MRSPTU PGDCA (Part-Time) SYLLABUS BATCH 2022 ONWARDS (1.5 YEARS COURSE)

Semester 1st		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
GCAPP1-101	Operating System	3	1	0	40	60	100	4
GCAPP1-102	Information Technology	3	1	0	40	60	100	4
GCAPP1-103	Computer System Architecture	3	1	0	40	60	100	4
GCAPP1-104	Software Lab I (Information Technology)	0	0	4	60	40	100	2
Total		9	3	4	180	220	400	14

Semester 2nd		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
GCAPP1-201	Data Structure using Python	3	1	0	40	60	100	4
GCAPP1-202	Database Management System	3	1	0	40	60	100	4
GCAPP1-203	Software Lab II (Data Structure using Python)	0	0	4	60	40	100	2
GCAPP1-204	Software Lab III (Database Management System)	0	0	4	60	40	100	2
Total		6	2	8	200	200	400	12

Semester 3rd		Contact Hours			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
GCAPP1-301	Web Development using Open Source Technology	3	1	0	40	60	100	4
GCAPP1-302	Application Development using Python	3	1	0	40	60	100	4
GCAPP1-303	Software Lab IV (Web Development using open source technology)	0	0	4	60	40	100	2
GCAPP1-304	Software Lab V (Application Development using Python)	0	0	4	60	40	100	2
Total		**6**	**2**	**8**	**200**	**200**	**400**	**12**

Operating System

Subject Code: GCAPP1-101   **L T P C**   **Total Hours:-60**
                                  3 1 0 4

Course Objectives:
1: Identify the role of different components of operating systems and process management.
2: Analyze the performance of different algorithms used in design of operating system and memory management
3: Create awareness of concepts related to input output and file management.

Course Outcomes:
1: Identify the role of different components of operating systems and process management.
2: Analyze the performance of different algorithms used in design of operating system and memory management
3: Create awareness of concepts related to input output and file management.

UNIT 1 (15 hrs.)

Introduction to Operating System: Definition, its need and Operating system services, Functions of an operating system, Structure of operating system (Role of kernel and Shell), Types of operating systems.
Process Management: Process concept, types of Process scheduling, Program vs. Process. PCB, State transition diagram.

UNIT 2 (15 hrs.)

CPU Scheduling: Basic concept of CPU Scheduling, Preemptive vs. Non-pre-emptive scheduling. Scheduling criteria, and Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms.
Deadlock: Definition, necessary conditions, Strategies for handling Deadlock.

UNIT 3 (15 hrs.)

Memory Management: Introduction, address binding, relocation, loading, linking, memory sharing and protection; Paging and segmentation, paging with segmentation,
Virtual memory: basic concepts of demand paging, page replacement algorithms.

UNIT 4 (15 hrs.)

I/O Device Management: I/O devices and controllers, device drivers; disk storage.
File Management: File concepts, file operations, access methods, directory and disk structure, file system structure, Protection and Security.

Recommended Books:
1. Steve Heath, 'Embedded Systems Design', 2 nd Edn., Newnes, 2002.
2. Jane W.S. Liu, 'Real-Time Systems', 1 st Edn., Prentice Hall, 2000.
3. John B. Peatman, 'Design with PIC Microcontrollers, 2 nd Edn., Pearson Education, 1998.
4. Pearson Education, 1997 PIC 12F629/675 Manual.

Information Technology

Subject Code: GCAPP1-102   **L T P C**   **Total Hours:-60**
                                        3 1 0 4

Course Objectives:
1: Identify the role of different components of operating systems and process management.
2: Analyze the performance of different algorithms used in design of operating system and memory management
3: Create awareness of concepts related to input output and file management.

Course Outcomes:
1. Understand the basic fundamentals of Computer, memory and input-output devices.
2. Learn the number system and binary arithmetic operations in Computers.
3. Analyze Computer Software languages and applications of Information Technology.

UNIT 1 (17 hrs.)
Basic Anatomy of Computers: Block Diagram of computer, characteristics of computers, types of computers, computer generations,
Memory: Hierarchical Memory Structure, RAM, ROM, PROM, EPROM**,** Cache, Auxiliary Memory
Input-Output Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, DeskJet printer, Laser printer, and plotters.

UNIT 2:(12 hrs.)
Number System: Non-positional and positional number systems, Base conversion, binary, decimal, hexadecimal, and octal systems.
Binary Arithmetic: Addition, subtraction and multiplication.

UNIT 3 (15hrs.)
Types of Languages: Machine, assembly and High level Language.
Computer Software: Introduction, types of software, systems software, GUI, operating system, high level languages, assemblers, compilers and interpreters, system utilities, program testing and debugging, program documentation.

UNIT 4 (16hrs.)
Applications of Information Technology and Trends: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment.
E-Commerce: Meaning, its advantages & limitations, Infrastructure for E-commerce, Types of E-Commerce Applications.
Multimedia: Concepts, Components and Application.

Recommended Books:
1. V. Rajaraman, 'Fundamentals of Computers', 5 th Edn., PHI, 2010.
2. Satish Jain, 'Information Technology Concepts', 4 th Edn., BPB Publications, 2006.
3. Turban, Mclean and Wetherbe, 'Information Technology for Management', 4 th Edn., John Wiley & Sons, 2006.

Computer System Architecture

Subject Code- GCAPP1-103 **L T P C** **Total Hours:-60**

3 1 0 4

Course Objectives:

1: Identify the role of different components of operating systems and process management.

2: Analyze the performance of different algorithms used in design of operating system and memory management

3: Create awareness of concepts related to input output and file management.

Course Outcomes:

1. Infer the concepts of Computer organization and architecture.
2. Understand the common bus system and Register transfer operations.
3. Analyze the concepts of Boolean algebra, combinational circuits and sequential circuits.

UNIT 1 (17 hrs.)

Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture, Harvard Architecture, RISC and CISC Architecture.

CPU Architecture - General register & stack organization, Instruction formats, Instruction types: Three-address, Two-address, One-address, Zero-address, Program Control, ALU & Control Unit Architecture.

UNIT 2(16 hrs.)

Register Transfer and Micro operations-: - Introduction to Registers, Instruction Format, Types of Instructions- Memory Reference Instructions, Register Reference Instructions and Input-Output Instructions. Addressing Modes, Interrupts.

Common Bus System: Introduction to Common Bus System, Types of Buses (Data Bus, Control Bus, Address Bus), 16-bit Common Bus System--Data Movement among registers using Bus.

UNIT 3 (12 hrs.)

Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR, NAND & NOR as Universal Gates, Logic Gates Applications.

Boolean Algebra: Introduction, Theorems, Simplification of Boolean Expression using Boolean Algebra, SOP & POS Forms.

UNIT 4 (15 hrs.)

Combinational Logic Circuits: Half Adder & Half Subtractor, Full Adder & Full Subtractor, Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer, Encoders & Decoders.

Sequential Circuits: SR, JK, D, T Flip-Flop, Excitation Tables, State Diagram, State Table, Race Around Condition, Removing Race Around Condition, Applications of Flip-Flops.

Recommended Books:

1. M. Morris Mano, 'Computer System Architecture', PHI.
2. P.V.S. Rao, 'Computer System Architecture', 2nd Edn., PHI.
3. J.P. Hayes, 'Computer Architecture & Organization, 3rd Edn., McGraw Hill.

Software Lab I (Information Technology)

Subject Code: GCAPP1-104   **L T P C**   **Total Hours:-60**
                                      0 0 4 2

This laboratory course will comprise as exercises to supplement that is learnt under the Subject

1. Draw and explain block diagrams of a computer system with peripherals.

2. Identify various peripherals of a computer system such as Printers, keyboard, mouse, scanners, modem, Joy tick, Track Ball, Touch Screen, Light Pen, Speakers, Microphone, Projectors, Monitors and other display devices.

3. Hierarchical Memory Structure, various types of memory: RAM, ROM, Cache, Auxiliary Memory and Secondary Memory.

4. Understanding number systems, binary, decimal, hexadecimal and octal systems and conversion from one type to another.

5. Concept of Binary Arithmetic: Addition, Subtraction and Multiplication.

6. Program examples written in Machine Language and Assembly Language.

7. Program examples (as written in Machine and/or Assembly Language) written in High Level Language and their comparison with Machine Language and Assembly Language code.

8. Installation of various Operating Systems: Windows/Linux.

9. Installation of System Software and Utility Software.

10. Working of E-Commerce and Multimedia websites.

2ND

SEMESTER

Data Structure Using Python

Subject Code: GCAPP1-201   **L T P C**   **Total Hours:-60**

3 1 0 4

COURSE OBJECTIVES:
1. To introduce the core data structures using Python programming language.
2. To explore the applications of Python built-in data structures.
3. To understand the complexity analysis of various algorithms.

COURSE OUTCOMES:
1. Demonstrate basic concepts of Python, its flow control and Functions.
2. Understanding the basics of implementing Data structure and array using python.
3. Analyzing different operations performed on linear and non-linear data structures.

UNIT – I (17 hrs.)

Python Basics: - Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program.

Flow control:-Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit(),
Functions.

UNIT-II (15 hrs.)

Data Structures: Definition, Linear Data Structures, Non-Linear Data Structures
Python Specific Data Structures: List, Tuples, Set, Dictionaries, Comprehensions and its Types, Strings, slicing.
Arrays - Overview, Types of Arrays, Operations on Arrays, Arrays vs List.

UNIT-III (16 hrs.)

Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists.
Stacks - Overview of Stack, Implementation of Stack.
Queues-Overview of Queue, Implementation of Queue.
Applications of stack and queue.

UNIT-IV (12 hrs.)

Searching -Linear Search and Binary Search.
Sorting - Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

TEXTBOOKS:
1. Data structures and algorithms in python by Michael T. Goodrich
2. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

Database Management System

Subject Code: GCAPP1-202 **L T PC** **Total Hours:-60**

3 1 0 4

COURSE OBJECTIVES:
1. To explain basic database concepts, applications, data models, schemas and instances.
2. To emphasize the importance of normalization in databases.
3. To familiarize issues of concurrency control and transaction management.

Course Outcomes:
1. To understand the basic concepts of DBMS.
2. To understand the concept of normalization theory.
3. To demonstrate the concepts of database security.

UNIT 1 (17 hrs.)

Database Concept: Introduction to Data, Field, Record, File, Database, Database management system, Database Vs File Oriented Approach, Basic DBMS terminology, DBA and its responsibilities, Data Independence, DBMS architecture, Components of DBMS, Advantages and Disadvantages of DBMS.
Database languages: DDL, DML, DCL. Database utilities, Data Models, Keys: Super, candidate, primary, unique, foreign.

UNIT 2 (16 hrs.)

Database Design: Introduction to Data Models, Hierarchical model, network model, Entity Relationship Model, Entities, Attributes, E-R Diagrams. Relational Data Model: concepts, constraints.
Relational Database: Relational Algebra: Basic operations and Calculus, SQL Fundamentals, PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions.

UNIT 3 (15 hrs.)

Normalization: Introduction to Normalization, Functional dependency, First, Second, Third Normal Forms, Boyce-Codd Normal Form (1NF, 2NF, 3NF, BCNF), multivalued dependency, Fourth Normal Form, Fifth Normal Form.
Database security: Authentication, authorization, methods of implementing security.

UNIT 4 (12 hrs.)

Database Security: Database Recovery, Concurrency Management: Definition and problems arising out of Concurrency. Integrity and Control. Structure of a Distributed Database, Design of Distributed Databases.

Recommended Books:
1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 'Database System Concepts', 6 th Edn., Tata McGraw Hill, 2010.
2. Ramez Elmasri andShamkant B. Navathe, 'Fundamentals of Database Systems', 6 th Edn., Pearson, 2010.

Software Lab II (Data Structure Using Python)

Subject Code: GCAPP1-203   **L T P C**   **Total Hours:-60**

                                                        0 0 4 2

This laboratory course will comprise exercises to supplement that is learnt under the Subject.

1. Write a program to demonstrate the
   (a) use of basic Data Types (b)Operators and Expressions(c)flow control(d)Modules (e)Built-in Functions.
2. Write a Python program to illustrate List Comprehensions.
3. Write a Python program to illustrate Dictionary Comprehensions.
4. Write a Python program to illustrate Set Comprehensions
5. Program to insert, delete and traverse an element from an array.
6. Write a program to implement a Singly Linked List.
7. Write a program to implement Stacks .
8. Write a program to implement Bubble Sort and Selection Sort.
9. Write a Python script for implementing linear search technique.
10. Write a Python script to for implementing binary search technique

Software Lab III (Database Management System)

Subject Code: GCAPP1-204   **L T P C**   **Total hours:-60**

0 0 4 2

This laboratory course will comprise as exercises to supplement that is learnt under the Subject

1. Use of CREATE, ALTER, RENAME and DROP statements in the database tables (relations).
2. Use of CREATE, ALTER, RENAME and DROP statements in the database tables (relations).
3. Use of simple select statements.
4. Use of traditional operators.
5. Use of nesting of queries.
6. Use of substring comparison.
7. Use of aggregate functions.
8. Use of order by statement.
9. Write a PL/SQL code to add two numbers and display the result. Read the numbers during run time.
10. . Write a PL/SQL code to find the sum of the first 10 natural numbers using while and for loop.

3RD

SEMESTER

Web Development Using Open-Source Technology

Subject Code- GCAPP1-301   **L T P C**   **Total Hours:-60**
                                    3 1 0 4

Course Objectives

The Objective of the Course is to help students in analyzing and evaluating the web technology components for formulating web related problems. The students will be able to learn the concepts of different web technologies such as WWW, HTML, Java Script, Ajax, PHP-MySQL.

Course Outcomes

1. Analyze and evaluate web technology components for formulating web related problems.
2. Demonstrate the use of advanced technologies in dynamic websites to provide performance efficiency and reliability for customer satisfaction.
3. Infer basic concepts of Ajax, JSON and PHP.

UNIT 1 (16 hrs.)

Introduction to WWW: Protocols and programs, secure connections, application and development tools, the web browser, internet domains.

Introduction to HTML: The development process, Html tags and simple HTML forms, web site structure.

UNIT 2 (16 hrs.)

Style sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, CSS Properties - Background images, Colors and properties, Text Formatting, Margin, Padding, Positioning etc.

Java Script: Introduction, JavaScript's history and versions, Basic syntax, Variables, Data types, Statements, Operators, loops and repetition.

UNIT 3 (14 hrs.)

Ajax: Introduction, HTTP request, XHTTP Response, Advantages & disadvantages, Purpose of it, Ajax based web application, and alternatives of Ajax.

JSON: JSON– Syntax, Data types, Objects, Reading and writing JSON on client and server.

UNIT 4 (14 hrs.)

PHP and MySQL: Introduction and basic syntax of PHP, Data types, Variables, Decision and looping with examples, String, Functions, Array, Form processing, Cookies and Sessions, E-mail, PHP-MySQL: Connection to server.

Reference Books:

1. Computer Basics and Beyond by Michael A. Price.
2. MS-Office 2007 for Dummies by Wallace Wang, Wiley Publishing Inc.
3. Fundamentals of Computers. Delhi: Prentice-Hall.

Application Development Using Python

Subject Code: GCAPP1-302   **L T P C**   **Total Hours:-60**
                                       3 1 0 4

Course Objectives

The Objective of the Course is to help students in analyzing and understanding the concepts related to the language Python. The students will be able to

Course outcomes:

1. Demonstrate basic concepts of Python .
2. Infer the flow control and functions in python.
3. Understanding the concepts of lists and dictionaries in python.

UNIT-I (17 hrs.)

Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program

Pattern matching with Regular Expressions: Finding Patterns of Text Without Regular Expressions, Finding Patterns of Text with Regular Expressions,More Pattern Matching with Regular Expressions, Greedy and Nongreedy Matching, The findall() Method, Character Classes, Making Your Own Character Classes, The Caret and Dollar Sign Characters.

UNIT-II (14 hrs.)

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module,Saving Variables with the pprint.pformat() Function, Project: Generating Random Quiz Files, Project: Multi Clipboard.

UNIT-III (15 hrs.)

