans including VRS / Golden Handshake Schemes.

Unit IV

EXECUTIVE COMPENSATION

Executive Compensation Systems in Multinational Companies and IT companies including ESOP.

Unit V

COLLECTIVE BARGAINING AND EMERGING TRENDS

Collective Bargaining Strategies – Long term settlements – Cases of Productivity Settlements – Exercise on drawing up 12(3) and 8(1) settlement. Cases of Productivity Settlement. Emerging Trends in IR due to LPG.

Recommended Text books

1. Compensation – By George T. Milovich and C.S. Venkatraman special Indian Edition, Tata Mcgraw Hill.
2. Human Resource Management by C.B. Gupta sultan chand & sons.
3. Compensation Management Rewarding Performance By D.S.Upadhyay Global India Business Publications, New Delhi.
   E-mail: info@globalindiapublications.com
4. Compensation: Theory, Evidence and Strategic Implications, Barry Gerhart and other ISBN : 8178 2992 08 Sage Publications , New Delhi.
   E-mail: chennai@sagepub.in
5. Reward Management – A Critical Text Vol:2, By White Geoff
   ISBN : 0415431891 (PB) Taylor and Francis, 2008
   Marketing By Atlantic Publishers, Chennai.
   E.mail: chennai@atlanticbooks.com

C : HUMAN RESOURCE
ELECTIVE COURSE – III : CHANGE MANAGEMENT

Objectives: To study how environmental events affect organizations and drive the need for continuous change · Analyze change at the individual, group, and systemic levels · Contrast planned and unplanned change · Evaluate and apply integrative models for assessing, diagnosing, and implementing the need for change · Identify the role of leaders and managers, change agents and change recipients in various stages of organizational change.

Unit I

Nature and Types of Organizational Change, Causes of and rationales for change, environmental and internal organizational determinants of change. Planned and emergent change. Proactive and reactive emergent change and response to these changes. Incremental and radical change, and rates / levels of change as a function of organizational life cycle positions. The links between nature / type of change and nature / type of leadership required e.g. transactional Vs transformational. The roles of corporate vision and strategy in charge.

Unit II

Theoretical frameworks, multi-source feedback for organizational change, Models of diagnosing organizational groups and jobs The organizational change web Resistance to change, Barriers to organizational change, rethinking resistance to organitional change, strategies to deal with resistance.

Unit III

Culture and the change process. The personnel manager as a cultural change agent handling power and political issues arising from change. The theoretical and practical contexts of cultural maintenance and cultural change strategies, corporate reorganization and sub culture management, Strategies and methods for achieving cultural change.

Unit IV

Behavioral Implications of change, The manifest, intent and paradoxical consequences of change, the concept of resigned behavioral compliance. The positive and negative functions of resistance. Intended and unintended behavioural reaction to downsizing and delayering. Understanding and managing uncertainty and ambiguity in the change process.

Unit V

Intervention Strategy, Structural, technological and process factors in intervention strategies. Advantages / limitations of change technologies and associated leadership models. Role of leadership in change process. Leadership and emotional knowledge strategies to achieve congruence of personnel, structure and culture. Challenges of leading change.

Recommended Text books

1. Change Management By V. Nilakani and S. Ramnaryan By Sage, www.sagepublications.com
2. Organizational change, Tupper cawsly and Gene Deszca by Sage
3. Management of Organizational change K. Harigopal by Sage.
4. Managing Organizational change Indian Edition By Palmer /dunfordlakin, Tata Mcgraw Hill Co.,
5. Change Management, Radha R. Sharma Tata Mcgraw Hill. Co.,
6. The Theory and practice of change Management, By John Hayes, Palgrave Macmillan Co., distributed by Ane books PVT Ltd., www.anebooks.com

D : SYSTEM

ELECTIVE COURSE – I : E-BUSINESS

Objectives: This course encompasses the study of current management issues associated with electronic commerce strategies. It gives an insight into Intra Business applications and electronic payment system. The course imparts understanding of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business.

Unit I **Introduction**

Definitions of Electronic Business, Categories of E-business (b2b, b2c, b2a etc)Introduction to Whiteley's Model (Electronic Markets, EDI, Internet Commerce).Emerging cyber economy – Opportunities and challenges offered by internet – generic business models on the net-types and technology and economic changes.

Unit II **Intra Business Applications**

Intra business applications : Online sales force automation, online customer service & support, virtual organization, logistics management, distribution & payment channel, corporate digital library network centric computing, EDI implementation & standards, software, network carrier & mode of information transmission, business applications.

Unit III **Marketing through the Internet**

Marketing through the internet : Advertising & Marketing on the internet – Analysis of markets – Building of electronic market place of buyers & sellers, E-intermediaries, mercantile models – consumers & merchants perspective. E-Commerce & retailing – Case studies of products and services marketed on the internet.

Unit IV **Electronic Payment Systems**

Electronic payment systems & electronic cash E-Commerce & banking. Internet monetary payment & security requirements – confidentiality of payment information, payment information integrity, account holder & merchant authentication payment & purchase order process, account holder registration, merchant registration, account holder ordering, payment authorization, online e-cash anonymity, double spending, interoperability, electronic payment schemes – digital cash, credit cards, internet cheque, debit card, smart cards, financial EDI, E -wallers, micro transactions, payment clearing service providers.

Unit V **Emerging Trends**

Emerging trends : Cyber communities – new communication paradigm, building infrastructure, gaining access, multi-sensory communications, mass markets / verticals / affinity groups, e governance. Legal & regulatory issues, global learning infrastructure, computer based education & training, digital copyrights.

Recommended Text books :

1. E-commerce, By Dr. M. MAMOUDI Maymand, Deep and Deep publications PVT Ltd., www.ddpbooks.com
2. E-commerce, India Edition, Gary P. Schneider – Cengage Learning.
3. Information Systems today Leonard Jessup / Joseph VALLACICH. PHI learning PVT Ltd.,
4. E-business in the 21st century – Realities and outlook by Junu XV and Mohamed Quaddus, Cambridge University Press India Ltd., ISBN : 978-981-283-674-8 www.cambridgeindia.org

Suggested Readings :

1. Essentials of E-commerce Technology By V. Rajaraman – PHI learning PVT Ltd.,
2. Introduction to Information Systems by Alexis Leon and Mathens Leon Tata Mcgraw hill Co.,
3. E-Commerce and Web Marketing by Hanson and Kalyanam, India Edition Cengage learning.
4. Internet Marketing, By Mary Lou Roberts, India Edition, Cengage learning.