Classes and objects: Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying

Classes and methods: Object-oriented features, Printing objects, Another example, A more complicated example,The init method, The __str__ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,

UNIT-IV(14 hrs.)

Web Scraping: Project: MAPIT.PY with the webbrowser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML, Parsing HTML with the BeautifulSoup Module.

Reference Books:

1. Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018.
2. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", 1 st Edition, O'Reilly Media, 2016.

Software Lab IV (Web Development Using Open Source Technology)

Subject Code: GCAPP1-303   **L T P C**   **Total Hours:-60**

0 0 4 2

This laboratory course will comprise as exercises to supplement that is learnt under the Subject Web Development Using Open Source Technology :

Programs based on different web technologies:

1. Write a HTML code that displays various formatting tags.
2. Write a HTML code to create an ordered list.
3. Write a HTML code to create an unordered list.
4. Write a HTML code to create a table having 5 rows and 5 columns.
5. Write a HTML code to create an admission form.
6. Write a HTML code to create a frame.
7. Write a HTML code to create an image map.
8. Write a HTML code to create hyperlink b/w multiple pages.
9. Write a HTML code to create a hyperlink to an image. [DHTML]
10. Write a DHTML code to create a cascading style sheet. [JAVA SCRIPT]
11. Write a Program in JavaScript to show if a number is big or not.
12. Write a Program in JavaScript to implement for loop.
13. Write a Program in JavaScript to implement a while loop.
14. Write a Program in JavaScript to show the usage of if statement.
15. Write a Program in JavaScript to show the usage of if-else statement.
16. Write a Program in JavaScript to show the usage of switch statement.
17. Write a Program in JavaScript to call a function.
18. Write a Program in JavaScript to show a function with an arguments.
19. Write a Program in JavaScript to show the number is even or odd.
20. Write a Program in JavaScript to show if a number is prime or not.

Software Lab V (Application Development Using Python)

Subject Code: GCAPP1-304   **L T P C**   **Total Hours:-60**

                                                0 0 4 2

This laboratory course will comprise exercises to supplement that is learnt under the Subject.

1 Write an algorithm and program to search an element using linear search.

2 Write a program to implement a Binary search tree.

3 Write Quicksort algorithm and program in language C.

4 Implement the Polynomial representation using Array.

5 Create a program to sort it in ascending order using heap sort (Min Heap and Max Heap both). Given an array of 6 elements:

6. Write programs for finding the element in the array using the binary search method using iteration and recursion concepts.

7 Write a program to create a link list and perform operations such as insert, delete, update and reverse.

8 Write a program to insert value in a Linear Array at Specified Position.

9 Write a program to swap two numbers using calls by value and call by reference.

10 Write a C program to simulate the working of a circular queue of integers using an array. Provide the following operations, Insert, Delete.

11 Write a program to sort elements using the Merge Sort method.

12 Write a program to support the following operations on a doubly linked list where each node consists of integers.

13 Write a program to construct a stack of integers and to perform the following options on it

            PUSH

            POP

The program should print appropriate messages for stack overflow, stack underflow and stack empty.

14 Write a program to find shortest path using Dijkstra's Algorithm

15 Write a C program using dynamic variables and pointers to construct a queue of integers using singly link list and perform the following operations:

            Insert

            Delete

16 The program should print appropriate messages for queue full and queue empty conditions

17 Write a program to arrange words in dictionary order using Binary Search Tree (In order Traversal) and implement binary search tree for word representation and make in order traversal for sorting in dictionary order

18 Write a program to implement Breadth First Search and Depth First Search Algorithm.

19 Write a program to implement any one hashing technique in c and also measure its complexity.

20 Write a program to design a priority queue which is maintained as a set of queues (maximum of three queues). The elements are inserted based upon the given priority; the deletion of an element is to be done starting from the first queue, if it is not empty. If it is empty then the second queue will be deleted and so on.

B.Sc. (Hons.) MATHEMATICS SYLLABUS 2022 BATCH ONWARDS

Course Structure: As per the UGC guidelines, UG degree with honours in Mathematics includes core courses (CC), Ability Enhancement Compulsory Courses (AECC), Discipline Specific Elective (DSE), Generic Elective (GE), Skill Enhancement Courses (SEC) and Non Credit Courses (NCC). On the basis of these guidelines the course structure for B. Sc. (Hons.) Mathematics has been designed as detailed below:

Sem.	Course Type						Marks	Credits
	CC	DSE	GE	SEC	AECC	NCC		
I	2	--	1	--	1		500	20
II	2	--	1	--	1	1	600	21
III	3	1	1	--	--		600	30
IV	3	1	--	1	--		600	28
V	2	1	--	1	--		500	22
VI	2	1	1	--	--		400	24
Total	14	4	4	2	2		3200	145

1st Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-121	Calculus-I	CC-I	5	1	0	40	60	100	6
BMATS1-122	Algebra-I	CC-II	5	1	0	40	60	100	6
BHSMC0-042	English	AECC-I	2	0	0	40	60	100	2
BMATS1-123	Fundamentals of Computer and its Applications	GE-I	4	0	0	40	60	100	4
BMATS1-124	Software Lab (Fundamentals of Computer and its Applications)	GE-I Lab	0	0	4	60	40	100	2
	Total		**16**	**2**	**4**	**220**	**280**	**500**	**20**

2nd Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-221	Calculus-II	CC-III	5	1	0	40	60	100	6
BMATS1-222	Algebra-II	CC-IV	5	1	0	40	60	100	6
BHSMC0-041	Environmental Science	AECC-II	3	0	0	40	60	100	3
BMNCC0-041	Drug abuse: problem, management and prevention	NCC-I	2	0	0	100	---	100	0
BMATS1-223	C Programming	GE-II	4	0	0	40	60	100	4
BMATS1-224	C Programming Lab.	GE-II Lab	0	0	4	60	40	100	2
	Total		**16**	**2**	**4**	**220**	**280**	**600**	**21**

3rd Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-321	Differential Equations-I	CC-V	5	1	0	40	60	100	6
BMATS1-322	Analysis-I	CC-VI	5	1	0	40	60	100	6
BMATS1-323	Number Theory	CC-VII	5	1	0	40	60	100	6
BMATS1-324	Analytical Geometry	DSE-I	5	1	0	40	60	100	6
BMATS1-325	Object Oriented Programming	GE-III	4	0	0	40	60	100	4
BMATS1-326	Object Oriented Programming Lab.	GE-III Lab	0	0	4	60	40	100	2
	Total		24	4	4	260	340	600	30

4th Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-421	Differential Equations-II	CC-VIII	5	1	0	40	60	100	6
BMATS1-422	Analysis-II	CC-IX	5	1	0	40	60	100	6
BMATS1-423	Numerical Methods	CC-X	5	1	0	40	60	100	6
BMATS1-424	Theory of Probability	DSE-II	5	1	0	40	60	100	6
BMATS1-425	Programming with Python	SEC-I	3	0	0	40	60	100	3
BMATS1-426	Software Lab (Programming with Python)	SEC-I Lab	0	0	2	60	40	100	1
	Total		23	4	2	260	340	600	28

5th Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-521	Linear Algebra	CC-XI	5	1	0	40	60	100	6
BMATS1-522	Differential Geometry	CC-XII	5	1	0	40	60	100	6
BMATS1-523	Mechanics	DSE-III	5	1	0	40	60	100	6
BMATS1-524	MATLAB	SEC-II	3	0	0	40	60	100	3
BMATS1-525	MATLAB Lab.	SEC-II Lab	0	0	2	60	40	100	1
	Total		18	3	2	220	280	500	22

6th Semester			Contact Hrs.			Marks			Credits
Subject Code	Subject	Course Type	L	T	P	Internal	External	Total	
BMATS1-621	Complex Analysis	CC-XIII	5	1	0	40	60	100	6
BMATS1-622	Discrete Mathematics	CC-XIV	5	1	0	40	60	100	6
BMATS1-623	Linear Programming and Optimization	DSE-IV	5	1	0	40	60	100	6
BMATS1-624	Mathematical Methods	GE-IV	5	1	0	40	60	100	6
	Total		20	4	0	160	240	400	24

Calculus-I					
Subject Code- BMATS1-121	**L**	**T**	**P**	**C**	**Total Hours: 90**
	5	**1**	**0**	**6**	

Course Objectives

To make students familiar with basic concepts of limit and continuity, Differentiability and differentials, Successive differentiation, Derivatives of higher order, Partial derivatives of higher order, Gradient, Curl and Divergence, Geometrical interpretation and basic properties, Directional Derivative.

Course Outcomes

Students will be able to:

1. Apply the knowledge of basic concepts of calculus in order to study theoretical development of different mathematical techniques and their applications.
2. Develop the skills to sketch the curves in a plane using its mathematical properties in the different coordinate systems of reference.
3. Apply derivatives for the computation of directional derivative and Optimization.
4. Extend the knowledge of Partial derivatives of higher order for further exploration of the subject for going into higher education.

UNIT-I (23 Hours)

Basic concept of limit and continuity, Properties of limit and classification of discontinuities, Properties of continuous functions, Differentiability and differentials, Successive differentiation and Leibnitz theorem, Derivatives of higher order, nth derivative of well-known functions.

UNIT-II (22 Hours)

Concavity, Convexity, Points of inflexion, Increasing and decreasing function, Asymptotes, Polar curves, Multiple points, Tracing of Cartesian curves, Idea of some well-known parametric and polar curves, Curvature of a curve at a point, Radius of curvature for Cartesian, Parametric, Polar forms, Centre of curvature.

UNIT-III (22 Hours)

Partial differentiation –Function of two variables, Partial derivatives of higher order, Homogeneous functions, Euler's theorem and its extension (with proof), Composite functions, Total derivative, Differentiation of implicit functions and composite functions, Jacobians and its properties.

UNIT-IV (23 Hours)

Tangent plane and normal to a surface, Maxima and Minima of functions of two variables, Working rule to find the extreme values of a function $z= f (x, y)$, Lagrange's method of undetermined multipliers, Gradient, Curl and Divergence, Geometrical interpretation and basic properties, Directional Derivative.

Recommended Books:

1. G. B. Thomas, M. D. Weir, J. Hass: Thomas' Calculus (Twelfth Edition), Pearson Education.
2. Gorakh Prasad: Integral Calculus, Fourteenth Edition, Reprint **2007**, Pothishala Private Limited, Allahabad.
3. Zafar Ahsan: Differential Equations and Their Applications, Second Edition, Prentice Hall of India Private Limited, New Delhi.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, **2000**.
5. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, **2006**.

Algebra-I

Subject Code- BMATS1-122

L	T	P	C
5	1	0	6

Total Hours: 90

Course Objectives

Define and interpret the concepts of basic algebra, Introduction of Group, Normal subgroups, Quotient subgroups, homomorphism, isomorphism permutation group and its properties.

Course Outcomes

Students will be able to:

1. Understand the concept of groups and its properties.
2. Analyze& demonstrate different types of algebraic structures such as subgroups Normal subgroups and Quotient groups to understand and use the fundamental results in Algebra.
3. Apply the concepts of isomorphism and homomorphism for groups to solve different types of problems.
4. Access the idea of counting subgroups and analyse all groups to relate with one special group.

UNIT-I (25 Hours)

Definition of a group, its examples and simple properties, Abelian group, Groups of transformations, Subgroups, Generation of groups and cyclic groups, Order of group.

UNIT-II (22 Hours)

Coset decomposition, Lagrange's theorem and its consequences, Fermat's and Euler's theorems. Normal subgroup, Quotient group.

UNIT-III (22 Hours)

Homomorphism, theorems on homomorphisms, Isomorphism, Automorphism, theorems on isomorphisms, Freshmen's theorem.

UNIT-IV (21 Hours)

Direct products, Permutation of group, Even and Odd permutation, alternative group, Cayley theorem, Sylow's theorems (including proofs) and its applications.

Recommended books:

1. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, **2002**.
2. M. Artin, Abstract Algebra, 2nd Ed., Pearson, **2011**.
3. Joseph A Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa, **1999**.
4. David S. Dummit and Richard M Foote, 'Abstract Algebra,' John Wiley & Sons, **2004**.
5. Surjeet Singh and Qazi Zameeruddin, 'Modern Algebra.' 7th Ed, Vikas Publishing House, New Delhi,**1993**.
6. Herstein, I.N., 'Topics in Algebra.'2 nd Ed, Vikas Publishing House, **1976**.

ENGLISH

Subject Code: BHSMC0-042   L   T   P   C   Total Hours: 30
                                2   0   0   2

UNIT-I (8 Hours)

Communication Skills: Introduction, Definition, the Importance of Communication,

The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

UNIT-II (7 Hours)

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

UNIT-III (7 Hours)

Communication Styles: Introduction, The Communication Styles Matrix with example for each Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations

UNIT-IV (8 Hours)

Interview Skills: Purpose of an interview, Do's and Don'ts of an interview

Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

Group Discussion: Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion.

Recommended Books:

1. Ruther Ford A. J., 'Basic Communication Skills for Technology', 2nd Edition, Pearson Education,**2011**.
2. Kumar S. and Pushplata, 'Communication Skills', 1st Edition, Oxford Press,**2011**.
3. Stephen P. Robbins, 'Organizational Behaviour', 1st Edition, Pearson,**2013**.
4. Gill H., 'Brilliant-Communication Skills', 1st Edition, Pearson Life,**2011**.
5. Gopalawamy R., 'The Ace of Soft Skills: Attitude, Communication and Etiquettefor Success', 5th Edition, Pearson,**2013**.
6. Dalley D., Burton L. and Margaret G., 'Developing your Influencing Skills', Green Hall, 1 st Edition, Universe of Learning LTD,**2010**.
7. Konarnira, 'Communication Skills for Professionals', 2nd Edition, PHI,**2011**.
8. Mitra B. K., 'Personality Development and Soft Skills', 1st Edition, Oxford Press,**2011**.
9. 'Soft Skill for Everyone', Butter Field, 1stEdition, Cengage Learning India Pvt. Ltd., **2011**.
10 Francis Peters S.J., 'Soft Skills and Professional Communication', 1st Edition, McGraw HillEducation, **2011**.

11 John A., 'Effective Communication', 4th Edition, Pan MacMillan, **2009**.
12 Aubrey D., 'Bringing out the Best in People', 2nd Edition, McGraw Hill, **1999**

Fundamentals of Computer and its Applications

Subject Code- BMATS1-123	L T P C	Total Hours: 60
	4 0 0 4	

Course Outcomes

Students will be able to

1. Learning the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.
2. Understanding the concept of input and output devices of Computer
3. Learning concepts of Operating system and its types.
4. Gaining knowledge about various MS Office services like Word, Excel and PowerPoint.

UNIT-I (15 hours)

Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.
Number System: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication) Applications of IT.

UNIT II (15 hours)

Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, barcode reader, web camera, monitor, printer, plotter.
Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks, concept of compiler and interpreter.

UNIT – III (15 hours)

Operating System: Batch, multiprogramming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.

Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.

UNIT IV (14 hours)

Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs.
Presentation Graphics Software: Templates, views, formatting slides, slides with graphs, animation, using special features, presenting slide shows.

Recommended Books:

1. V. Rajaraman, 'Fundamentals of Computers', 5 th Edn., PHI, 2010.
2. Satish Jain, 'Information Technology Concepts', 4 th Edn., BPB Publications, 2006.
3. Turban, Mclean and Wetherbe, 'Information Technology for Management', 4 th EdnJohn Wiley & Sons, 2006.
4. Courter G, 'Mastering MS Office 2000 Professional', 3 rd Edn., BPB Publication, 2006.

Software Lab (Fundamentals of Computer and its Applications)

Subject Code- BMATS1-124   **L   T   P   C**   **Total Hours : 60**

                                    0   0   4   2

Course Outcomes

Students will be able to

1. Learning the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.
2. Understanding the concept of input and output devices of Computer
3. Learning concepts of Operating system and its types.
4. Gaining knowledge about various MS Office services like Word, Excel and PowerPoint.

List of following programs are as follows:

1. Familiarizing with PC and WINDOWS commands,
2. Learning file creation commands.
3. To learn to set up an email account and send and receive emails.
4. Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint.
5. Using MS-WORD Tools to create Resume.
6. Implementation of various powerpoint presentations tools.
7. Performing various excel operations.
8. Create envelopes inserting your merge fields for the recipient's name and address. Save the merged envelopes as Mail Merge Envelopes.