D : SYSTEM
ELECTIVE COURSE – II : INTERNET TECHNOLOGIES

Objectives: The objective of this course is to enable the students to develop an online platform for various business transaction using internet and java programming tools.

Unit I **Introduction & Web Design**

Internet Communication Technologies - Networking Architecture – Protocols – Value Added Networks – Virtual Private Networks. Introduction to Web Technologies – Evolving Trends – Content Design – Graphics and Animation using Adobe Photoshop, Dream Weaver, Flash player, Shockwave – HTML Fundamentals.

Unit II **Client Application Development**

Java Script : Variables – Literal Arrays – Expressions and Operators – Control Statements – Functions – Event Handling – Working with Layers – Controlling Page Appearance using Style Sheets – Providing Security with object Assigning. VB Script : Variables – Data types – Operators – Control Flow – Error Handling – Event Programming, Procedures – Forms – Controls – Active X objects.

Unit III **Web Architecture and Web Servers**

Overview of components – Tuning and Load balancing – Network Architecture – Architecture Security, E-commerce architecture models – MS Internet Information Server – Distributed Internet Architecture – Microsoft Transaction Server – Visual Age of Java – Net Objects fusion – Web sphere Web logic – Net Commerce - Netscape Application Server – Cold Fusion – Silver Stream – Vignette Story Server – Broad Vision one – to – one Enterprise.

Unit IV **Security**

Need for Computer Security – Protecting resources – Types of risks – Security Strategies, Mechanisms for Internet Security – Security Tools, Enterprise Level Security, Encryption, PKI (Public Key Infrastructure), Fire Walls, Digital Certificate (X.509), Digital Certificate servers (entrust, netscape, verisign, oracle), Secure Socket Layer, LDAP (Light Weight Directory Access Protocol).

Unit V **Advanced Concepts**

Dynamic HTML – Extended Markup Language – Wireless Markup Language – Virtual Reality Modeling Language – Wireless Application Protocol – Voice Over Internet Protocol – Component Object Model – Common Object Request Broker Architecture – Java Beans – Enterprise Java Beans.

Recommended Text books :

1. The Internet Book by Douglas E Comer, India Edition, PHI Learning PVT Ltd.,
2. Introduction to Information Systems, Alexis Leon and Mathews Leon by Tata Mcgraw Hill.Co.,
3. Internet for Everyone, By Alexis Leon and Mathews Leon,Vikas Publishing House PVT Ltd.,
4. Information Systems Today, By Leonard Jessup and Joseph Vallacich. PHI learning PVT Ltd.,

D : SYSTEM

ELECTIVE COURSE – III : MANAGEMENT INFORMATION SYSTEMS

Objectives: The objective of this course is to expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in this regard.

Unit I INTRODUCTION TO BUSINESS SYSTEMS IN BUSINESS

Foundations of Information Systems: A framework for business users - Roles of Information systems - System concepts - Organisation as a system - Need for IS in Business – fundamentals of IS – System concepts – Components of IS – IS resources Activities – Overview of IS – Operation Support Systems, Management Support Systems, Other Classification – System approach to Problem solving – Global business scenario – trends in technology and applications.

Unit II INFORMATION SYSTEMS FOR BUSINESS OPERATIONS :

Business Information Systems – Marketing Information Systems – Manufacturing – Information Systems – Human Resource Information Systems – Accounting Information Systems, Financial Information Systems – Transaction Processing System.

Unit III INFORMATION SYSTEMS FOR MANAGERIAL DECISION SUPPORT

Management Information & Decision Support Systems – Management Information Systems – Expert Systems – Examples, Executive Information Systems – Artificial Intelligence Technologies.

Unit IV INFORMATION SYSTEMS FOR STRATEGIC ADVANTAGE :

Strategic roles of IS-Breaking Business Barriers – Reengineering Business Processes Improving Business Quality – Creating Virtual Company – Building knowledge Creating Company – Using Internet Strategically – Challenges of Strategic IS – Enterprise – wide systems and E-Business applications.

Unit V **MANAGING INFORMATION SYSTEMS :**

Enterprise Management – Information Resource Management – Strategic Management, Operational Management – Resource Management Technology Management – Distributed Management. Organizing Planning – IS planning methodologies – Critical Success Factors – Business Systems Planning – Computer Aided Planning Tools. Security & Ethical Challenges; IS controls – Facility Controls – Procedural Controls – Computer Crime – Privacy Issues.

Recommended Text books

1. Information Systems Today, By Leonard Jessup and Joseph VALACICH INDIAN Edition, PHI learning PVT Ltd.,
2. Management Information system, By EFF OZ, Indian Edition, Cengage learning.
3. Management of Information systems by S.A. Kelkar, PHI learning PVT Ltd.,
4. Management Information systems Indian Edition, Gordon B. Davis and Margrethe H. Olson, Tata Mcgraw Hill.
5. Introduction to Information Systems by Alexis Leon and Mathews Leon Tata Mcgrawhill Co.

Suggested Readings

1. Management Information Systems S. Sadagopan, PHI learning PVT Ltd.,
2. Management of Information Systems By Waman S. Jawadekar Tata Mcgraw Hill.
3. Management Information System – The Managers view Indian Edition By ROBERT Schultheis and Mary Summer Tata Mcgraw Hill.
4. Principles of Information Systems By RALPH Stair and George Reynolds, Cengage Learning.

E : OPERATIONS

ELECTIVE COURSE – I : SUPPLY CHAIN MANAGEMENT

Objectives :

To explain basic theory and techniques of supply chain to examine the issue and problems associated with supply chain in a changing business environment.

Unit I

Supply Chain Management: Introduction and Development- Nature and Concept - Importance of Supply Chain - Value Chain - Components of Supply Chain - The Need for Supply Chain - Understanding the Supply Chain Management - Participants in Supply Chain – Global Applications.

Unit II

Flow Management and its importance-Management of material flow in the supply chain, Management of information flow, Management of cash flow and value flows, Customer Service strategy, Bench marking best practices.

Unit III

Customer relationship Management, Out-bound logistics resources planning and management, Quick response systems in Manufacturing .

Unit IV

Management of in-bound logistics, E-supply chain cases, Role of a Manager in Supply Chain - Supply Chain Performance Drivers - Key Enablers in Supply Chain Improvement - Values of Supply Chain.