Recommended Books

1. V. Rajaraman, 'Fundamentals of Computers', 5 th Edn., PHI, 2010.
2. Satish Jain, 'Information Technology Concepts', 4 th Edn., BPB Publications, 2006.
3. Turban, Mclean and Wetherbe, 'Information Technology for Management', 4 th EdnJohn Wiley & Sons, 2006.
4. Courter G, 'Mastering MS Office 2000 Professional', 3 rd Edn., BPB Publication, 2006.

Calculus-II

Subject Code- BMATS1-221   **L T P   C**   **Total Hours: 90**

                                  5 1 0   6

Course Objectives

To Introduce the Concepts of Areas under curves, Volume and surfaces of revolution of curves, Definite integrals, double integrals and Green, Gauss and Stokes Theorems.

Course Outcomes

Students will be able to:

1. Apply the knowledge of advanced concepts of calculus in order to study theoretical development of different mathematical techniques and their applications.
2. Use the idea of reduction formulae enables to solve an integral problem by reducing it to a problem of solving an easier integral problem.

3. Develop the knowledge of computing the area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.

4. Extend the knowledge of scalar surface integrals, vector surface integrals, theorems of Green, Gauss and Stokes for exploring its use in physical sciences.

UNIT-I (22 hours)

Arc formula for the Cartesian equation $y=f(x)$, Other expressions for lengths of arcs, Areas under curves, Area formulas for parametric, Polar equation, Area of the closed curve, Volume and surfaces of revolution of curves, Area of the surface obtained by revolving the curve about axes.

UNIT-II (23 hours)

Integration by partial fractions, Integration of rational and irrational functions, Properties of definite integral, Reduction formulae for integrals of rational, Trigonometric, Exponential and Logarithmic function and of their

combinations, Reduction formulae for integral of the form $\int_0^{\frac{\pi}{2}} \sin^n \theta \, d\theta$, $\int_0^{\frac{\pi}{2}} \cos^n \theta \, d\theta$, $\int_0^{\frac{\pi}{2}} \sin^m \theta \cos^n \theta \, d\theta$.

UNIT-III (22 hours)

Improper Integral and special function- Beta and Gamma functions and their properties.

Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: Areas and volumes, Centre of mass and gravity.

UNIT-IV (23 hours)

Triple integrals (Cartesian), Simple applications involving cubes, Sphere and rectangular parallelepipeds, Scalar line integrals, Vector line integrals, Scalar surface integrals, Vector surface integrals, Theorems of Green, Gauss and Stokes.

Recommended Books:

1. G.B. Thomas and R.L. Finney: Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,**2002.**
2. T. Veerarajan: Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, **2008**.
3. B. V. Ramana: Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint,**2010.**
4. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 35th Edition, **2000**.
5. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, **2006**.

Algebra-II

Subject Code- BMATS1-222	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives

To Introduce the Concepts of Ring , Ideals , Ring Homomorphism , Integral domain , Division rings , Fields , Inner Product spaces and their properties .

Course Outcomes

Students will be able to:

1. Understand the concept of Rings ,Fields and their properties.
2. Analyze & demonstrate different types of algebraic structures such as sub rings , Ideals and Quotient rings to understand and use the fundamental results in Algebra.
3. Apply the concepts of isomorphism and homomorphism for rings to solve different types of problems.
4. Access the idea of inner product space and determine it's orthogonally on vector space, including gram –schmidth orthogonalisation to obtain orthonormal basis.

UNIT-I (21 hours)

Definition and examples of a ring, Its properties, Integral domains, Characteristics of ring, Division rings and Fields.

UNIT-II (21 hours)

Sub-rings, Ideals and Quotient rings, Ring homomorphism, isomorphism and related theorems.

UNIT-III (24 hours)

Field of quotients, polynomial rings, Euclidean ideal domain, Euclidean domain ,definition of fields and its properties ,subfield.

UNIT-IV(24 hours)

Inner product, Length, Inner product spaces, Orthogonality, Orthogonal projections, Cauchy-Schwartz inequality, Gram Schmidt orthogonalisation process.

Recommended books:

1. David S. Dummit and Richard M Foote, 'Abstract Algebra,' John Wiley & Sons, **2004.**

2. SurjeetSingh and Qazi Zameeruddin, 'Modern Algebra.' 7th Ed, Vikas Publishing House, New Delhi,**1993.**

3. Herstein, I.N., 'Topics in Algebra.'2nd Ed, Vikas Publishing House, **1976.**

4. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, **2002**.

5. M. Artin, Abstract Algebra, 2nd Ed., Pearson, **2011.**

6. Joseph A Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa, **1999**.

7. George E Andrews, Number Theory, Hindustan Publishing Corporation, **1984**.

8. S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer, **2005**.

ENVIRONMENTAL SCIENCES

Subject Code: BHSMC0-041   **L T P   C**   **Total Hours: 45**

                                3 0 0   3

Unit-I (08 Hours)

The Multidisciplinary nature of environmental studies, Natural Resources: Renewable and non-renewable resources

Unit-II (15 Hours)

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-III (12 Hours)

Ecosystems, Concept of an ecosystem, Structure and function of an ecosystem, Introduction, types, characteristic features of the ecosystems (a) Forest ecosystem (b) Grassland ecosystem (c) (d) Desert ecosystem (e) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- IV (10 Hours)

Environmental Pollution: Air pollution; Water pollution; Soil pollution

Recommended Books (Latest edition):

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore

2. Agarwal, K.C. **2001** Environmental Biology, Nidi Publ. Ltd. Bikaner.

3. Bharucha Erach, The Biodiversity of India, Map in Publishing Pvt. Ltd., Ahmedabad – 380 013, India,

4. Brunner R.C., **1989**, Hazardous Waste Incineration, McGraw Hill Inc. 480p

5. Clark R.S., Marine Pollution , Clanderson Press Oxford

6. Cunningham, W.P. Cooper, T.H. Gorhani , E & Hepworth, M.T. **2001**, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd. 8. Down of Earth, Centre for Science and Environment

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-041   **L T P C**   **Time Allowed: 30 Hrs.**
                               2 0 0 2

Unit-I (06 Hours)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

Unit-II (08 Hours)

Consequences of Drug Abuse: Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

Unit-III (08 Hours)

Prevention of Drug Abuse: Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

Unit- IV (10 Hours)

Treatment and Control of Drug Abuse: Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books (Latest edition):

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.

2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.

3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,1981.

4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,1985.

5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,1982.

6. IshwarModi and ShaliniModi, 'Addiction and Prevention', RawatPublications,Jaipur, 1997. 7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 &2004.

8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,2013.

9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi,1991.

10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar,2009.

11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra,Delhi, 2000.

12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press,2008.

13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017. 1

14. 'World Drug Report', United Nations Office of Drug and Crime,2016.
15. 'World Drug Report', United Nations Office of Drug and Crime,2017.

C Programming

Subject Code- BMATS1-223	L	T	P	C	Total Hours:60
	4	0	0	4	

Course Objectives

1. The intention is for the student to be able to articulate and demonstrate a basic understanding of thefundamental concepts of information technology and office tools.

2. The objective of this course is to help the students in finding solutions to various real life problems andconverting the solutions into computer program using C language (structured programming).

Course Outcomes

1. Understand the fundamentals of C programming.

2. Students should be able to write algorithms for solving various real life problems.

3. Ability to implement fundamental data structures in C.

4. Implement different operations on functions & files.

UNIT-I (16 hours)

C programming: Introduction to C language, Evolution and characteristics of C language, Character set, Keywords, Identifiers, Data types, Variables, Constants, Operators, Expressions, Type conversion and type casting, Overview of pre-processors, Structure of a C program, Input and output statements

UNIT-II (16 hours)

Control Statements: Basic programming constructs, 'if', 'if-else', 'nested-if' statements, Conditional operator, 'for', 'while', 'do - while', Switch, Break, Continue.

UNIT-III (15 hours)

Arrays and strings need for an array, Declaration and initialization, Basic operation on arrays, Multidimensional array, Structures, Union, Introduction to strings, String handling, Pointers Introduction, Declaration and initialization, Pointers and arrays: Similarities and advantages/disadvantages of using pointers.

UNIT-IV (14 hours)

Functions and Storage classes need for functions, Prototype, Function definition, Function call, Return type and Return statement, Passing arguments, Functions and arrays, Functions and pointers, Recursive functions, Difference between recursion and iteration storage classes, Files Introduction, File Operations, Character I/O, String I/O, Numeric I/O, Formatted I/O, Block I/O.

Recommended Books

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.

2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.

3. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.UNIT-II (8 Hrs.) C programming:

4. P.K Sinha, 'Computer Fundamental', 5th Edn., BPB Publication.

5. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI.

6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.

7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, New Delhi.

8. R.S. Salaria, 'Application Programming in C', Edn', Khanna Book Publishing.

Lab of C Programming

Subject Code- BMATS1-224	L	T	P	C	Total Hours:60
	0	0	4	2	

Course Objectives

1. The intention is for the student to be able to articulate and demonstrate a basic understanding of thefundamental concepts of information technology and office tools.

2. The objective of this course is to help the students in finding solutions to various real life problems andconverting the solutions into computer program using C language (structured programming).

Course Outcomes

1. Understand the fundamentals of C programming.

2. Students should be able to write algorithms for solving various real life problems.

3. Ability to implement fundamental data structures in C.

4. Implement different operations on functions & files.

List of following programs are as follows:

1. Operators: Arithmetic, Logical, Conditional, Assignment, Increment/Decrement operators

2. Decision Making: switch, if-else, nested if, else-if ladder, break, continue, go to

3. Loops: while, do-while, for

4. Functions: Definition, Declaration, Call by value, Call by reference, Recursive Function

5. Arrays: Arrays declarations, Single and multi-dimensional, Strings and string functions

6. Pointers: Pointer declarations, Pointer to function, Pointer to array.

Recommended Books

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.

2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.

3. V. Rajaraman, 'Fundamentals of Computers', 3 rd Edn., PHI.

4. P.K. Sinha, 'Computer Fundamentals', 5th Edn.', BPB Publication.

5. Brian Kernighan and Dennis Ritchie, 'C Programming Language, 2nd Edn., PHI.

6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.

7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, NewDelhi.

8. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.

Differential Equations– I					
Subject Code- BMATS1-321	**L**	**T**	**P**	**C**	**Total Hours: 90**
	5	**1**	**0**	**6**	

Course Objectives

To introduce the theoretical concepts of ordinary and partial differential equations.

Course Outcomes

Students will be able to:

1. Understand the concept of ordinary differential equation, formation and order and degree of differential equation etc.

2. Apply various methods to Solve first order non-linear differential equation and linear differential equations of higher order .

3. Apply various power series methods to find series solution of differential equations.

4. Apply differential equations to significant applied and theoretical problems.

UNIT-I (25 hours)

Elementary Methods in Ordinary Differential Equation : Degree and order of a differential equation, Formation of a differential equation, General, particular, and singular solutions , Equations of first order and first degree, Equations in which the variable are separable, Homogeneous equations, Linear equations and equations reducible to linear form, First order exact equations and integrating factors.

UNIT-II (23 hours)

First order higher degree equations solvable for x, y, p, Clairaut's form and singular solutions, Linear differential equations with constant coefficients ,method of variation of parameters ,method of undetermined

coefficients.

UNIT-III (21 hours)

Homogeneous Linear differential equation with variable coefficients: Cauchy Linear equation and Legendre linear equation. Differential Operator method: Linear dependent, Independent, Wronskian, Operator method for linear system with constant coefficients.

UNIT-IV (21 hours)

Power Series solution about an ordinary point, solutions about singular points, The method of Frobenius, Series solutions of Bessel equation and Legendre equation, Bessel function and their Integral expression & recurrence relations, Legendre Polynomials , Rodrigues's formula, Recurrence relations, Generating functions and Orthogonal properties.

Recommended books:

1. W.E.Boyce and P.C.Diprima : Elementary Differential Equations and Boundary valueproblems, John Wiley, **1986.**
2. R. K. Jain and S.R.K.Iyengar: Advanced Engineering Mathematics, 2nd Edition, Narosa Publishing House, **2003**.
3. E.L.Ince: Theory of Ordinary Differential Equations. Dover ,**1956**.
4. M. Braun, 'Differential Equations and Their Applications', 4th Edn., Springer, **2011**.
5. F. Braue and J.A. Nohel, 'The Qualitative Theory of Ordinary Differential Equations', Dover Publications, **1989**.
6. E.A. Coddington, 'Ordinary Differential Equations', Tata McGraw Hill, **2002**.

Analysis-I

Subject Code- BMATS1-322	L	T	P	C	Total Hours : 90
	5	1	0	6	

Course Objectives

To Introduce the Concepts and to Develop Working Knowledge of Sets and Functions, Binary and decimal representation of real numbers, Infinite series, Continuous functions, uniform continuity, Differentiability and Derivatives of real functions.

Course Outcomes

Students will be able to

1. Understand many properties of the real line $\mathbb{R}$, including completeness and Archimedean properties
2. Apply the ratio, root, and alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
3. Understand the concept of continuous functions, uniform continuity and discontinuity
4. Apply mean value theorem, Taylor's theorem

UNIT-I (23 hours)

Real Numbers

Preliminaries: Sets and Functions, Mathematical induction, Finite and infinite sets. Algebraic and order properties of R, Absolute value and the real line, Completeness property of R, Applications of supremum property, Archimedean property, Density of rational numbers in R, Intervals- Characterization theorem, Nested intervals, Nested interval property, The uncountability of R, Binary and decimal representation of real numbers.

UNIT-II (21 hours)

Sequences of Real Numbers

A sequence in R, The limit of a sequence, Convergence of a sequence, Uniqueness of limits, Limit theorems, Monotone sequence, Euler's number, Subsequence, Divergent criteria, Monotone subsequence theorem, Bolzano-Weierstrass theorem, Cauchy sequence, Cauchy convergence criterion, Properties of divergent sequences.

UNIT-III (22 hours)

Infinite Series

Infinite Series, Convergence of infinite series, The nth term test, Cauchy criterion for series, The harmonic series, P- series, Comparison test.

Absolute convergence, Tests for absolute convergence- The root test, The ratio test, The integral test, The Rabbe's test, Logarithmic test, Gauss test, Alternating series, Leibnitz test, Dirichlet test, Abel's test.

UNIT-IV (24 hours)

Limits and Continuity of Functions

Limits and Continuity of functions, Cluster point of a subset of R, Limit of a function at a cluster point of a set, Sequential criterion for the limits, Divergence criterion, Limit theorems, Squeeze theorem, Infinite limits.

Continuous functions, Sequential criterion of continuity, Discontinuity criterion, Combinations of continuous functions- sum, Difference, Product and quotient and compositions. Continuous functions on intervals, Boundedness theorem, Maximum-Minimum theorem, Bolzano's Intermediate value theorem, Preservation of intervals theorem.

Uniform continuity, Non-uniform continuity criteria, Uniform continuity theorem, Lipschitz functions, Continuous Extension theorem, Approximations of continuous functions by step functions and by piecewise linear functions, Weierstrass Approximation theorem.

Recommended Books:

1. ROBERT G. Bartle and Donald R. Sherbert, Introduction to Real Analysis, 3/e, John Wiley & Sons, Inc. **2000**.
2. Walter Rudin, Principles of Mathematical Analysis, 3/e, McGraw-Hill, **1976**.
3. S.C. Malik and Savita Arora, Mathematical Analysis, New Age International Publisher, Reprint **2008**.
4. T.M. Apostol, Mathematical Analysis, 2/e, Narosa Publishing House, Reprint **2002**.

Number Theory

Subject Code- BMATS1-323	L T P C	Total Hours : 90
	5 1 0 6	

Course Objectives

To introduce the concept of Division algorithm, Euclid's algorithm, Modular arithmetic, Arithmetic modulo p, Greatest integer function.

Course Outcomes

Students will be able to :

1. Find quotients and remainders from integer division, Division algorithm, Apply Euclid's algorithm for the greatest common divisor, Linear Diophantine equations, Prime numbers
2. Learn about congruence, residue classes and least residues add and subtract integers, modulo n, multiply integers and calculate powers, modulo n, Simultaneous linear congruence's
3. Familiarise with Arithmetic modulo p and related theorems, Solving congruences modulo prime powers.
4. Learn about Euler's Phi function, Euler's theorem and properties of the Phi Function

UNIT-I (25 hours)

Division algorithm, Euclid's algorithm for the greatest common divisor, Linear Diophantine equations, Prime numbers, Fundamental theorem of arithmetic, infinitude of primes, Distribution of primes, twin primes, Goldbach conjecture, Fermat primes.

UNIT-II (23 hours)

Modular arithmetic, Basic properties of congruence's, linear congruence's, Simultaneous linear congruence's, Chinese Remainder Theorem, An extension of Chinese Remainder Theorem.

UNIT-III (23 hours)

Arithmetic modulo p, Fermat's little theorem, Wilson's theorem, Pseudo-primes and Carmichael numbers, Solving congruences modulo prime powers.

UNIT-IV (19 hours)

Greatest integer function, τ and σ functions, Mobius Inversion formula, Euler's Phi function, Euler's theorem, some properties of the Phi Function.

Recommended Books:

1. D. Burton: Elementary Number Theory, Sixth Edition, McGraw-Hill.
2. Niven and Zuckerman: An Introduction To Number Theory.
3. T.M. Apostol, 'Introduction to Analytic Number Theory', Springer.
4. Paul T. Bateman, 'Analytic Number Theory', World scientific.
5. H. Rosen Kenneth, 'Elementary Number Theory', 6th Edn.
6. G.H. Hardy, 'An Introduction to the Theory of Numbers', 6th Edn.

Analytical Geometry

Subject Code- BMATS1-324	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives

Define and interpret the concepts of Transformation of axes, cone, sphere and cylinder.

Course Outcomes

Students will be able to :

1. Understand the relationship between different coordinate systems, transformation of axes and intersection of three planes.
2. Apply the knowledge to obtain the equation of cone, enveloping cone, tangent plane, reciprocal cone of given cone and prove their results.
3. Develop the equation of cylinder, right circular cylinder, enveloping cylinder.
4. Introduce the family of spheres passing through a circle, tangent planes and normal lines to a sphere and radical planes.

UNIT-I (21 hours)

Transformation of axes, Shifting of origin, Rotation of axes, Reduction of the second degree equation into standard forms by transformation of co-ordinates, Intersection of three planes, Condition for three planes to intersect in a point or along a line or to form a prism.

UNIT-II (23 hours)

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in *x, y, z,* Cone as a surface generated by a line passing through a fixed curve and fixed point outside the plane of the curve, Right circular and elliptic cones.

UNIT-III (24 hours)

Cylinder as surface generated by a line moving parallel to a fixed line and through fixed curve . Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standardforms.

UNIT-IV (22 hours)

Sphere, Section of a sphere by a plane, Spheres of a given circle, Intersection of a line and a sphere,Tangent line, Tangent plane, Power of a point w.r.t. a sphere, Radical planes.

Recommended Books

1. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry.
2. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
3. Narayan, S.: Analytical Solid Geometry, Sultan Chand & Sons (**2005**).
4. Kreyszig, E.: Advanced Engineering Mathematics.
5. Thomos, G.B. and Finney, R.L.: Calculus and Analytic Geometry

Object Oriented Programming Language Using C++

Subject Code- BMATS1-325	L	T	P	C	Total Hours: 60
	4	0	0	4	

Course Objectives

1. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of information technology and office tools.
2. The objective of this course is to help the students in finding solutions to various real life problems andconverting the

solutions into computer program using C++ language (structured programming).

Course Outcomes

1. Ability to implement programs using C++.

2. Identify classes, objects , member of class , and the relationships among them needed to solve a specific problem.

3. Understand the concept of inheritance .

4. Demonstrate the concept of polymorphism and operator overloading and file operations.

UNIT- I (13 Hrs.)

Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types. Introduction to C++: Identifier, Keywords, Constants, And Operators: Arithmetic, relational, logical, And conditional and assignment. size of operator, Operator precedence and associativity.

UNIT- II (15 Hrs.)

Classes and Objects: Class Declaration and Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer. Objects: Object as function arguments, array of objects, functions returning objects, Const member functions.

Constructors and Destructor: properties, types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes, Virtual destructors. Destroying objects. Rules for constructors and destructors. Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes.

UNIT- III (16 Hrs.)

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class. Types of Inheritance: Single, Multiple, Multilevel and Hybrid. Types of base classes: Direct, Indirect, Virtual, Abstract. Code Reusability.

UNIT- IV (16 Hrs.)

Polymorphism and Operator Overloading: Methods of achieving polymorphic behavior. Operator overloading: overloading binary operator, overloading unary operators, rules for operator overloading, operator overloading using friend function. Function overloading: early binding, Polymorphism with pointers, virtual functions, late binding, pure virtual functions and abstract base class. Introduction to File Handling.

Recommended Books:

1. E. Balagurusamy, 'Object Oriented Programming with C++', Tata McGraw Hill.

2. Deitel and Deitel, 'C++ How to Program', Pearson Education.

3. Herbert Schildt, 'The Complete Reference C++', Tata McGraw Hill.

4. Robert Lafore, 'Object Oriented Programming in C++', Galgotia Publications.

5. Bjarne Strautrup, 'The C++ Programming Language', Addition-Wesley Publication Co.

6. Stanley B. Lippman, JoseeLajoie, 'C++ Primer', Pearson Education, **2002.**

Object Oriented Programming Lab

Subject Code- BMATS1-326	**L**	**T**	**P**	**C**	**Total Hours: 60**
	0	**0**	**4**	**2**	

Course Objectives

1. The intention is for the student to be able to articulate and demonstrate a basic understanding of thefundamental concepts of information technology and office tools.

2. The objective of this course is to help the students in finding solutions to various real life problems andconverting the solutions into computer program using C++ language (structured programming).

Course Outcomes

1. Ability to implement programs using C++.
2. Identify classes, objects , member of class , and the relationships among them needed to solve a specific problem.
3. Understand the concept of inheritance .
4. Demonstrate the concept of polymorphism and operator overloading and file operations.

List of Programmes:

1. Introduction to C++: Identifier, Keywords, Constants.
2. Operators: Arithmetic, relational, logical, And conditional and assignment. size of operator
3. classes and objects: Class Declaration and Definition, Defining member functions
4. Constructors and Destructor**:** types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes, Virtual destructors.
5. Inheritance: Access Specifiers, Types of inheritance
6. Operator Overloading: overloading binary operator, overloading unary operators
7. Polymorphism: virtual functions, late binding, pure virtual functions and abstract base class
8. File Handling: Implement various file HANDLING operations.

Operational Knowledge and Implementation of numerical methods & statistical Techniques using C++ Language.

Differential Equations– II

Subject Code- BMATS1-421   **L T P C**   **Total Hours: 90**

     5 1 0 6

Course Objectives

To introduce the theoretical concepts of partial differential equations, Classification of linear partial differential equations of second order, Boundary-value problems.

Course Outcomes

Students will be able to :

1. Understand the concept of partial differential equation of first order (linear and nonlinear).
2. Solve partial differential equations (linear and nonlinear) using various methods and apply these methods in solving some physical problems.
3. Understand the formation and solution of some significant PDEs like wave equation, heat equation and diffusion equation
4. Undertake any advanced course on ordinary as well as partial differential equations

UNIT-I (22 hours)

Formation of partial differential equations, PDEs of the first order, Lagrange's method, determination of integral surfaces of linear first order partial differential equations passing through a given curve, surfaces orthogonal to given system of surfaces, non-linear PDE of first order, Cauchy's method of characteristic.

UNIT-II (21 hours)

Compatible system of first order PDE, Charpit's and Jacobi's general method of solution, Classification of linear partial differential equations of second order.

UNIT-III (24 hours)

Homogeneous and non- homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Characteristic curves of the second order PDE, Monge's methodof solution of non-linear PDE of second order.

UNIT-IV (23 hours)

Method of Solution: Separation of variables in a PDE, Laplace, wave and diffusion equations, Elementary solutions of Laplace equations.

Recommended books:

1. R. K. Jain and S.R.K.Iyengar: Advanced Engineering Mathematics, 2nd Edition, Narosa Publishing House, **2003**.

2. M. Braun, 'Differential Equations and Their Applications', 4th Edn., Springer, **2011**

3. Elements of Partial Differential Equation (3rd edition) – I. N. Sneddon, McGraw Hill Book Company, **1998**.

4. Partial Differential Equations (2nd edition) – E. T. Copson, Cambridge University Press, **1995**.

5. J.N. Sharma and K. Singh, Partial differential equations for engineers and scientists, 2nd Edition, Narosa Publication House, New Delhi, **2009**

Analysis-II				
Subject Code- BMATS1-222	**L**	**T**	**P**	**C**	**Total Hours: 90**
	5	**1**	**0**	**6**	

Course Objectives

To work comfortably with Differentiation, Reimann Integral , Sequences of Functions , Series of functions

Course Outcomes :

Students will be able to:

1. Apply Mean Value theorem, Rolle's Theorem in real life problems

2. Understand Properties of Riemann Integral and various theorems of Riemann integral.

3. know the sequences of functions and their Convergence.

4. Series of functions.

UNIT-I (24 hours)

Differentiation

Differentiability and Derivatives of real functions, Differentiability and Continuity, Basic properties of the derivatives, Caratheodory theorem, Chain rule, Inverse functions and their derivatives, Rolle's theorem, Mean Value theorem, Applications of mean value theorem, Intermediate value property of derivatives, Darboux's theorem, Indeterminate forms, L'hospital rules, Taylor's theorem, Applications of Taylor's theorem.

UNIT-II (23 hours)

Riemann Integral

Riemann Integral Definition of Riemann integral, Its examples and properties, Bounded theorem, Riemann integrable functions, Cauchy criterion, The Squeeze theorem, Classes of Riemann integrable functions, Additivity theorem, Fundamental theorem- first and second form, Substitution theorem, Lebesgue's integrability criterion, Composition theorem, Product theorem, Approximate integration, The trapezoidal rule, Simpson's rule.

UNIT-III (21 hours)

Sequences of Functions

Sequences of Functions Point wise and Uniform convergence, Interchange of limit and continuity, Interchange of limit and derivatives, Interchange of limit and integral, Bounded convergence theorem, Dini's theorem, The exponential functions logarithmic functions, trigonometric functions.

UNIT-IV (22 hours)

Series of Functions

Absolutely and uniformly convergent series of functions defined on a domain, Interchange of integral and summation, Tests for uniform convergence—Cauchy criterion, Weierstrass M-test, Power series, Radius of convergence, Cauchy hadamard theorem, Term by term differentiation, Taylor's series.

Recommended Books:

1. ROBERT G. Bartle and Donald R. Sherbert , Introduction to Real Analysis, 3/e, John Wiley & Sons, Inc. 2000.

2. Walter Rudin, Principles of Mathematical Analysis, 3/e, McGraw-Hill, **1976**.

3. S.C. Malik and Savita Arora, Mathematical Analysis, New Age International Publisher, Reprint **2008**.

4. S. Shirali & H.L. Vasudeva, Metric Spaces, Springer, **2006**.

5. T.M. Apostol, Mathematical Analysis, 2/e, Narosa Publishing House, Reprint **2002**.

Subject Code- BMATS1-423	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives

Construction and use of numerical systems, Influence of data representation and computer architectures on algorithms choice and development, use numerical methods for solving a problem, locate and use good mathematical software, get the accuracy you need from the computer, assess the reliability of the numerical results, and determine the effect of round off error or loss of significance.

Course Outcomes

Students will be able to

1. Learn various types of numerical methods to find the roots of nonlinear equations and solution of a system of linear equations.
2. Find values for a tabulated function using Interpolation techniques.
3. Apply these numerical methods to solve ordinary differential equation.
4. Introduce the basic concepts of Numerical Mathematics to solve the problems arising in science and engineering etc.

UNIT-I (24 hours)

Solution of Non Linear equations: Algorithms, Convergence, Bisection method, False position method, Fixed point iteration method, Newton raphson method, Secant method.

Solution of simultaneous equations: Gauss Elimination , Gauss Jordan , LU decomposition, Gauss Jacobi, Gauss-Siedel and Rayleigh's power method.

UNIT-II (23 hours)

Interpolation: Finite differences, Newton Gregory forward and backward formula, Lagrange's formulae, Newton divided difference formula, Central differences, Hermite interpolation.

UNIT-III (21 hours)

Numerical differentiation and integration: Differentiation at tabulated and non-tabulated points, Maximum and minimum values of tabulated function, Newton-Cotes Formulae-Trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ formula, Boole's and Weddle's rules of integration, Romberg integration, Gaussian integration.

UNIT-IV (22 hours)

Solution of Ordinary differential equation: Taylor series and Picard's methods, Euler and modified Euler methods, Runge–Kutta methods, Predictor- Corrector methods: Adams-Bashforth and Milne methods.

Recommended Books:

1. B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, India**, 2007**.
2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 5th Ed., New age International Publisher, India, **2007**.
3. S.D. Conte and C. De Boor, 'Elementary Numerical Analysis: An Algorithmic Approach', 3rdEdn, Mc Graw Hill, New York, **1980.**
4. J.B. Scarborough, Numerical Mathematical Analysis, Oxford & IBH Publishing Co., **2001.**

Theory of Probability

Subject Code- BMATS1-424	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives

To introduce the concept of random variables, distribution functions, various probability distributions, and concepts in testing of statistical hypotheses.

Course Outcomes

Students will be able to

1. Understand and use the concept of probability theory and statistics to solve industrial problems
2. Define and examine the random sampling and graphical methods with technology
3. Recognize and compute the sampling distributions, sampling distributions of means and variances (S2) and the t and F-distributions
4. Recognize the relationship between the confidence interval estimation and tests of hypothesis.

UNIT-I (22 hours)

Classical and axiomatic approach to the theory of probability, additive and multiplicative law of probability, conditional probability and Independent events, mutually and pair wise independent events, Baye's theorem, problems Bayes theorem,

UNIT-II (23 hours)

Concept of real random variable one dimensional (discrete and continuous), function of random variable and their distributions, probability mass function, probability density function, cumulative distribution function, Expectation and moments, moment generating function and its properties.

UNIT-III (23 hours)

Study of various discrete and continuous distributions: Binomial Distribution, Poisson Distribution, Poisson approximation to the binomial distribution, Normal Distribution.

UNIT-IV (22 hours)

Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, conditional expectations, independent random variables.

Recommended Books:

1. R.V. Hogg & Craige , 'Introduction to Mathematical Statistics', 7th Edn.,**2005**
2. S.C. Gupta, V.K. Kapoor, 'Fundamental of Mathematical Statistics', 7th Edn., S. Chand, **1990**.
3. Goon, Gupta and Das Gupta, 'Fundamentals of Statistics', 5th Edn., World Press, **1975**.
4. V.K. Rohatgi, 'Introduction to Probability Theory & Mathematical Statistics', **2009**.
5. Goon, Gupta and Das Gupta, Fundamentals of Statistics, Edition, Publisher, World Press, **1975**.

Programming with Python

Subject Code- BMATHS1-425   L   T   P   C   **Total Hours: 45**
                                        3   0   0   3

Course Outcomes
Students will be able to:

1. To learn and understand Python programming basics and paradigm.
2. Understand python loops, Control statements and string manipulations.
3. Design user defined functions, modules, and packages.
4. Learn Object Oriented Programming Concepts.

UNIT-I (10 hours)

Introduction to Python Programming Language: Programming Language, History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python Structure of a Python Program, Python Statement, Indentation, Documentation

Elements of Python: Keywords, Identifiers, Operators, Precedence and associativity of operators,Variables, Expressions and assignment statements, Data Types, Python Input and

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Output Functions, Import command.

UNIT-II (12 hours)

Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Strings.
Control Structures: Decision making statements, Python loops, Python control statements.

UNIT-III (13 hours)

Python Functions: Functions, Advantages of Functions, Built-in Functions, User defined functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables.
Python Modules: Module definition, Need of modules, Creating a module, Importing module, Standard Modules.