Unit V

Bull Whip Effect and Supply Chain – Supply Chain Relationships – Conflict Resolution Strategies .Supply chain cost analysis. Supply chain performance measures. Issues in Global supply chain

Recommended Text books:

1. Supply chain management – John T. Ment Z FR By Response Books, a division of Sage Publications. wwwsagepublications.com
2. Supply chain management – Rahul V. Altekar, By PHI learning PVT Ltd.,
3. Supply chain management, India Edition John J. Coyle and others. Cengage learning.
4. Supply chain management By Narayan Rangaraj and others, Tata mcgraw Hill. Co., www. tatamcgrahill.com

Suggested Readings

1. World class supply chain management India Edition, By Burt – Dobler – Starling Tata Mcgraw Hill Co.
2. Introduction to supply chain management Robert B. and others India Edition, PHI learning PVT Ltd.,
3. Designing and Managing The Supply chain, concepts, strategies and case studies by David Simchilevi, Ravi shankar and others Special Indian Edition, Tata Mcgraw Hill Co.
4. Supply Chain Management : Concepts Techniques and practices – by Lingli Cambridge university press International Edition. www.cambridgeindia.org.

E : OPERATIONS

ELECTIVE COURSE – II : ADVANCED OPERATION RESEARCH

Objectives: To develop an understanding of Advance concept of Operation Research techniques and their role managerial decision making.

Unit I

- Non Linear Programming – Non linear programming problems of general nature – one variable unconstrained optimization Multi variable unconstrained optimization – Karush Kuhn Tuker (KKT) conditions for constrained optimization – its Applications in Management.
- Seperable programming and its Applications in Management.
- Quadratic Programming – convex programming – geometric programming – Fractional programming and its Application in Management.

Unit II

- Markov chains – Formulation – Kolmogorov Equation – steady state conditions – Markov chain modelling through Graphs – communication networks – weighted diagraphs – classification of states of Markov chain – Long Run properties of Markov chains.
- Empherical Queuing models – (M/M/1) : (GD / ∞/∞) Model - (M/M/C) : (GD/∞/∞) Model – (M / M / 1) : (GD / N / ∞) Model –
  (M / M/ C) : (GD / N / ∞) Model (for C ≤ N) –
  (M / M / C) : (GD / N / N) Model (for C < N) –
  (M / M / 1) : (GD / N / N) Model (for N > 1)

Unit III

- Integer Programming – Formulation – Branch and Bound Technique and its applications to Binary Integer Programming and Mixed Integer Programming – Branch and Cut Approach to solve Binary Integer Programming (BIP).
- Applications of BIP in the Areas of Investment Analysis, site selection, Designing a production and Distribution network, Dispatching shipments, scheduling and its interrelated activities and Airlines Industry.

Unit IV

- Dynamic Programming (DP) – Applications of DP in capital budgeting, Reliability Improvements, stage-coach, cargo loading, single machine scheduling, optimal sub – dividing – solving LPP using Dynamic programming Technique.

Unit V

- Network Models – Terminologies – shortest path model – minimum spanning tree problem - Maximal flow problem – Minimum cost flow problem.
- Replacement and maintenance Analysis – Types of Maintenance – Types of Replacement problem and decisions – Determination and problems of Economic life of an Asset.

Recommended Text books

For Unit – I, Unit – II, Unit – III

1. Introduction to Operations Research (Concepts and cases)
   By Frederick S. Hillier and Gerald J. Lieberman (Eighth Edition)
   Tata Mc-Graw Hill Education Private Limited (Special Indian Edition)
   E-mail : mark_pani@mcgrawhill.com

For Unit II, Unit IV, Unit V

2. Operation Research (Second edition)
   By R. Paneerselvam
   PHI Learning Private Ltd., New Delhi.
   E-mail : prakash@phindia.com

For Unit II

3. Operations Research (Algorithms and Applications)
   By Rathindra P. Sen
   PHI Learning Private Ltd., New Delhi.

NOTE : TO COVER ALL THE UNITS IN THE SYLLABUS STUDENTS SHOULD GET THE ABOVE 3 BOOKS.

E : OPERATIONS

ELECTIVE COURSE – III : MANAGEMENT CONTROL SYSTEMS

Objectives: To enrich the students with the knowledge of Management Control concepts and its implication in organizations. To give an insight into key variables in Management control designs.

Unit I

Nature of Management control – Control in organisations – phases of management control system – Management control Vs Task control.

Unit II

Control and organisational Behaviour – Types of organisations and their implications – Types of organisations and their implications – Types of control and variations in controls based on organisational structure and design.

Unit III

Goals and strategies – Key variables in Management control Design and their types – key Result Areas.

Unit IV

Management control structure – Expense control – profit centers – Transfer pricing – Investment centers – Management control process – Programming and budgeting – Analysing reporting – Performance evaluation.

Unit V

M.I.S. for management control – Systems theory and management control – Installation of Management Information & Control System – Structured and unstructured decision – Implication for control.

Special management control situations – Multinational companies – Service organisation – Non-profit organisations – Multi – Project organisation.

Recommended Text book :

1) Management control systems By N. Ghosh – PHI learning private Ltd.,
2) For Unit – V
   Management control systems by Joseph A. Maciariello and other, India Edition PHI learning PVT Ltd.,

Suggested Readings

1) Management control system by Robert N. Anthony and Vijay Govindarajan, Tata Mcgraw Hill – special Indian Edition.

A : MARKETING

ELECTIVE COURSE - IV : ADVERTISING AND SALES PROMOTION

Objectives

The aim of the paper is to acquaint the students with concepts, techniques and give experience in the application of concepts for developing an effective advertising and Sales Promotion programme.

Unit I

Advertising's Role in the Marketing Process : Legal Ethical and Social Aspects of Advertising; Process of Communication – Wilbur Schramm's Model, Two step Flow of Communication, Theory of Cognitive Dissonance and Clues for Advertising Strategists.

Unit II

Simulation of Primary and Selective Demand – Objective Setting and Market Positioning; Dagmar Approach – Determination of Target Audience; Building of Advertising Programme – Message, Headlines, Copy, Logo, Illustration, Appeal, Layout.

Unit III

Campaign Planning; Media Planning; Budgeting; Evaluation – Rationale of Testing Opinion and Aptitude Tests, Recognition, Recall, Experimental Designs; Advertising Organisation.

Unit IV

Selection, Compensation and Appraisal of an Agency; Electronic Media Buying. Advertising campaign, Advertising V/s Consumer Behaviour.

Unit V

Sales promotion – Role of Creative Strategies – Different methods of sales promotion – Evaluating effectiveness of different promotional strategies.

Recommended Text book :

1) Advertising and Promotion By George E. Belch and others. Tata Mcgraw Hill Co. Email : mark_pani@mcgrawhill.com
2) Advertising Management with solution manual by Jaishri Jethwaney and Shruti Jaui Oxford University Press, Chennai.
3) Advertising and promotion by Shimp Cengage learning, Chennai. Email : sriram.b@cengage.com
4) Strategic advertising management by Lorry percy and Richard Elliott oxford University press, chennai.
5) Advertising planning and implementation by Sangeeta Sharma and Raguvirsingh PHI learning India PVT Ltd.,
6) Advertising & promotions are (IMC) Integrated Marketing Communication approach by Kruti Shah and Alan D'souza, Tata Mcgraw Hill Co.
7) Advertising Management by O' Guinn and others, cengage learning Chennai – Special India Edition.
8) Contemporary Advertising William .F Arens, Tata Mcgraw Hill Co.
9) Principles of Advertising and IMC by Tom Duncaw, Indian Edition Tata Mcgraw Hill Co.
10) Advertising Management Media approach for Market Research Global India Publications PVT Ltd., New Delhi. Email : info@globalindiapublications.com
11) Branding and Advertising by Seema Gupta – Global India Publications, New Delhi.

A : MARKETING

ELECTIVE COURSE - V : MARKETING OF SERVICES

Objectives: This course aims at providing a perspective on the concepts ,framework and analytical procedures available to service marketers to resolve the varies challenges faced in different situations.

Unit I

Developing a Framework for understanding Services Marketing – Classification of Services on similar characteristics.

Unit II

Nature of service – Relationship with customers – customerisation and judgement in Service delivery – Nature of demand relative to supply method of service – Delivery – Significance of people based attribute and / or facility based attributed of the service product.

Unit III

Managing Customer Mix – Deciding on what segment of Customers to serve – Positioning the service – Developing of service positioning strategy – Positioning map.

Unit IV

Managing Demand – Demand supply interaction – Strategies relating to demand – Inventory Demand – Flexible capacities – Modifying marketing mix elements to manage demand.

Unit V

Service business as a system – service operations sub – systems – Service delivery subsystem – Service marketing subsystem – Planning, organization – and implementation of Marketing effort – inter functional Conflict between marketing and operation – Evaluation of marketing effort.

Recommended Text book

1) For Unit I, II, III

   Services Marketing – operations and Management, By Vinnie Jauhari & Kirtidutta, Oxford University Press, Chennai. Email : v.anand@oup.com

2) For unit IV & V

   Marketing of services, India Edition, K. Douglas Hofiman, John.E.G. Bateson, Cengage learning. Chennai. Email : sriram.b@cengage.com

3) Services marketing by Kapoor, Paul & Halder – TATA Mcgraw Hill Co – Chennai.
4) Services marketing Govind Apte, Oxford University Press, Chennai.
5) Services marketing, The Indian Context, R. Srinivasan, PHI learning.

Suggested Reading

1) Services marketing and management by Audrey Gilmore, Response Book – sage publication. www.indiasage.com
2) Services marketing text and cases Steve Baron and others, published by Palgrave Macmilan London, Distributed by ANE book PVT Ltd., Chennai. Email : anebooks_tn@airtelmail.in
3) Text book of marketing of services by Nimit chowdhary – Macmillan India Ltd.,

A : MARKETING

ELECTIVE COURSE - VI : RETAIL MANAGEMENT

Objectives : The course will focus on (i) Manufacturers perspective on retailers.

(ii) Retailers understanding of the retail business.

Unit I

Retailing – meaning, definitions, functions performed by retailers, Importance of retailing. Requisites for successful retailer. Forces affecting retail sector in India. The retail life cycle. The strategic Retail Planning process, Retailing mix. Issues in Retailing.

Unit II

Traditional and modern formats of retail business – Marketing Concepts in Retailing – Consumer purchase behaviour – Cultural and Social group influence on Consumer Purchase Behaviour.

Unit III

Retail Location strategies: Issue to be considered in site selection. Decisions on geographic locations of a retail store. Location site and types of Retail development. Types of planned shopping area. Factors involved in the location decision. Catchment area analysis.

Unit IV

Merchandise Planning – Stock turns, Credit Management, Retail Pricing, Return on per. sq.feet of space – Retail Promotions . Traffic flow and analysis – Population and its mobility – Exteriors and layout – Customer traffic flows and pattern – Creative display.

Supply Chain Management – Warehousing – Role of IT in supply chain management.

Unit V

Consumerism and ethics in Retailing, Retail Audits, e-Retailing, Application of IT to Retailing, Retail Equity, Technology in Retailing – Retailing through the Internet.

Recommended Text book

1. Retailing Management – Text and cases by Swapna Pradhan – Tata Mcgraw Hill Co – Chennai. Email : mark_pani@mcgrawhill.com
2. Principles of retail management by Rosemary Varley and Mohamed Raffiq – Palgrave macmillan – London – distributed by ANE books PVT Ltd.,

Email : anebooks_tn@airtelmail.com

3. Retail management – Dunne Lusch, cengage learning, Chennai.

Email : sriram.b@cengage.com

4. Retail supply chain management by James B. Ayers and Mary Odegaard special Indian Edition – ANE books PVT Ltd., Chennai.

Email: anebooks_tn@airtelmail.com

Suggested Readings

1) Retailing management, Michael Barton and others – Tata Mcgraw Hill co.
2) Managing Retailing – Piyush Kumar Suiha and others. Oxford University press. Chennai.
3) Retailing environment & operations Andrew J. Newman and other, cengage learning Chennai.
4) International Retailing, Nicholas Alexander – Oxford University press Chennai.
5) Fundamentals of Retailing – KVS madaan, Tata Mcgraw Hill Co.
6) Retail Management – Chetan Bajaj and others. Oxford University Press.
7) Retail Management By Neelesh Jani Global India Publichations, New Delhi.
8) Retail Management by Sajai Gupta and GVR Preet Randhawa – Atlantic publishers – Chennai.