UNIT-IV (10 hours)

Objects and Their Use: Introduction to Object Oriented Programming, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes.

Recommended books:

1. Martin C. Brown ,Python The complete Reference, Mc Graw Hill Education,2018.
2. Hamilton, Naomi. "The A-Z of Programming Languages: Python",2008.
3. Downey, Allen B. Think Python: How to Think Like a Computer Scientist (Version 1.6.6 Ed.),2012.
4. Pilgrim, Mark Dive into Python 3. Apress,2009.

Software Lab (Programming with Python)

Subject Code- BMATHS1-426

L	T	P	C		Total Hours: 30
0	0	2	1		

Course Outcomes
Students will be able to:

1. To learn and understand Python programming basics and paradigm.
2. Understand python looping, control statements and string manipulations.
3. Design user defined functions, modules, and packages.
4. Learn Object Oriented Programming Concepts.

List of following programs are as follows:

1. Compute sum, subtraction, multiplication, division and exponent of given variables input by the user.
2. Compute area of following shapes: circle, rectangle, triangle, square, trapezoid and parallelogram.
3. Write a program to determine whether a triangle is isosceles or not?
4. Print multiplication table of a number input by the user.
5. Print Fibonacci series up to n numbers e.g. 0 1 1 2 3 5 8 13.....n
6. Compute the factorial of a given number.
7. Perform following operations on a list of numbers: 1) Insert an element 2) delete an element 3) sort the list 4) delete the entire list.
8. Design a Python class named Rectangle, constructed by a length & width, also design a method which will compute the area of a rectangle.

Recommended books:

1. Martin C. Brown ,Python The complete Reference, Mc Graw Hill Education,2018.
2. Hamilton, Naomi. "The A-Z of Programming Languages: Python",2008.
3. Downey, Allen B. Think Python: How to Think Like a Computer Scientist (Version 1.6.6 Ed.),2012.

4.   Pilgrim, Mark Dive into Python 3. Apress,2009.

Linear Algebra

Subject Code- BMATS1- 521	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives

To introduce the theoretical concepts linear transformations, Range, Null space, Eigen values and Eigen vectors, Invertibility and Isomorphisms.

Course Outcomes

Students will be able to :

1. Understand the basic concepts of linear transformations, the Rank-Nullity Theorem, matrix of a linear transformation, algebra of transformations and the change of basis.
2. Analyze & solve problems related to Matrices, Quotient space, Homomorphism & Isomorphism of vector space and Null space etc.
3. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, using rank.
4. Find eigenvalues and corresponding eigenvectors for a square matrix.

UNIT-I (23 hours)

Binary space, Definition of group, Ring and field, Vector space, Subspace, Linear combination, Linear span, Dimension of vector space, Direct sum of spaces, Quotient space.

UNIT-II (23 hours)

Linear Transformation, Null space, Range space, Rank nullity theorem, Product of linear transformation,, Representation of linear transformations by matrices, Change of basis, Singular and non singular transformation ,Isomorphism of vector space, Canonical forms, Jordan forms, Triangular forms ,Dual space.

UNIT-III (23 hours)

Matrices, Row and Column Space of Matrix, Row reduction and echelon forms, Rank, Systems of linear equations, Determinants and their properties, Cramer's rule, Vector equations, The matrix equation $AX = B$, Solution sets of linear systems (Homogeneous & Non homogeneous), Applications of linear systems.

UNIT-IV (21 hours)

Eigen value & Eigen vectors of linear transformation ,Characteristic polynomial, Characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding the inverse of a matrix, Minimal polynomial, Diagonalization, Linear transformations.

Recommended Books:

1. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., Prentice-Hallof India Pvt. Ltd., New Delhi, **2004**.
2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, IndianReprint, **2007.**
3. S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer, **2005**.
4. Gilbert Strang, Linear Algebra and its Applications, Thomson, **2007**.
5. Marc Lipson and Seymour Lipschutz , SCHAUM'S outlines Linear Algebra Fourth Edition Schaum's Outline Series, **1968** by The McGraw-Hill Companies

DIFFERENTIAL GEOMETRY

Sub. Code: BMATS1-522	L	T	P	C	Total Hours: 90
	5	1	0	6	

Course Objectives: The course aims to introduce space curves and their intrinsic properties of a surface and

geodesics. Further the non-intrinsic properties of surfaces are explored.

Course Outcomes:

1. Students will be at ease to understand the various curves in space
2. Students will be able to understand the behavior of the curves in various Situations.
3. Students will be able to understand the Concept of surface
4. Students will be able to understand geodesics.

UNIT-I (21 Hrs.)

Curves in Space: Space curves, Path, Arc length, Tangent line, Contact of nth order of a curve and surface, Plane of curvature, Tangent plane at any point of the surface f(x ,y , z)=0.The Principal normal and bi-normal, Definitions of curvature, Torsion and screw- curvature, Serret -Fernet Formulae, To find curvature and torsion of curve, Helices.

UNIT-II (22 Hrs.)

Intrinsic equations, Fundamental theorems for space curves, the circle of curvature, Osculating sphere, Behaviour of curve in the neighborhood of a point, Involute and Evolute.

UNIT-III (23 Hrs.)

Concept of a Surface and Fundamental Forms: Concept and Definition of a surface, Curvilinear equations of the curve on the surface, Parametric curves, Tangent plane and normal, First and Second Fundamental Form, Derivatives of N, Weingarton equations, Angle between parametric curves, Direction coefficients, Angle between any two intersecting curves on the surface.

UNIT-IV (24 Hrs.)

Geodesics: Geodesics, Differential equation of geodesics, Normal property of geodesics, Geodesics curvature, Gauss bonnet theorem, Torsion of geodesics, Geodesics on Geodesics parallel.

Recommended Textbooks/ Reference Books:

1. T. J. Willnore, An Introduction to Differential Geometry, Dover Publications, **2012**
2. D. Somasundaram, Differential Geometry: A First Course, Alpha SciencePublishers, **2008.**
3. S. Kobayashi and K. Nomizu, ,Foundations of Differential Geometry, Interscience Publishers, **1963.**
4. D.T. Struik, ,Lectures on Classical Differential Geometry, Addison - Wesley,Mass, **1950.**
5. Martin M. Lipschutz, „Differential Geometry" Schaum"s Outlines, McGraw HillEducation, **2012.**
6. Taha Sochi, „Introduction of Differential Geometry of space Curves"Createsapce Independent Pub, McGraw-Hill Education, **2017.**
7. C E Weatherburn, "Differential Geometry of Three Dimensions "Cambridge University Press, **2016.**

MECHANICS					
Sub. Code: BMATS1-523	**L**	**T**	**P**	**C**	**Total Hours: 90**
	5	**1**	**0**	**6**	

Course Objectives: The course will give introduction to Mechanics. This theory and its applications are an excellent example of how physics and mathematics work hand in hand to give a complete picture of the real problems.

Course Outcomes:

Students will be able to :

1. Thorough understanding of dynamics is essential to understanding any modern development of Physical sciences.
2. Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton.

3. Reduction of two-body central force problem to an equivalent one-body problem, Central force motion in a plane.

4. Mechanics and its applications are an excellent example of how physics and mathematics work hand in hand to give a complete picture of the real problems.

UNIT-I (23 Hrs.)

Langrangian Dynamics: Basic concepts, Constraints, Generalized coordinates, Holonomic and non-holonomic systems, scleronomic and rheonomic systems, Generalized potential, Lagrange's equation of first kind and second kind. Guage invariance of the Lagrangian.

UNIT-II (22 Hrs.)

Hamiltonian Dynamics: Hamilton canonical equation, cyclic coordinates, Routh's equation Hamiltonian function and Conservation of energy, Hamilton's equations in different coordinate systems, Principle of least action.

UNIT-III (23 Hrs.)

Two-Body Central Force Problem: Reduction of two-body central force problem to an equivalent one-body problem, Central force motion in a plane, Equations of motion under central force and First integrals, Differential equation of an orbit, Inverse square law of force, Kepler's laws of planetary motion and their deduction, Stability of orbit under central force, Virial theorem.

UNIT-IV (22 Hrs.)

Poisson brackets and Lagrange brackets:- Poisson brackets, Poisson's identity , Jacobi – Poisson theorem, Lagrange bracket, condition of canonical character of transformation in terms of Lagrange bracket and Poisson bracket, Poincare – carton integral invariant, invariance of Lagrange bracket and Poisson brackets under canonical transformation.

Recommended Textbooks/ Reference Books:

1. John L. Synge and Byron A. Griffith: Principles of Mechanics 3rd Edition McGraw-Hill international, **2000**.
2. J C Upadhyay, 3rd Edition „Classical-Mechanics" Himalaya Publication House,**2014**.
3. J. G. Chakraborty, and P R Ghosh, Advanced Analytical Dynamics, U.N. Dhur &Sons,**1982.**
4. F. Chorltan, Textbook of Dynamics, Published by Van Nostrand NJ, **1967.**
5. Lev. D. Elsgolc: Calculus of Variations, Dover Publication, **2007.**

MATLAB

Sub. Code: BMATS1-524	**L T P C**	**Total Hours: 45**
	3 0 0 3	

Course Objectives: Students will be able to integrates computation, visualization, and programming in an easy-to-use environment, being able to develop algorithms, Data analysis, exploration and visualization.

Course Outcomes:

1. Use MATLAB for Basic mathematics computations
2. Creating M-files , working with script tools and also writing script file
3. Program scripts and functions using the MATLAB development environment, Able to use basic flow controls (if else, for, while).
4. Use MATLAB for calculus , numerical integration and other mathematical operations

UNIT-I (12 hrs.)

Introduction to MATLAB , MATLAB software: Introduction, MATLAB window, command window , workspace ,command history ,basic commands ,operation with variables . Data Files and data types, Basic Mathematics: BODMAS RULES, Arithmetic operations, Mathematical and logical operators, solving arithmetic equations. Basic matrix operations.

UNIT-II (18 hrs.)

Other Operations: trigonometric functions, complex numbers, fractions, real numbers Functions: Writing user defined functions, Built in Function, Function Calling, Return value, Types of functions, Global variables. M files: Working with script tools, Writing Script File, Executing script file, The MATLAB editor, Saving M file.

UNIT-III (12 hrs.)

MATLAB Programming: Automating commands with Scripts, Writing programmes with logic and flow control, Writing functions, Control and conditional Statement programming. Loops and Conditional Statement: Control flow Conditional control: if , else , switch; Loop control- for, while, continue , break , programming termination – return.

UNIT-IV (18 hrs.)

Symbolic Math in MATLAB: calculus: numerical integration, linear algebra, roots of polynomials, algebraic equations, differential equations, transforms (Laplace and Fourier).

Recommended Text Books/ Reference Books:

1. Andrew knight, "Basics of MATLAB and beyond", Chapman and Hall/Crc,1stEdition **1999.**
2. Stephen .J. Chapman ,MATLAB Programming for engineers`, 4th Edition, **2007**.
3. Brian.R.Hunt `A Guide To MATLAB`, 3rd Edition, **2014**.
4. Rudra Pratap Singh, Getting Started with MATLAB: A Quick Introduction for Scientists &Engineers, **2010**.

MATLAB LAB

Sub. Code: BMATS1-525	L	T	P	C	Total Hours: 30
	0	0	2	1	

Course Objectives:

1. Understanding the MATLAB environment.
2. Being able to do simple calculations using MATLAB.
3. Being able to carry out simple numerical computations and analyses using MATLAB.

Course Outcomes: Upon successful completion of this course, the student should be able to:

1. Understand the main features of the MATLAB development environment
2. Design simple algorithms to solve problems
3. Write simple programs in MATLAB to solve scientific and mathematical problems
4. Understand the main features of the MATLAB/SCILAB program development environment

EXPERIMENTS

To develop algorithms/ programming in MATLAB language for following:

1. Study of basic matrix operations
2. Solve linear simultaneous equations
3. Determine eigen value and eigen vector of square matrix
4. Euler's method and Modified Euler's Method
5. Picard Method
6. 4th order Runge – Kutta method
7. Determine roots of polynomial
8. Simpson's 1/3 and 3/8 rules for numerical integration
9. Trapezoidal Method

Note: At least eight must be performed from the list

Recommended Textbooks/ Reference Books:

1. Andrew knight, "Basics of MATLAB and beyond", Chapman and Hall/Crc,1ˢᵗ Edition **1999**.
2. Stephen .J. Chapman ,`MATLAB Programming for engineers`4ᵗʰ Edition **2007**.
3. Brian.R.Hunt `A Guide To MATLAB`3ʳᵈ Edition, **2014**.
4. Rudra Partap Singh ,Getting Started with MATLAB: A Quick Introduction for Scientists& Engineers, **2010**.

COMPLEX ANALYSIS

Sub. Code: BMATS1-621   **L   T   P   C**   **Total Hours: 90**
                                   5   1   0   6

Course Objectives: The course aims to introduce the basic ideas of analysis for complex functions in complex variables which includes differentiability and geometrical representation of complex functions. The course also discuss the expansion of complex function in form of series.

Course Outcomes:

Students will be able to

1. Understand calculus of complex functions also concept and consequences of analyticity and Cauchy-Riemann equations .
2. Understanding Geometrical interpretation of Complex functions especially bilinear and conformal transformations.
3. Formulation of analytic functions and their applications.
4. Represent complex functions as Taylor, power and Laurent series, classification of singularities .

Unit-1 (21 HOURS)

Limits, continuity and derivatives of the function of complex variable, Analytic function, Necessary and sufficient conditions for analytic functions, Cauchy-Riemann equations, C-R equations in polar form.

Unit-II (23 HOURS)

Harmonic functions, Conjugate functions, Applications of Milne Thomson Method,Application to flow problems, Stereographic projection

Unit-III (23 HOURS)

Geometrical representation of $w = (z)$, Standard Transformations, Bilinear Transformatios , Conformal transformations.

Unit –IV (23 HOURS)

Expansion of f(z), Taylor's series, Laurent's Theorem, Zeros and singularities of analyticfunctions.

Recommended Books:

1. Brown, James Ward, & Churchill, Ruel V. **(2014).**"*Complex Variables and Applications* (9th ed.)", McGraw-Hill Education, New York.
2. Bak, Joseph & Newman, Donald J. **(2010)**. "*Complex analysis* (3rd ed.)". Undergraduate Texts in Mathematics, Springer. New York.
3. Zills, Dennis G., & Shanahan, Patrick D. **(2003)**. "*A First Course in Complex Analysiswith Applications"*. Jones & Bartlett Publishers, Inc.
4. "Higher Engineering Mathematics" B.S Grewal, Khanna Publishers ,Edition 35ᵗʰ.

DISCRETE MATHEMATICS

Sub. Code: BMATS1-622   **L   T   P   C**   **Total Hours: 90**
                                   5   1   0   6

Course Objectives: The objective of this course is to make the students familiar with the basic concepts in Discrete Mathematics and Graph Theory.

Course Outcomes:

1. Significant concepts of partial order relations, Recurrence relations, Boolean algebra, Lattices and Graph Theory.
2. To understand logical concepts and to show logical equivalences by using truth tables and rules in logics.
3. Appreciate the definition and basics of graphs along with types and their examples.
4. Understand the definition of a tree and learn its applications to fundamental circuits. Know the applications of graph theory to network flows. Relate the graph theory to the real-world problems.

UNIT-I (21 Hrs.)

Partial order relations, Chains and anti-chains, Pigeon hole principle, Principle of inclusion and exclusion, Analysis of algorithms-Time complexity. Complexity of problems, Discrete numeric functions and Generating functions.

UNIT-II (24 Hrs.)

Recurrence relations and Recursive algorithms, Linear recurrence relations with constant coefficients. Homogeneous solutions, Particular solution, Total solution, Solution by the method of Generating functions.

UNIT-III (23 Hrs.)

Boolean Algebra-Lattices as ordered sets and as Algebraic structures. Duality. Distributive and Modular lattices. Boolean lattices and Boolean algebras. Boolean functions and expressions. Prepositional calculus. Design and implementation of digital networks. Switching circuits.