B : FINANCE

ELECTIVE COURSE - IV : PROJECT MANAGEMENT

Objectives: This course enables the students to get enrich in the concepts of project management and to help the students in project planning and scheduling.

Unit I

Concepts of Project Management; Project – Meaning – Nature – Types of project and project life cycle – Project management – Nature and scope of project management – Project management as a profession – Role of project manager.

Unit II

Project Identification and Formation: Project environment – Identification of investment opportunities – Projects screening – Preferability study – Project selection – Project formulation – Stages in project formulation – Project report preparation – Planning Commission's guidelines for project formulation.

Unit III

Project Appraisal: Objectives, essentials of a project methodology – Market appraisal – Technical appraisal – Financial appraisal – Socio – economic appraisal – Management appraisal.

Unit IV

Project Planning and Scheduling : Objectives – Process or Planning Components or good planning – Project designing and project scheduling and time estimation – Scheduling to match availability of man power and release of funds – Cost and time trade cost.

Unit V

Project Execution and Administration – Project contracting: Contract pricing, types – Project organisation: Forms of organisation – Project direction – Project communication – Project co ordination – Factors influencing effective project management – project time monitoring and cost monitoring – Project over runs. Project Control : Control techniques – PERT, CPM - Proper review – Project audit.

Recommended Text book

1) For Unit II and IV
Total project T Management The Indian context by PK. Joy – Mac millan
India Ltd.,
2) For Unit I and V
Project Management – by R. Panneerselvam and P. Senthil kumar PHI learning
India PVT Ltd.,
3) Project Management By Bhavesh .M Patel, Vikas Publishing Hous PVT Ltd.,
4) Project Management By S. Choudhury Tata Mcgraw Hill Co.
5) Project Management India Edition By CIDO I Clements, Cengage learning.
Suggested Readings
1) Project Management by CCI Pfor D.F. Gray and Erik .w Carson – Tata Mcgraw Hill Co.
3) Text book of project management by P. Gopalakrishnan & VE. Ramamoorthy Macmillan India Ltd.,
4) Projects, Planning, analysis, selection financing, Implementation and Review
by Prasanna Chandra – Tata Mcgraw Hill Co.

Suggested Readings

1) Project Management by CCI Pfor D.F. Gray and Erik .w Carson – Tata Mcgraw Hill Co.
2) Project Management – Management extra series – ANE books
   E-mail : anebooks_tn@airtelmail.in
3) Text book of project management by P. Gopalakrishnan & VE. Ramamoorthy Macmillan India Ltd.,
4) Projects, Planning, analysis, selection financing, Implementation and Review by Prasanna Chandra – Tata Mcgraw Hill Co.

B : FINANCE

ELECTIVE COURSE - V : GLOBAL FINANCIAL MANAGEMENT

Objectives: This course enrich the students with the concepts of International Financial markets. It also gives an insight into merits and effects of Foreign Direct Investments.

UNIT-I

Globalisation - Implications of Globalisation – Goals of International Financial Management - scope of International Finance – International Monetary System – Bimetallism – Gold Standard – Bretton Woods System – Floating Exchange Rate Regime – European Monetary System – IMF – WTO – GATT .

UNIT-II

Balance of Payments – The Current Account – The Capital Account – significance - Balance of Payments in the World – Balance of Payments Account of India

UNIT-III

International Financial Markets – Sources of International Funds – Multilateral Development Banks – Governments/ Governmental Agencies – International Banks – Security Markets Instruments of International Financial Markets– International Equities – GDRs – ADRs - International Money Market and Bond Market Instruments – Euro Bonds – Repos – Euro Commercial Paper – Medium Term Notes – Floating Rate Notes – Loan Syndicates – Euro Deposits – Euro Issues in India.

UNIT-IV

Currency Risk and Exposure – Types of Currency Risk – Management of Currency Risk – Concept and Measurement of Transaction Exposure - Techniques of Transaction Exposure Management – Translation Exposure – methods – Transaction Exposure Vs. Translation Exposure – Exchange Risk Management – Operating Exposure – measuring and managing Operating Exposure.

UNIT-V

Foreign Direct Investment (FDI) – Forms of FDIs – FDI in World – purpose of overseas investment – Benefits to the Host Countries – Effects of FDI – Political Risk.

Recommended Text books

1.Joseph Anbarasu, Global Financial Management, Ane, Delhi, 2010
2.Kevin s, Fundamentals Of International Financial Management, PHI, Delhi, 2010
3.Jeff Madura, International Financial Management, Cengage learning, Delhi, 2008

Suggested Readings

1) International Finance – By Thomas J. Obrien, Oxford University Press, Chennai.
2) International Financial Management By PG. APTE, Tata Mcgraw Hill Co
3) Global Financial Reporting and Analysis, Cengage learning – By Alexander Britton and Jorissen.
4) International Financial Management by Ephraim Clark – cengage learning.

ELECTIVE COURSE - VI : MERCHANT BANKING

Objectives: To help students to learn the various concepts in merchant banking and its role in appraisal of projects.
To help the students to know about insurance industry.

Unit I

Introduction – An Over view of Indian Financial System – Merchant Banking in India – Recent Developments and Challenges ahead – Institutional Structure – Functions of Merchant Banking - Legal and Regulatory Frameworks – Relevant Provisions of Companies Act- SERA- SEBI guidelines- FEMA, etc. - Relation with Stock Exchanges, OTCEI and NSE.

Unit II

Role of Merchant Banker in Appraisal of Projects, Designing Capital Structure and Instruments – Issue Pricing – Pricing – Preparation of Prospectus Selection of Bankers, Advertising Consultants, etc. - Role of Registrars – Underwriting Arrangements - Dealing with Bankers to the Issue, Underwriters, Registrars, and Brokers – Offer for Sale – Book – Building – Green Shoe Option – E-IPO Private Placement – Bought out Deals – Placement with FIs, MFs, FIIs, etc.

Unit III

Mergers and Acquisitions – Portfolio Management Services – Credit Syndication – Credit Rating – Mutual Funds - Business Valuation.

UNIT-IV

Mutual Funds - Origin, Types of Mutual Funds, Importance, Mutual Funds Industry in India – SEBI's directives for Mutual Funds, Private Mutual Funds, Asst Management company – Unit Trust of India – Evaluation of Performance of Mutual Funds – Money Market Mutual Funds – RBI Guidelines – Venture Capital: Meaning, Origin, Importance, Methods, India Scenario.