UNIT-IV (22 Hrs.)

Graph Theory: Graphs and Planar graphs-Basic concept. Biparite multigraphs. Weighted graphs. Paths and circuits, Shortest paths. Eulerian and Hamiltonian trails and cycles, Theorems related to eulerian and hamiltanion graph, Travelling salesman problem. Planar graphs. Trees.

Recommended Text Books/ Reference Books:

1. C. L. Liu, "Elements of Discrete Mathematics", 2nd Edition, McGraw Hill, International Edition, Computer Science Series, **1986**.
2. Dr. Babu Ram, "Discrete Mathematics", Pearson Education India; First edition **2010.**
3. B A. Davey and H. A. Priestley, "Introduction to Lattices and Order", CambridgeUniversity Press, Cambridge, **1990**.
4. Edgar G. Goodaire and Michael M. Parmenter, "Discrete Mathematics with GraphTheory", 2nd Edition , Pearson Education (Singapore) P. Ltd. , Indian Reprint 2003.
5. Dr. Satinder Pal Gupta and Dr. C.P. Gandhi , "Discrete Structures" ,Fourth edition ,University Science Press,**2009.**

LINEAR PROGRAMMING AND OPTIMIZATION

Sub. Code: BMATS1-623   **L   T   P   C**   **Total Hours: 90**
                                        5   1   0   6

Course Objectives: To introduce the basic concepts of linear programming among the students for its applications in solving optimization problems.

Course Outcomes:

Students will able to:

1. Introduce and formulate linear programming models of real life situations.
2. Understand the selection and implementation of graphical solution and variants of simplex method for the solution of LPP.
3. Develop the relationships between the primal and dual problems and their solutions.
4. Apply the knowledge to solve two-person zero-sum game problems.

UNIT-I (23 hrs.)

System of Linear Equations, Linear independence and dependence of vectors, Concept of basis, Basic feasible solution, Convex sets. Extreme points, Hyperplanes, Introduction and formulation of linear programming problem (LPP), Solution of LPP using graphical method: Unbounded solution, infeasible solutions.

UNIT-II (23 hrs.)

Standard form of LPP, Slack, surplus and artificial variables, Optimal solution of LPP using Simplex, Big-M and two phase computational procedure, Exceptional cases in LPP i.e., Infeasible, unbounded, alternate and degenerate solutions.

UNIT-III (22 hrs.)

Duality in Linear Programming: General Primal- Dual pair, Formulating a dual problem from primal problem, Duality theorems, Complementary slackness theorem, Duality and simplex method, Dual simplex method.

UNIT-IV (22 hrs.)

Game Theory: Two person zero sum games, pure strategies (minimax and maximin principles), Game with saddle point, Mixed strategies: Game without saddle point, Rule of Dominance, Solution methods for games without saddle point: Graphical method, Linear programming method.

Recommended Text Books/ Reference Books:

1. G. Hadley: "Linear Programming", Narosa, Reprint, **2002**.
2. Kanti Swarup, P.K. Gupta and Man Mohan, "Operations Research", 9th Edn., Sultan Chand & Sons, **2002.**
3. Hamdy A. Taha, "Operations Research-An Introduction", Prentice Hall, 9th Edition, **2010**.
4. Martin Osborne, "An Introduction to Game Theory", Oxford University Press, **2003**.
5. F.S. Hillier. G.J. Lieberman: "Introduction to Operations Research- Concepts and Cases", 9th Edition, Tata Mc-Graw Hill, **2010**.
6. S. D. Sharma ,Himanshu Sharma, Operations Research: Theory, Methods and Applications
   Kedar Nath Ram Nath, **2010**.

MATHEMATICAL METHODS				

Sub. Code: BMATS1-624	L T P C			Total Hours: 90
	5 1 0 6			

Course Objectives: The course aims to provide students with adequate knowledge of methods to find exact or approximate solutions of their problems through various methods.

Course Outcomes:
Students will be at able to learn:
1. Fourier series and its applications.
2. Fourier transform and its applications to P.D.E
3. Laplace transform and its applications to solutions of integrals and Differential Equations.
4. Z-transforms and inverse Z-transforms and its importance in context of Difference equations

Unit I (25 hrs.)

Fourier Series: Dirichlet's conditions, Expansion of functions in the form of Fourier Series, Even and Odd functions, half range series, Complex Fourier Series, practical harmonic analysis.

Unit II (23 hrs.)

Fourier transforms: Fourier integrals, Fourier transforms (finite and infinite), Inverse Fourier transforms, Parseval's identities, Convolution theorem.

Unit III (24 hrs.)

Laplace transforms: Definition, Laplace transform of standard functions, Laplace transform of derivatives and

integrals, Inverse Laplace transform, Convolution theorem, Unit step function, Application of Laplace transforms to boundary value problems.

Unit IV (18 hrs.)

Z - transforms: Difference equations, Basic definition of Z transform, Z- transform of standard functions, Shifting rules, Initial and final value theorems, Inverse Z- transforms, Application of Z- transform to solve difference equations.

Recommended Textbooks/ Reference Books:

1. R. K. Jain & S.R.K. Iyengar: Advanced Engineering Mathematics (Narosa Publishing House), 2nd Edition, **2003**.
2. Sokolnikoff and Redheffer: Mathematics for Physics and Engineering, Mc Graw Hill, 2nd Edition, **1966**.
3. Erwin Kreyszig: Advanced Engineering Mathematics (Wiley EasternLimited), 8th Edition, **2006**.
4. George B. Thomas, Jr, Ross L. Finney: Calculus &Analytic Geometry, PearsonPublication, **2016.**

Pre-Ph.D. (Mathematics)		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MREM0-101	Research Methodology	4	0	0	40	60	100	4
PMAT1-101	Numerical Analysis Lab	0	0	4	100	00	100	2
PMAT1-104	Seminar	0	0	2	100			1
PREPE0-101	Research and Publication Ethics	2	0	0	40	60	100	2
Departmental Electives (Choose any two subjects)		4x2	0	0	40x2	60x2	100x2	4x2
PMAT1-102	Advanced Numerical Analysis							
PMAT1-103	Fourier Analysis and its Applications							
PMAT1-105	Partial Differential Equations							
PMAT1-106	Mathematics Statistics							
PMAT1-107	Methods in Operations Research and Information Theory							
Total		14	0	6	260	240	600	17

RESEARCH METHODOLOGY

Subject Code: MREM0-101 L T P C **Duration: 60Hrs.**
4 0 0 4

UNIT–I (15 Hrs.)

Introduction to Research: Meaning, Definition, Objective and Process.
Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental.
Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem, Review of Literature.
Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.
Hypothesis: Types, Formulation of Hypothesis, Feasibility, Preparation and Presentation of Research Proposal.

UNIT–II (15 Hrs.)

Sources of Data: Primary and Secondary, Validation of Data
Data Collection Methods: Questionnaire Designing, Construction.
Sampling Design & Techniques – Probability Sampling and Non Probability Sampling.
Scaling Techniques: Meaning & Types.
Reliability: Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability.
Validity: Content Validity, Criterion Related Validity and Construct Validity.

UNIT–III (15Hrs)

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation.
Analysis of Data: Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Partial, Regression: Simple and Multiple Regression, Skewness, Time series Analysis, Index Number.
Testing of Hypothesis: T-test, Z- test, Chi Square, F-test, ANOVA.

UNIT – IV (15 Hrs.)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi-Dimensional Scaling.
Report Writing: Essentials of Report Writing, Report Format.

Statistical Software: Application of Statistical Softwares like SPSS, MS Excel, Mini Tab or MATLAB Software in Data Analysis.

*Each Student has to Prepare Mini Research Project on Topic/ Area of their Choice and Make Presentation. The Report Should Consists of Applications of Tests and Techniques Mentioned in The Above UNITs

Recommended Books:

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7thEdn. Pearson Education New Delhi.
2. N.K. Malhotra, 'Marketing Research – An Applied Orientation', 4thEdn.,Pearson Education NewDelhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, NewDelhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', HimalayaPublishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education, New Delhi
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2ndEdn.,New Age InternationalPublishers.

NUMERICAL ANALYSIS LAB.

Subject Code: PMAT1-101　　　　**L T P C**　　　　　　**Duration: 60Hrs.**

0　0　4　2

Course Objectives
To use numerical methods for solving a problem, locate and use good mathematical software, get the accuracy you need from the computer, assess the reliability of the numerical results, and determine the effect of round off error or loss of significance.

Course Outcomes
1. Solve numerically algebraic equations, linear systems of equations, ordinary and partial differentialequations, eigenvalue problems & Carry out numerical differentiation, integration and interpolation.
2. Develop understanding of numerical error and applicability of a particular method.

The following programs of following methods are to be practiced:
1. To find a real root of an algebraic/ transcendental equation by using Bisection method.
2. To find a real root of an algebraic/ transcendental equation by using Regula-Falsi method.
3. To find a real root of an algebraic/ transcendental equation by using Newton-Raphson method.
4. To find a real root of an algebraic/ transcendental equation by using Iteration method.
5. Implementation of Gauss- Elimination method to solve a system of linear algebraic equations.
6. Implementation of Gauss Jordan method to solve a system of linear algebraic equations.
7. Implementation of Gauss-Seidel method to solve a system of linear algebraic equations.
8. Implementation of Newton's Forward interpolation formula to find tabulated values.
9. Implementation of LaGrange's interpolation formula to find tabulated values.
10. Implementation of Newton's Divided Difference formula to find tabulated values.
11. To evaluate double integrals by using Trapezoidal and Simpson method.
12. To compute the solution of ordinary differential equations by using Euler's method.
13. To compute the solution of ordinary differential equations by using Runge -Kutta methods.
14. To find differential equation using Picards method.

15. To compute the solution of ordinary differential equations by using Milne-Simpson method.

Recommended Books

1. E. Balagurusamy, 'Object Oriented Programming with C++', Tata McGraw Hill, New Delhi, **1999.**

2. J.N. Sharma, 'Numerical Methods for Engineers and Scientists', 2nd Edn., Narosa Publishing House,New Delhi/ Alpha Science International Ltd. Oxford UK, **2007.**

3. Conte and de Boor, 'Numerical Analysis', McGraw Hill, New York, **1990.**

4. John H. Mathews, 'Numerical Methods for Mathematics, Science and Engineering', 2nd Edn.,Prentice Hall, New Delhi, **2000.**

SEMINAR

Subject Code: PMAT1-104	L T P C	Duration: 30Hrs.
	0 0 2 1	

The Pre-PhD course work candidate will do literature review of minimum 10 research paper of reputed journals related to his/her research field and will finally present the seminar.

The student has to do literature review of minimum 10 research paper of that topic of reputed journals and will finally present the seminar.

RESEARCH AND PUBLICATION ETHICS

Subject Code- PREPE0-101	L T P C	Duration: 30Hrs
	2 0 0 2	

UNIT – I (5 Hrs)

Introduction to Philosophy: Definition, Nature and Scope, Concept and Branches.

Ethics – Definition, Moral Philosophy, Nature of Moral Judgements and Reaction, Ethics with respect to Science and Research.

UNIT -II (6 Hrs)

Intellectual Honesty and Research integrity.

Scientific Misconduct: Falsification, Fabrication and Plagiarism.

Redundant Publications: Duplicate and Overlapping Publication, Salami Slicing Selective reporting and misrepresentation of data.

Database: Indexing Databases, Citation Databases – Web of Science, Scopus etc.

Research Metrics: Impact Factor of Journal as per journal citation report, SNIP, SJR, IPP, Cite Score.

Metrics – H-Index, i10-Index, g-Index, Altmetrics.

UNIT -III (9 Hrs)

Publication Ethics- Definition, Introduction and Importance Best Practices/Standard Settings initiatives and guidelines: COPE, WAME etc. Conflict of Interest Software to identifypredatory publications developed by SPPU.

Journal Finding / Journal Suggester Tools – Elsevier Journal Finder, Springer Journal Suggester etc.SHERPA/RoMEO online resource to check publisher copyright & Self Archiving Policies.

UNIT -IV (10 Hrs)

PublicationMisconduct–Definition,Concept,Problemsthatleadtounethicalbehaviour and vice-versa Violation of Publication ethics and authorship and contributorship, Identification of PublicationMisconduct,ComplaintsandAppeal-ExamplesandFraudfromIndiaandAbroad, Predatory

Publishers and Journals.

Use of Plagiarism Software like Turnitin, Urkund and other open source software tools.

Recommended Books

- Bird A. (2006) Philosophy of Science Roultedge
- MacIntyre Alasdair (1967) A Short History of EthicsLondon
- P. Chaddah (2018) Ethics in competitive Research: Do not get scooped; Donot get plagiarized, ISBN:9789387480865
- National Academy of Sciences, National Academy of Engineering and Institute of Medicine, (2009) On being a scientist: A Guide to Responsible Conduct in research: Third edition, National Academies Press.
- Resnik,D.B.(2011)Whatisethicsinresearchandwhyitissoimportant,NationalInstitute of Environmental Health Sciences,1-10
- Beall, J. (2012) Predatory publishers are corrupting open access, Nature 415 (7415), 179- 179
- Indian National Science Academy (INSA) Ethics in Science Education Research and Governance ISBN: 978-81-939482-1-7

ADVANCED NUMERICAL ANALYSIS

Subject Code: PMAT1-102   **L T P C**   **Duration: 60Hrs.**
4 0 0 4

Course Objectives

To provide knowledge about advanced numerical methods for solving partial differential equations.

Course Outcomes

To analyze the error incumbent in any such numerical approximation, compare the viability ofdifferent approaches to the numerical solution of problems arising in roots of solution of non- linear equations, Finite difference methods.

Unit-I (12 Hrs.)

Iterative Methods for Linear Systems: The classical iterative methods (Jacobi, Gauss- seidel, Muller method and successive over relaxation (SOR) methods), Krylov subspace methods, Conjugate gradient, Bi-conjugate-gradient (BiCG), BiCG stability methods, Preconditioning techniques, parallel implementations.

Unit-II (11 Hrs.)

Finite Difference Methods: Explicit and implicit schemes, consistency, stability and convergence, Lax equivalence theorem, Numerical solutions to elliptic, parabolic and hyperbolic partial differential equations.

Unit-III (11 Hrs.)

Approximate Methods of Solution: Rayleigh-Ritz, Collocation and Galerkin methods, properties of Galerkin approximations, Petrov-Galerkin method, Generalized method, Spline (Quadratic, Cubic) Theory.

Unit-IV (11 Hrs.)

Finite Element Method (FEM): FEM for second order problems, one and two dimensional problems, the finite elements (elements with a triangular mesh and a rectangular mesh and three dimensional finite elements), Fourth-order problems, Hermite families of elements, Iso-parametric elements, Numerical integration.

Recommended Books:

1. M.K. Jain, S.R.K. Iyengar, and R.K. Jain, 'Numerical Methods for Scientific and Engineering

Computation', 5th Edn., New Age international, **2008**.

2. Joe D. Hoffman, 'Numerical methods for Engineers and Scientists', McGraw Hill, **1993**.

3. K.E Atkinson, 'An Introduction to Numerical Analysis', 2nd Edn., John Wiley, **2004**.

4. R.S. Gupta, 'Elements of Numerical Analysis', McMillan India, **2009**

5. P. Seshu, 'Textbook of Finite Element Analysis', Prentice Hall India, **2003**.

FOURIER ANALYSIS AND ITS APPLICATIONS

Subject Code: PMAT1-103   **L T P C**   **Duration: 60 Hrs.**
                                  4 0 0 4

Course Objectives

To provide the knowledge and concepts of Fourier series, its convergence and uniform convergence, Fourier transforms and its applications for the solution of differential equations.

Course Outcomes

To understand the concept of Fourier series, Dirichlet's conditions, Convergence and Uniform convergence of Fourier series. Define Fourier transforms, Application of Fourier transforms and Discrete Fourier Transform.

UNIT-I (16 Hrs.)

Fourier Series: Fourier series, Theorems, Dirichlet's conditions, Fourier series for even andodd functions, Half range Fourier series, Other forms of Fourier series.

UNIT-II (14 Hrs.)