UNIT-V

Insurance – Meaning, Types, Insurance Industry in India and related reforms – Other Financial Services – Credit Cards – Credit Rating: Regulatory framework – Credit Rating Agencies – Rating Process and Methodology – Rating symbols/Grades – Pension Plan.

Recommended Text books

1. J.C.Verma, 'A Manual of Merchant Banking', Bharath Publishing House, New Delhi.
2. K.Sriram, 'Hand Book of Leasing, Hire Purchase & Factoring', ICFAI, Hyderabad.
3. Economic Dailies, Relevant Publication of AMFS.
4. Bhalla. V.K. – 'Management of Financial Services' – Anmol, New Delhi.
5. Khan, M.Y., FINANCIAL SERVICES, Tata McGraw Hill, New Delhi, 2001. Gurusamy, MERCHANT BANKING AND FINANCIAL SERVIES, Tata McGraw Hill, Delhi, 2009.

C : HUMAN RESOURCE

ELECTIVE COURSE - IV : PUBLIC RELATIONS MANAGEMENT

Objectives

1. To understand the role of public relations in building and maintaining a healthy corporate image.
2. To gained working knowledge of the various tools used in public relations.

Unit I

Introduction to P.R. – Definition, Nature, History and Development, Role of PR, PR associations. Objectives Of Public Relations, Emergence Of Public Relation.

Unit II

Public Relations Process, PR Problems, Elements Of Public Relations, The Psychological factors that affect the perception of the public,decision making process.

Unit III

Public Opinion Research, Functions Of Public Relations Department, PR Professional Code. Relations with the Government, Community Relations, Shareholders Relations, Promotion Programmes, Donations, Employee Publications, Guest Relations, Establishment Of Relations With The Public.

Unit IV

Media & Tools : Press, Radio, Television, Documentaries, Films.

Company Literature : Annual reports, manuals Brochures Information bulletins, House Journals, News Letters, Direct mailing.

Unit V

Advertising and Promotional Techniques : Promoting and positioning your organization through Advertising, Exhibitions, open house, Tournaments etc.,

Lobbying, Managing Rumors & Leaks.

Recommended Text books

1) Effective public relations and media strategy by C.,V. Narasimha Reddy – PHI learning India PVT Ltd.,
   Email : phi@phindia.com
2) For Unit V
   Public Relations principles and practices with solution manual by Iqbal S. Sach deva Oxford University Press, Chennai. Email : v.anand@oup.com
3) Public relations practices by Allen H. Center and patrick Jackson – cage studies and problems – Indian Edition - PHI learning India PVT Ltd.,
4) Public management – maximize efficiency and effectiveness by Sukumar chatterjee – Global India Publications, New Delhi.
   Email : 1) info@globalindiapublications.com
   2) pragati@mdppi.com

C : HUMAN RESOURCE

ELECTIVE COURSE - V : MANAGING INTERPERSONAL EFFECTIVENESS

Objectives: To help the students to understand their self. To give an insight into changing attitude and environment influence. It also helps the students to understand the concepts of stress.

Unit I : SELF PERCEPTION AND SELF-PRESENTATION

Defining & perceiving self, gaining self-knowledge, self-effectiveness, self-presentation, self-presentation motives and strategies, impression management, self-monitoring.

Unit II : COMMUNICATION

Communication & language, Non-verbal communication, proxemics (interpersonal space) paralanguage, kinesics, deception, detection deception, non-verbal leakage.

Unit III : ATTITUDE AND ATTITUDE CHANGE

The nature of attitude, changing attitudes – theoretical perspectives, changing attitudes through persuasion, Avoiding measurement pitfalls, conditions promoting and reducing consistency.

Unit IV : ENVIRONMENTAL INFLUENCE

Territoriality, crowding, environmental quality and social behavioour, the impact of our surroundings.

Unit V : QUALITY OF WORK LIFE (QWL)

Quality of Work Life : Working and well being, The working woman and the stress on working women, Advertising and consumer Behaviour, public health, aging and life quality, using social psychology to improve quality of work life.

Recommended Text Books

1) For Unit I and II

   Behaviour in Organisations By Jerald Greenberg and Robert. A. Baron – PHI learning India PVT Chennai. E-mail : phi@phindia.com

2) Culture and Organisational Behavior by Jai B.P> Sinha – Sage, Chennai. E.mail : chennai@sagepub.insagepublications.com

3) Organisational behaviour by S. Fayyaz Ahamed and others – Atlantic publishers – chennai.

4) For unit II

   Fundamentals of Organizational behaviour by Slocum and Hellriegel, India Edition by cengage learning chennail. Email : sriram.b@cengage.com

5) For Unit III

   Organisational Behaviour by Steven L MC Shane and others, Tata MCgrawhill Co. Chennai. Email : mark_pani@mcgrawhill.com

6) For Unit Iv

   Essential social Psychology – By (RISO . R.J) and Turner R.N. – Thousand Oaks, CA; International Edition – Sage publication, chennai. E.mail : chennai@sagepubuisagepublications.com

7) For Unit V Quality of work life

   Organisational Behaviour By John. W. Newstrom – Tata Mcgraw Hill, Special Indian Edition. Email : mark_pani@mcgrawhill.com.

8) For Unit V

   Working Woman and the stress organisational behaviour by Steeven L. MC Shane, Tata Mcgraw hill. Chennai.

C : HUMAN RESOURCE

ELECTIVE COURSE - VI : GROUP DYNAMICS

Objectives: To help the students understand the concepts in group dynamics and to learn the process of decisions making in groups. To know the factors affecting the integration in groups and how to overcome it.

Unit I

Groups and its formation – Formal and informal groups – Functions fulfilled by groups – Variables affecting the integration in groups of organization in groups of organizational groups and personal needs.

Unit II

Training for effective group membership – T Group training or sensitivity training – Lab exercises and feedback to individuals for improving interpersonal competence goals, approaches and utilization of sensitivity – training in Organizations.

Unit III

Process of decisions making in groups – Problems and approaches for 'consensus' formation – effective meetings.

Theory and model of interpersonal behaviour of C William Shutz – FIRO – B Test – its application – Achieving group compatibility – Problems in Reaching compatibility.