Convergence and Uniform convergence of Fourier series, Cesaro and Abel Summability of Fourier series, The Dirichlet Kernal, The Fejer kernel, $L2$-theory: Orthogonality, Completeness.

UNIT-III (15 Hrs.)

Fourier Transforms: Dirichlet's conditions, Fourier integral formula (without proof), Fourier transform, Inverse Theorem for Fourier transform, Fourier sine and cosine transforms and their inversion formulae. Properties of Fourier transform, Convolution theorem of Fourier transforms, Parseval's identity, Finite Fourier sine and cosine transform, Inversion formula for sine transform, **Application of Fourier Transforms**: Simultaneous ordinary differential equations, second order Partialdifferential equations (Heat, Wave and Laplace).

UNIT-IV (15 Hrs.)

The Discrete Fourier Transform (DFT): Definition, Theorems, Properties: Periodic and Linear Convolution by DFT, The Fast Fourier Transform, FFT convolutions, Two dimensional FFT Analysis.

Recommended Books:

1. Javier Duoandikoetxe, 'Fourier Analysis', University Press, **2012**.

2. Gerald B. Folland, 'Fourier Analysis and its Applications', American Mathematical Society, **2010**.

3. N.K. Bary, 'A Treatise on Trigonometric Series' Vol. 1, Pergamon, **2014**.

4. B.S. Grewal, 'Higher Engineering Mathematics', Khanna Publisher, **2014**.

5. Duraisamy Sundararajan, 'The Discrete Fourier Transform: Theory, Algorithms and Applications',World Scientific Publishing Co. Pte Ltd., **2001**.

PARTIAL DIFFERENTIAL EQUATIONS

Subject Code: PMAT1-10   **L T P C**   **Duration: 60Hrs.**
                                  4 0 0 4

Course Objectives

To equip the students with the analytical methods for solving different types of Partial differential equations.

Course Outcomes

Be familiar with the modeling assumptions and derivations that lead to PDEs, Recognize the major classification of PDEs and the qualitative differences between the classes of equations and be competentin solving linear PDEs using classical solution methods.

UNIT-I (14 Hrs.)

Non-linear PDE of First Order: Complete Integrals, Envelopes, Characteristics, Hamilton- Jacobi equations, Hamilton's ODE, Legengre transform, Hopf – Lax formula, Cauchy's method of characteristic; Compatible system of first order PDE, Charpit's method of solution, Solutions satisfying given conditions, Jacobi's method of solution.

UNIT-II (16 Hrs.)

Second Order PDE: Partial Differential equations of 2nd and Higher order, Classification, Examples ofPDE, Solutions of Elliptic, Hyperbolic and Parabolic equations, Canonical Form, Initial and Boundary Value Problems, Lagrange-Green's identity and uniqueness by energy methods, Stability theory, energy conservation and dispersion.

UNIT-III (16 Hrs.)

Method of Solution: Separation of variables in a PDE, Laplace equation: mean value property, Weak and strong maximum principle, Green's function, Poisson's formula, Dirichlet's principle, Existence of solution using Perron's method (without proof).

UNIT-IV (14 Hrs.)

Heat Equation: Initial value problem, Fundamental solution, Weak and strong maximum principle and uniqueness results, wave equation: uniqueness, D'Alembert's method, Method of spherical means and Duhamel's principle.

Recommended Books:

1. I.N. Snedon, 'Elements of Partial Differential Equation', 3rd Edn., McGraw Hill Book Company,1998.
2. E.T. Copson, 'Partial Differential Equations', 2nd Edn., Cambridge University Press, **1995.**
3. Walter A. Strauss, 'Partial Differential Equations-An Introduction', 2nd Edn., **2007.**
4. Robert C. McOwen, 'Partial Differential Equations methods and application', 2nd Edn., PearsonEducation Inc., **2003.**

5. Sankara Rao, 'Introduction to Partial Differential Equations', PHI, **2010.**

MATHEMATICAL STATISTICS

Subject Code: PMAT1-106	**L T P C** **4 0 0 4**	**Duration: 60 Hrs.**

Course Objectives

To introduce the concept of random variables, distribution functions, various probability distributions, and concepts in testing of statistical hypotheses.

Course Outcomes

To understand the concept of probability theory and statistics to solve industrial problems. Define and examine the random sampling and graphical methods with technology. Recognize and compute the sampling distributions, sampling distributions of means and variances (S2) and the t- and F-distributions, Recognize the relationship between the confidence interval estimation and tests of hypothesis.

UNIT-I (14 Hrs.)

Concept of random variables and probability distributions: Two dimensional random variables, Joint, Marginal and conditional distributions, Independence of random variables, Expectation, Conditional expectation, Moments, Product moments, Probability generating functions, Moment generating function and its properties, Moment inequalities, Techebyshey's, inequalities, Characteristic function and its elementary properties.

UNIT-II (15 Hrs.)

Study of various discrete and continuous distributions: Binomial, Poison, Negative binomial, Geometric, Hyper geometric, Rectangular, Normal, Exponential, Beta and gamma distributions.

UNIT–III (16 Hrs.)

Concept of sampling distribution and its standard error, Derivation of sampling distributions of Chi-square, t and F (null case only) distribution of sample mean and sample variance and their in random sampling from a normal distribution.

UNIT–IV (15 Hrs.)

Elementary concepts in testing of statistical hypotheses, Tests of significance: tests based on normal distribution, Chi-square, t and F statistic and transformation of correlation coefficient, tests for regression coefficients and partial and multiple correlation coefficients.

Analysis of variance: One-way classification, two-way classification with one observation per cell.

Recommended Books:

1. R.V. Hogg & Craige, 'Introduction to Mathematical Statistics', 7th Edn., **2005.**

2. J.W. Mckean and A.T. Craig, P. Mukhopadhyay, 'Mathematical Statistics', **2000.**

3. S.C. Gupta, V.K. Kapoor, 'Fundamental of Mathematical Statistics', 7th Edn., S. Chand, **1990**.

4. Goon, Gupta and Das Gupta, 'Fundamentals of Statistics', 5th Edn., World Press, **1975**.

5. V.K. Rohatgi, 'Introduction to Probability Theory & Mathematical Statistics', **2009**.

METHODS IN OPERATIONS RESEARCH AND INFORMATION THEORY

Subject Code: PMAT1-107   **L T P C**   **Duration: 60 Hrs.**
                                       4 0 0 4

Course Objectives

To acquaint the students with the theory and techniques of Operations Research.

Course Outcomes

Formulate and model a linear programming problem from a word problem and solve them graphically in 2 and 3 dimensions, while employing some convex analysis. Find the dual identify andinterpret the solution of the Dual Problem.

UNIT –I (15 Hrs.)

Introduction, Definition of operation research, Models in operation research. Formulation of linear programming problem (LPP): Graphical method, Basic Feasible Solution, optimal solution of LPP usingSimplex, Big-M and Two phase methods, Exceptional cases in LPP i.e. Infeasible, unbounded, alternate and degenerate solutions, Extreme Points, Convex set, Convex linear combination.

UNIT –II (15 Hrs.)

Concept of convexity and concavity, Maxima and minima of convex functions, Single and multivariate unconstrained problems, constrained programming problems, Kuhn-Tucker conditions for constrained programming problems, Quadratic programming, Wolfe's method.

UNIT III (15 Hrs.)

Description of communication system, Axioms for uncertainty measures, Measure of Information, Properties of uncertainty function, Entropy in two dimensional scheme, joint and conditional uncertainties, Interpretation of uncertainty function.

UNIT –IV (15 Hrs.)

The problem of unique decipherability, conditions for instantaneous and uniquely decipherable codes, noiseless coding theorem, channel capacity, efficiency and redundancy, Shannon-Fano encoding procedure.

Recommended Books:
1. Kanti Swarup, P.K. Gupta and Man Mohan, 'Operations Research', 9th Edn., Sultan Chand & Sons, **2002**.
2. Friderick S. Hillier and Gerald J. Lieberman, 'Operations Research', 2nd Edn., Holden-Day Inc, USA, **1974.**
3. M.S. Bazaraa, H.D. Sherali, C.M. Shetty, 'Nonlinear Programming: Theory and Algorithms', JohnWiley and Sons, **1993**.
4. Ash, R.: Information Theory, Inderscience Publishers, NY, 1965.
5. Reza, F.M.: An Introduction to Information Theory, Mc Graw Hill Book Co. Inc, 1961.
6. Aczal, J. and Daroczy, Z. On Measures of Information and their Characterizations, Academic Press NY, 1975.

B.SC. NON-MEDICAL SYLLABUS 2022 BATCH ONWARDS

(UPDATED ON 30.03.2022)

1st Semester		Contact Hrs.			Marks			Credits
Sub. Code	Subject	L	T	P	Int.	Ext.	Total	
	English (Ability Enhancement Compulsory Course –I)*	2	0	0	40	60	100	2
	Mechanics (Core Course-I)*	4	0	0	40	60	100	4
	Inorganic Chemistry-I (Core Course-II A)*	3	0	0	40	60	100	3
	Organic Chemistry-I (Core Course-II B)*	3	0	0	40	60	100	3
	Differential Calculus-I (Core Course-III A)*	3	0	0	40	60	100	3
	Differential Calculus-II (Core Course-III B)*	3	0	0	40	60	100	3
	Mechanics Lab (Core Course-I Practical)*	0	0	4	60	40	100	2
	Chemistry Lab- I (Core Course-II Practical)*	0	0	4	60	40	100	2
Total		**18**	**0**	**8**	**360**	**440**	**800**	**22**

2nd Semester		Contact Hrs.			Marks			Credits
Sub. Code	Subject	L	T	P	Int	Ext	Total	
	Drug abuse: problem, management and prevention (Ability Enhancement Compulsory Course –II)*	2	0	0	40	60	100	0
	Electricity, Magnetism and EMT (Core Course-IV)*	4	0	0	40	60	100	4
	Physical Chemistry-I (Core Course-V A)*	3	0	0	40	60	100	3
	Organic Chemistry-II (Core Course-V B)*	3	0	0	40	60	100	3
	Differential Equations-I (Core Course-VI A)*	3	0	0	40	60	100	3
	Differential Equations-II (Core Course-VI B)*	3	0	0	40	60	100	3
	Electricity, Magnetism and EMT Lab (Core Course-IV Practical)*	0	0	4	60	40	100	2
	Chemistry Lab-II (Core Course-V Practical)*	0	0	4	60	40	100	2
Total		**18**	**0**	**08**	**360**	**440**	**800**	**20**

B.SC. NON-MEDICAL SYLLABUS 2022 BATCH ONWARDS

(UPDATED ON 30.03.2022)

3rd Semester		Contact Hrs.			Marks			Credits
Sub. Code	Subject	L	T	P	Int.	Ext.	Total	
	Thermal Physics and Statistical Mechanics (Core Course-VII)*	4	0	0	40	60	100	4
	Thermal Physics and Statistical Mechanics Lab (Core Course-VII Practical)*	0	0	4	60	40	100	2
	Inorganic Chemistry-II (Core Course-VIII A)*	3	0	0	40	60	100	3
	Physical Chemistry-II (Core Course-VIII B)*	3	0	0	40	60	100	3
	Chemistry Lab III (Core Course-VIII Practical)*	0	0	4	60	40	100	2
	Real Analysis-I (Core Course IX A)*	3	0	0	40	60	100	3
	Real Analysis-II (Core Course IX B)*	3	0	0	40	60	100	3
	Computational Physics Skills (Skill EnhancementCourse-1)*	0	0	4	60	40	100	2
	Total	**16**	**0**	**12**	**380**	**420**	**800**	**22**

4Th Semester		Contact Hrs.			Marks			Credits
Sub. Code	Subject	L	T	P	Int	Ext	Total	
	Environmental Science (Ability Enhancement Compulsory Course –III) *	3	0	0	40	60	100	3
	Waves and Optics (Core Course-X)*	4	0	0	40	60	100	4
	Waves and Optics Lab (Course-X Practical)*	0	0	4	60	40	100	2
	Organic Chemistry-III (Core Course-XI A)*	3	0	0	40	60	100	3
	Physical Chemistry-III (Core Course-XI B)*	3	0	0	40	60	100	3
	Chemistry Lab-IV (Core Course-XI Practical)*	0	0	4	60	40	100	2
	Algebra-I (Core Course-XII A)*	3	0	0	40	60	100	3
	Algebra-II (Core Course-XII B)*	3	0	0	40	60	100	3
	Basic Analytical Chemistry (Skill Enhancement Course-II)*	0	0	4	60	40	100	2
	Total	**19**	**0**	**12**	**420**	**480**	**900**	**25**

B.SC. NON-MEDICAL SYLLABUS 2022 BATCH ONWARDS

(UPDATED ON 30.03.2022)

5Th Semester		Contact Hrs.			Marks			Credits
Sub. Code	Subject	L	T	P	Int	Ext	Total	
	Digital Analog and Instrumentation (Discipline Specific Elective-I)*	4	0	0	40	60	100	4
	Chemistry of Main group elements (Discipline Specific Elective-II)*	4	0	0	40	60	100	4
	Matrices (Discipline Specific Elective-III A)*	3	0	0	40	60	100	3
	Linear Algebra (Discipline Specific Elective-III B)*	3	0	0	40	60	100	3
	Digital Analog and Instrumentation Lab (Discipline Specific Elective Lab-I)*	0	0	4	60	40	100	2
	Chemistry of Main group elements Lab (Discipline Specific Elective Lab-II)*	0	0	4	60	40	100	2
	Computer ProgrammingLab (Skill EnhancementCourse-3)*	0	0	4	60	40	100	2
Total		**14**	**0**	**12**	**340**	**360**	**700**	**20**

6Th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int	Ext	Total	
	Elements of Modern Physics (Discipline Specific Elective-4)*	4	0	0	40	60	100	4
	Elements of Modern Physics Lab (Discipline Specific Elective Lab-4)*	0	0	4	60	40	100	2
	Comprehensive Chemistry (Discipline Specific Elective-V)*	4	0	0	40	60	100	4
	Comprehensive Chemistry Lab (Discipline Specific Elective Lab-V)*	0	0	4	60	40	100	2
	Numerical Methods (Discipline Specific Elective-VI A)*	3	0	0	40	60	100	3
	Complex Analysis (Discipline Specific Elective-VI B)*	3	0	0	40	60	100	3
	Numerical Analysis Lab (Skill Enhancement Course-4)*	0	0	4	60	40	100	2
Total		**14**	**0**	**12**	**340**	**360**	**700**	**20**

ENGLISH

Subject Code:	**L T P C** **2 0 0 2**	**Duration:30 Hrs.**

Course Objectives:
1. To aware students about basic communication of English
2. To make students aware about verbal concept of English
3. To make students aware about non-verbal communication

Course Outcomes:
1. The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT-I   (8 Hours)

Communication Skills: Introduction, Definition, the Importance of Communication,
The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
.

UNIT-II   (7 Hours)

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.
Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

UNIT-III   (7 Hours)

Communication Styles: Introduction, The Communication Styles Matrix with example for each Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.
Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations

UNIT-IV   (8 Hours)

Interview Skills: Purpose of an interview, Do's and Don'ts of an interview
Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery
Group Discussion: Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion.

Recommended Books:

1. Ruther Ford A. J., 'Basic Communication Skills for Technology', 2nd Edition, Pearson Education,2011.

2. Kumar S. and Pushplata, 'Communication Skills', 1st Edition, Oxford Press,2011.

3. Stephen P. Robbins, 'Organizational Behaviour', 1st Edition, Pearson,2013.

4. Gill H., 'Brilliant-Communication Skills', 1st Edition, Pearson Life,2011.

5. Gopalawamy R., 'The Ace of Soft Skills: Attitude, Communication and Etiquettefor Success', 5th Edition, Pearson,2013.

6. Dalley D., Burton L. and Margaret G., 'Developing your Influencing Skills', Green Hall, 1 st Edition, Universe of Learning LTD,2010.

7. Konarnira, 'Communication Skills for Professionals', 2nd Edition, PHI,2011.

8. Mitra B. K., 'Personality Development and Soft Skills', 1st Edition, Oxford Press,2011.

9. 'Soft Skill for Everyone', Butter Field, 1stEdition, Cengage Learning India Pvt. Ltd., 2011. 10. Francis Peters S.J., 'Soft Skills and Professional Communication', 1st Edition, McGraw HillEducation, 2011.