Unit IV

Use of groups in Organizations Vs Individual performance – Inter group Problems in Organizations – Inter group competition – Reducing competition through training – Conflict – Management of conflict – Preventing interpersonal conflict and inter group conflict Achieving integration in groups.

Unit V

Organization Development through better management of group dynamic – Team work development.

Recommended Text book

1) Group processes – India Edition by Donel son. R. Forsyth – cengage learning.
   Email : sriram.b@cengage.com
   Mobile : 99401 11491
   www.cengage.co.in
2) Organisational Behaviour By S. Fayyaz Ahamed and others, Atlantic publishers & Distributors (p) Ltd., Chennai.
   Email : chennai@atlanticbooks.com

D : SYSTEM

ELECTIVE COURSE - IV : SOFTWARE PROJECT MANAGEMENT

Objective: To introduce the students to various key stages in the development of software. The focus is on system implementation. To introduce database technologies and software project management.

Unit I : SYSTEM ANALYSIS & DESIGN

Overview of system analysis & Design : Introduction to different methodologies & Structured system analysis – Details of SDLC approach – mini cases – E.R. diagrams – DFD concepts – Data dictionary concepts. Structure charts – modular programming – I/O & file design consideration – Entity Life histories (ELH).

Unit II SYSTEM IMPLEMENTATION

System implementation & maintenance : Implementation Strategies – SW / HW selection & procurement – Control & security – issues of designing & implementing on-line systems – data communication requirements – system conservation approaches & selection issues.

Unit III PROJECT DEVELOPMENT & DATABASE DESIGN

Introduction to Database technologies & CASE tools with specific packages – overview of relational model – Database creation – SQL command – Normalization – designing forms & reports – using CASE tools for system analysis & design-case studies – Cost / benefit analysis – project & resource planning – design & development testing & documentation.

Unit IV SOFTWARE PROJECT MANAGEMENT

Software project management: challenges & opportunities – changing technologies & approaches – choice development of methodologies & technical platforms, project management techniques – monitoring 7 measurement of progress.

Unit V SOFTWARE PROJECT MANAGEMENT

Software project management – elements, cost estimation, manpower planning, Software & Product Metrics – Quality assurance & control – standards' & documentation – testing – implementation – training – technology management – quality standards – certificate – handling multiple projects, issues of share development.

Recommended Text books :

1) Software Engineering Principles and practice by Waman S.Jawadekar Tata Mcgraw Hill Co. – Chennai. Email : mark_pani@mcgrawhill.com
2) For Unit I

   Database Management systems Alexis Leon & Mathews Leon, Vikas Publishing House PVT Ltd.,
3) Software Project Management by S.A. Kelkar, PHI learning India PVT Ltd., Email : phi@phindia.com
4) Software project management (2 volumes set) by Prof. SN. Singh and SL. Gupta – Global India publications PVT Ltd., New Delhi.

   Email : info@globalindiapublications.com

D : SYSTEM

ELECTIVE COURSE - V : RELATIONAL DATABASE MANAGEMENT SYSTEM

Objective: The course is aimed at providing skills on developing and implementing applications in RDBMS.

Unit I INTRODUCTION TO RDBMS AND ORACLE

Basic concepts of Relational Data Model – Introduction to SQL – Normalization. Creating tables – data types – data functions – conservation and transformation functions – queries and sub queries.

Unit II ADVANCED CONCEPTS OF ORACLE

Changing data – advanced use of functions and variables – creating, dropping, altering tables and views – SQL (Structured Query Language) plus – accessing remote data – building reports – authority allocation – triggers and procedures. Data dictionary – design and performance issues.

Unit III INTRODUCTION TO VISUAL BASIC

Introduction to basics – variable and values – drawing on the screen – building programs – adding menu bar – using array variable – building clock programs.

Unit IV BUILDING LARGER PROGRAMS

Designing and building larger programs – address – book interfacing – working with multiple records – searching, printing, sorting and deleting – data management and control tool box for controls, forms, drawing fonts, and miscellaneous.

Unit V PROJECT DEVELOPMENT

Selection of a Client / Server based application – design the project and tools – development using Oracle and Visual Basic – demo and review.

Recommended Text books :

1) For Unit I and II

   Oracle Database 11g By Satish Asnani – PHI learning India PVT Ltd.,

   Email : phi@phindia.com

2) For Unit III and IV

   Programming with visual basic 6.0 by Mohamed Azam – Vikas publishing house PVT Ltd., Chennai – www.vikaspublishing.com

3) For Unit V

   Database Management System Oracle SQL and PL / SQL by Pranabkumar Dasguptal PHI learning India PVT Ltd.,

4) Database system concepts by Peter Rob & Carlos Coronel India Edition, Cengage learning Chennai. Email : sriram.b@cengage.com

Suggested Readings :

1) Oracle PL / SQL programming by Laksman Bulusu, cengage learning, Chennai.
2) Database Management Systems By Gerald V.Post – Tata Mcgraw Hill Co.
3) Database Management Systems By Alexis Leon and Mathews Leon – Vikas Publishing House PVT Ltd.

D : SY STEM

ELECTIVE COURSE - VI :

OBJECT ORIENTED PROGRAMMING & C++

Objective: The objective is to provide the students with basic understanding of programming. It also gives an insight into object oriented Programming and data modeling.

Unit I : INTRODUCTION

Traditional Programming approaches – Straight – Run Programming & structured Programming techniques – Limitations of Traditional Approaches – Object Oriented Approach – Objects – Classes – Data encapsulation – Data abstraction – Inheritance – Code Reusability – Polymorphism – Object Oriented Languages.

Unit II OBJECT ORIENTED ANALYSIS AND DATA MODELING

Object Oriented Analysis & Data Modeling – Object Oriented Concepts, Object Oriented Analysis Modeling – Object Oriented design concepts, object oriented design methods, class & object definition, refining operations, program components & interfaces.

Unit III DESIGNING OF OOD SYSTEMS

Notation for OOD, Implementation detailed design, An Alternative Object Oriented Design strategy, integrating OOD with SA/SD.

Unit IV C++ BASICS

C++ Programming basics – classes & objects, constructor & destruction, Overloaded constructors, Access specifies, static class data, Inheritance, Base Class & Derived class constructors, overriding member functions, class hierarchies, abstract base class, public & private inheritance, levels of inheritance, multiple inheritance.

Unit V ADVANCED CONCEPTS

Polymorphism, operator overloading, Virtual functions, Dynamic or Late binding, abstract classes, virtual base classes, friend functions static functions, Templates classes, Case Studies & Programming development in C++ demonstration & presentation.

Recommended Text book

1) For Unit I

   C++ and object oriented programming paradigm by ebasish Jawa, PHI learning India PVT Ltd.,

2) For Unit II, III and IV

   Object Oriented Programming with C++ by Balagurusamy – Tata Mcgraw Hill Co.,

3) For Unit V and case studies

   Programming with ANSI C++ by Bhusha Trivedi with solution manual Oxford University press, Chennai. www.oup.com

4) For unit II, III & IV

   Object Oriented Programming using C++ by Joyce Farrell, Cengage learning, India edition.

Suggested Readings :

1) Programming with C++ by D. Ravichandran – Tata Mcgraw Hill Co.
2) C++ programming Today by Barbara Johnson, India Edition PHI learning India Edition.
3) Introduction to Object Oriented Programming and C++ By ISRD Group, Tata Mcgrawhill Co.
4) Object Oriented Programming with C++ by Rohit Khurana Vikas publishing house PVT Ltd.,

E : OPERATIONS

ELECTIVE COURSE - IV : MATERIAL MANAGEMENT

Objectives :

The key objective of this course is to acquaint the students with Decision – making for effective and efficient purchase, storage and flow of materials in manufacturing and service organizations.

Unit I PURCHASING

Material management-meaning, advantages. Codification. Purchase management-Objectives, ,Functions, responsibilities and duties of purchase department .8R's of Purchasing. Kardex system. Methods of purchasing. Buying procedure.

Unit II VENDOR DEVELOPMENT

Scope of vendor development, stages in source selection, vendor rating- criteria, methods of rating .

Unit III RELATED MATERIALS FUNCTION

Spare parts management- definition, classification of spares, problems and issues in spares management.
Store keeping – types of stores, benefits, store location, store layout, principles in stores management.

Unit IV MATERIAL HANDLING

Definition, objectives of material handling, Importance, symptoms of poor material handling, principles of material handling. Material handling equipments, symbols, costs.

Unit V

Out sourcing, Make or buy decisions. Value engineering. Stores material accounting-Bin card, stores related ledgers.Recent development in material handling.

Recommended Text books

1) Materials Management procedures Text and cases, By A.K. Datta, PHI Learning India, www.phindia.com
2) Materials Management Text and cases, PHI learning India, New Delhi.
3) Materials Management case study and solutions by H. Kaushal Macmillan India Ltd.,
4) Purchasing and materials management – NK Nair Vikas Publishing House PVT Ltd.,
5) Material Management
   An Integrated approach by Dr. Pawan Arora Global India Publications PVT Ltd., New Delhi. Email : info@globalindiapublications.com
6) Purchasing – By Monczka, Trent and Hand field – By cengage learning, India Edition.

E : OPERATIONS
ELECTIVE COURSE - V : LEAN MANUFACTURING

Objectives :

This course gives the integrated perspective of Lean thinking apart from covering all the basic tools needed. This course will be relevant for those joining both manufacturing and service organizations.

Unit I

Evolution of lean thinking – Craftsman era, Mass Production era and Lean thinking.

Unit II

Lean Principles :

- The value
- Value stream mapping
- Flow
- Pull
- Perfection

Unit III

From thinking to action : Lean Leap Tool – Kit

1. TQM Concepts and Tools – QFD, FMEA Robust Design concepts; SPC, QC circles and KAIZEN approaches Six – Sigma philosophy and Methodologies.
2. 5S and TPM
3. JIT system and KANBAN concepts
4. Cellular Layouts

Unit IV

Creating Lean Enterprise – Organization and Implementation steps.

- Cases from Manufacturing Industries.
- Cases from service Industries, Including Software Industry.

Unit V

The Future – Lean Network.

Recommended Text book

1) Lean materials planning and execution India Edition – Cengage learning by Donald H. Sheldon.
2) Lean manufacturing implementation by Dennis P. Hobba. Cengage learning.
3) <u>For Unit III</u>
   Total Quality Management by SK. Mandal Vikas publishing.
4) Simplified Lean manufacture – By N. Gopala krishnan – PHI learning Private Ltd.

E : OPERATIONS

ELECTIVE COURSE - VI : WORLD CLASS MANUFACTURING

Objective: To help the students understand the concepts in Manufacturing management.

Unit I : Strategic decisions in Manufacturing Management

- Choice of Technology, Capacity
- Layout / Automation in Material handling systems
- Emerging trends

Unit II : Aggregate planning and Master Production Scheduling

- Materials Requirement Planning (MRP)
- Manufacturing Resources Planning (MRP – II)
- Implementation Problems / Indian experience

Unit III : Review of Operations Scheduling Process

- Job Shop Scheduling
- Batch Production Scheduling
- Flow Production Line Balancing

Unit IV Just-in-Time System

- Pull System – Use of Kanban
- JIT Purchase – Source Development, Buyer – seller relations
- Indian Experience

Unit V Total Productive Maintenance

- Objective of TPM – Total System effectiveness
- Break-down maintenance
- Preventive Maintenance
- Predictive Maintenance
- Condition Monitoring System
- Maintenance Prevention

  } Productive Maintenance

- Mainfability Improvement
- Reliability Improvement
- Total Employee Involvement and Small Group Activities.

Recommended Text book

1) Production and operations managements by R. Panneerselvam, PHI learning India Ltd., www.phiindia.com
2) For Unit II and V

   Operations Management with DVD in the Book by William J. Stevenson, Special Indian Edition, Tata Mcgraw Hill Co. Chennai.

   Email : mark_pani@mcgrawhill.com
3) World Class Manufacturing by B.S. Sahay and others Macmillan publishers India Ltd., Chennai. Phone : 044 – 22384231.

Suggested Readings

1) Industrial Engineering and Management by OP. Khanna, Dhanpatrai publications PVT Ltd., New Delhi.
2) Operations Management – By James R. Evans. David A. Collier, India Edition Cengage learning, Chennai.

   Email : narasimhan.r@cengage.com
3) Operations Management by Norman Gaither Greg Frzier, India Edition, cengage learning, Chennai.
4) Essentials of operations management by Scott.T. Young, sage South Asia Edition. www.sagepublications.com
5) Progressive manufacturing, India Edition, By Soli.J Engineer, Cengage learning.

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