11. John A., 'Effective Communication', 4th Edition, Pan MacMillan, 2009.

12. Aubrey D., 'Bringing out the Best in People', 2nd Edition, McGraw Hill,1999

MECHANICS

Subject Code: **L T P C**   **Duration: 60Hrs.**
4 0 0 4

Course Objective:-

To understand the concept of Dynamics, Motion under Central Forces, Oscillations and special theory of relativity.

Course Outcome:-
1. Understanding the concepts of fundamentals of dynamics, gravitation and central force motion, oscillations, and special theory of relativity.
2. To analyze and solve numerical problems in mechanics.
3. Apply knowledge of Mechanics to go for higher studies in diverse fields.
4. To inculcate and develop the ability to think abstractly.

UNIT-I

Vector Calculus and Lawsof Motion   (15 Hrs)
Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter. Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass. Momentum and Energy: Conservation of momentum. Work andenergy.

Conservation of energy. Motion of rockets. Rotational Motion: Angular velocity and angular momentum. Torque, Conservation of angular momentum.

UNIT-II

Gravitation   (15Hrs)
Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).

UNIT-III

Oscillations   (15Hrs)
Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations. Elasticity: Hooke's law, Stress-strain diagram, Elastic moduli-Relation between elastic constants, Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants, Work done in stretching and work done in twisting a wire, Twisting couple on a cylinder, Determination of Rigidity modulus by static torsion, Torsional pendulum, Determination of Rigidity modulus and moment of inertia, q, η and σ by Searles method.

UNIT-IV

Special Theoryof Relativity   (15 Hrs)
Concept of Inertial and non-inertial frames, Concept of ether, Constancy of speed of light,

Michelson-Morley Experiment, Galilean transformation, Postulates of Special Theory of Relativity, Lorentz transformation, Length contraction. Time dilation, Relativistic addition of velocities.

Recommended Books:

1. University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986.AddisonWesley
2. Mechanics Berkeley Physics course,volume.1: Charles Kittel, et. Al. 2007, TataMcGrawHill.
3. Physics – Resnick, Halliday & Walker 9/e, 2010,Wiley.
4. Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford UniversityPress.
5. University Physics, Ronald Lane Reese, 2003, ThomsonBrooks/Cole.

MECHANICS LAB

SubjectCode: **L T P C**   **Duration: 60Hrs.**
                                              0 0 4 2

Course Objective: To learn practically the various concepts of mechanics. The course will provide hand on training to the students for handling various mechanical instruments.

Course Outcome:
1. Able to verify the concepts/laws of Mechanics.
2. To inculcate and develop scientific aptitude by performing the various experiments.
3. Skill enhancement by solving experimental problems.
4. To inculcate the spirit of teamwork.

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the Height of a Building using aSextant.
3. To determine the Moment of Inertia of aFlywheel.
4. To determine the Young's Modulus of a Wire by Optical LeverMethod.
5. To determine the Modulus of Rigidity of a Wire by Maxwell'sneedle.
6. To determine the Elastic Constants of a Wire by Searle'smethod.
7. To determine g by BarPendulum.
8. To determine g by Kater'sPendulum.
9. To determine g and velocity for a freely falling body using Digital TimingTechnique.
10. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value ofg

RecommendedBooks:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann EducationalPublishers.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
4. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

INORGANICCHEMISTRY-I

SubjectCode: **L T P C**   **Duration: 45Hrs.**
                        3 0 0 3

Course Objectives:

1. To introduce various principles describing the shape and structure of an atom.

2. To understand periodicity and its applications in understanding of different chemical properties.

3. To familiarize with the concept of ionic bonding and crystal lattice.

4. To introduce the concept of covalent bond and different types of interactions.

Course Outcomes: On completion of this course students will be able to:

1. Apply different principles for filling of atomic orbitals.

2. Correlate periodic properties with different chemical properties.

3. Analyze ionic solid and their lattice structures

4. Apply various theories to understand covalent structure.

Unit-I
AtomicStructure: **(8 Hrs.)**

de Broglie equation, Heisenberg's Uncertainty Principle and its significance. Schrödinger's wave equation and its derivation, significance of ψ and ψ^2. Quantum numbers. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions and distribution curves. Shapes of s, p, d and f orbitals.
Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau principle and its limitations.

Unit-II
ChemicalPeriodicity: **(7 Hrs.)**

Effective nuclear charge, shielding or screening effect (Slater rules), variation of effective nuclear charge in periodic table.
Atomic and ionic radii, Ionization enthalpy, Electron gain enthalpy and their trend in groups and periods.
Electronegativity and various scales. Variation of electronegativity with bond order, partial charge, hybridization, group electro negativity.

Unit-III

ChemicalBonding-I: (15 Hrs.)

Ionic bond: General characteristics of ionic compounds, size effects, radius ratio rule and its limitations. Efficiency of packing, Hexagonal close packing, Cubic close packing. Structures of different crystal lattices, Sodium chloride, Cesium chloride, Wurtzite, Zinc blende, Fluorite, Rutile, Cristobalite, Nickel arsenide, Pervoskite, Rhenium oxide, Calcium carbide, The calcite and aragonite structures. Born-Landé equation with derivation and importance of Kapustinskii expression for lattice energy. Madelung constant, Born-Haber cycle and its application, Solvation energy.

Unit-IV

ChemicalBonding-II: (15 Hrs.)

Covalent bond: Lewis structure, Valence Bond theory, VSEPR theory (Prediction of structures and variation of bond angles on the basis of VSEPR theory, Shortcomings of VSEPR theory), Hybridization, Molecular orbital theory (LCAO method). Molecular orbital diagrams of diatomic and simple polyatomic molecules (Be_2, N_2, O_2, F_2, LiH, NO, CO, HCl, NO_2, BeH_2, NO_2^-), Formal charge, Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules and consequences of polarization. Ionic character in covalent compounds (Bond moment, dipole moment, Percentage ionic character)

Metallic Bond: Valence bond and band theories. Semiconductors and insulators, defects in solids.

Weak Interactions: van der Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interaction, Hydrogen bonding.

Recommended Books:

1. D.F.C. Shriver, P.W. Atkins and C.H. Langford, 'Inorganic Chemistry', ELBS Oxford,**1991**.
2. J.E. Huheey, E.A. Keiter, R.L. Keiter, 'Inorganic Chemistry', 4th Edn., Pearson Education, Singapore,**1999**.
3. J.D. Lee, 'Concise Inorganic Chemistry', ELBS, Oxford,**1994**.

ORGANICCHEMISTRY-I

SubjectCode: L T PC   Duration: 45Hrs.
                                 3 0 0 3

Course objectives:

1. **To understand the knowledge of parameters involved in Structure and bonding**

2. **To familiarize with the mechanisms of organic reactions**

3. **To provide the knowledge of structure, synthesis and reactivity of alkanes/ alkenes/alkynes**

4. **To understand the preparation and reactions of aromatic hydrocarbons**

Course outcomes:

   After the completion of course, students will acquire the knowledge of:

   1.   **Structural features and bonding of organic molecules**

   2.   **Mechanistic pathways of various organic reactions**

   3.   **Synthesis and reactivity of alkanes/ alkenes/alkynes**

   4.   **Preparation and reactivity of aromatic hydrocarbons**

Unit-I

StructureandBonding: **(5 Hrs.)**

Hybridization, bond lengths, bond angles, bond energy, localized and delocalized chemical bond, van der Waals interactions, inclusion compounds, clatherates, charge transfer complexes resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding

Mechanism ofOrganic Reactions: **(10 Hrs.)**

Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of reagents- electrophiles and nucleophiles. Types of organic reactions. Energy considerations. Reactive intermediates (carbocations, carbanions, free radicals, carbenes, arynes and nitrenes). Assigning formal charges on intermediates and other ionic species.
Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

Unit-II

AlkanesandCycloalkanes: (10 Hrs.)

Introduction, IUPAC nomenclature, Isomerism and classification of carbon atoms of alkanes. Sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids). Physical properties and chemical reactions ofalkanes.

Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity.

Cycloalkanes - nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring; banana bonds.

Unit-III

Alkenes, Cycloalkenes, DienesandAlkynes: (14 Hrs.)

Alkenes Nomenclature, methods of synthesis (mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. Saytzeff rule, Hofmann elimination), physical properties and relative stabilities of alkenes. Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikiff's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$, Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene.

Cycloalkenes Methods of formation, conformation and Chemical reactions of cycloalkenes.

Dienes Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions – 1, 2 and 1,4 additions, Diels-Alder reaction.

Alkynes Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration oxidation, metal-ammonia reductions, oxidation and polymerization.

Unit-I

Aromatichydrocarbons (6 Hrs.)

Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.

Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) (upto 4 carbons on benzene). Side chain oxidation of alkyl benzenes (upto 4 carbons on benzene).

Recommended Books:

1. Morrison and Boyd, 'Organic Chemistry', PrenticeHall.
2. Solomons, 'Fundamentals of Organic Chemistry', JohnWiley.
3. F.A. Carey, 'Organic Chemistry', McGraw Hill,Inc.
4. L.G. Wade Jr., 'Organic Chemistry', PrenticeHall.
5. S.M. Mukherji, S.P. Singh and R.P. Kapoor, 'Organic Chemistry', Vol.-I, II & III, Wiley Eastern Ltd. (New AgeInternational).

CHEMISTRY LAB-I

SubjectCode: **L T PC**   **Duration:60Hrs.**
                              0 0 4 2

Course objectives:
1. To develop basic understanding of various lab practices and functional groups analysis in organic compounds.
2. To familiarize with the basics of the phenomenon of cation and anion analysis.
3. To understand principles of chromatography.

Course Outcomes:
The students will acquire knowledge of:

1 Salt analysis with interfering anions.
2 Detection of different functional groups in organic compounds.
3 Chromatography for separation of dyes in a given mixture**.**

Semi Micro analysis. Cation analysis, Separation and identification of ions from groups I, II, III, IV, V, and VI. Anionic analysis. Four ions with no interference.

Organic Chemistry Laboratory Techniques:
Detection of various functional groups in organic compounds (containing upto two extra elements)

Separation of mixtures by Chromatography: Measure the R_f value in each case (combination of two compounds to be given)
Identify and separate the components of a given mixture of two dyes (red and blue ink, fluorescent and methylene blue) by paper chromatography

Recommended Books:

1.H. Denny, W. Roesky, 'Chemical Curiosites', WILEY VCH,1996.
2.G. Marr and B.W. Rocket,'Practical Inorganic Chemistry', University Science Books,1999.
3.G. Pass and H. Sutcliffe, 'Practical Inorganic Chemistry', 2ndEdn., Chapman and Hall, London, 1974.
4.J. Mendham, R.C. Denney, J.D. Barnes, M.Thomas, 'Vogel's Textbook of Quantitative Analysis', 5thEdn., Pearson Education,2006.
5.G. Svehla, 'Vogel's Textbook of Quantitative Analysis', Pearson Education,2006.

DIFFERENTIAL CALCULUS-I

SubjectCode: **LTPC** **Duration: 45 Hrs.**
3 0 0 3

Course Objectives:

1. To introduce the concepts of limit, continuity and derivatives.

2. To discuss some important theorems of calculus using the idea of derivatives.

3. To trace the curves by understanding their mathematical properties.

4. To familiarize with the concept of partial derivatives.

Course Outcomes

Students will be able to:

1. Apply the knowledge of basic concepts of calculus in order to study theoretical development of different mathematical techniques.

2. Use the derivatives for the study of Rolle's theorem, Mean Value theorems, Taylor's series, Maclaurin's series and Optimization of the function.

3. Develop the skills to sketch the curves in a plane using its mathematical properties in the different coordinate systems of reference.

4. Extend the knowledge of Partial derivatives of higher order for further exploration of the subject for going into higher education.

Unit-I (12Hrs.)

Limit and Continuity (ϵ and δ definition), Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem.

Unit-II(11Hrs.)

Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder, Taylor's series, Maclaurin's series of sin x, cos x, ex , log(l+x), $(l+x)^m$, Maxima and Minima, Indeterminate forms.

Unit-III(14 Hrs.)

Tangents and normals, Curvature, Asymptotes, Singular points, Tracing of curves. Parametric representation of curves and tracing of parametric curves, Polar coordinates and tracing of curves in polar coordinates.

Unit-IV (8 Hrs.)

Partial differentiation –Function of two variables, Partial derivatives of higher order, Homogeneous functions, Euler's theorem and its extension (with proof), Composite functions, Total derivative,

Differentiation of implicit functions and composite functions, Jacobians and its properties.

RecommendedBooks:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc.,2002.
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education,2007.
3. Zafar Ahsan: Differential Equations and Their Applications, Second Edition, PrenticeHall of India Private Limited, New Delhi.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition,2000.
5. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

DIFFERENTIAL CALCULUS-II

SubjectCode:	**L T PC** **3 0 0 3**	**Duration: 45 Hrs.**

Course Objectives:

1. To discuss the optimization of functions of two variables.

2. To develop the knowledge of using integration for finding area and volume enclosed by curves.

3. To introduce the concept of reduction formulae for finding the integrals of higher order.

4. To get the idea of multiple integrals and their uses.

Course Outcomes

Students will be able to:

1. Make the use of derivatives for the computation of the tangent plane, normal to the surface and Optimization of two variable functions.

2. Apply the knowledge of advanced concepts of calculus in order to study theoretical development of different mathematical techniques and their applications.

3. Use the idea of reduction formulae enables to solve an integral problem by reducing it to a problem of solving an easier integral problem.

4. Apply the mathematical tools needed in evaluating multiple integrals and their usage.

Unit-I   (12Hrs.)

Tangent plane and normal to a surface, Maxima and Minima of functions of two variables, Working rule to find the extreme values of a function $z = f(x, y)$, Lagrange's method of undetermined multipliers.

Unit-II (10Hrs.)

Arc formula for the Cartesian equation $y=f(x)$, other expressions for lengths of arcs, Areas under curves, Area formulas for parametric, Polar equation, Area of the closed curve, Volume and surfaces of revolution of curves.

Unit-III (12Hrs.)

Integration by partial fractions, Integration of rational and irrational functions, Properties of definite integral, Reduction formulae for integrals of rational, Trigonometric, Exponential and Logarithmic function and of their combinations.

Unit-IV(11Hrs.)

Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: Areas and volumes, Centre of mass and gravity, Triple integrals (Cartesian), Simple applications involving cubes, Sphere and rectangular parallelepipeds.

Recommended Books:

1. G. B. Thomas, M. D. Weir, J. Hass: Thomas' Calculus (Twelfth Edition), PearsonEducation.
2. Gorakh Prasad: Integral Calculus, Fourteenth Edition, Reprint 2007, Pothishala Private Limited,Allahabad.
3. Zafar Ahsan: Differential Equations and Their Applications, Second Edition, PrenticeHall of India Private Limited, New Delhi.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition,2000.
5. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: **L T P C**   **Duration: 30Hrs.**
                                          2 0 0 0

Course Objectives
The main aim of this course is:
1. To aware students about Consequences of Drug Abuse
2. To aware students about preventions of Drug Abuse
3. To aware various roles of society to prevent drug abuse

Course Outcomes
After completing this course, Students will be able to:
1. Understand the responsibilities of society and family to prevent Drug Abuse
2. Understand the role of educational institutes in controlling Drug Abuse
3. Aware about various Psychological and Social management of Drug abuse
4. Understand the role of Media and Legislation to control the drug abuse.

UNIT-I   (6 Hours)
Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II   (8 Hours)
Consequences of Drug Abuse: Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

UNIT-III   (8 Hours)
Prevention of Drug Abuse: Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV   (8 Hours)
Treatment and Control of Drug Abuse: Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books:
1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications,Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India

Institute of Medical Sciences, New Delhi, 2003 &2004.

8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,2013.

9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi,1991.

10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar,2009.

11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra,Delhi, 2000.

12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press,2008.

13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017. 1

14. 'World Drug Report', United Nations Office of Drug and Crime,2016.

15. 'World Drug Report', United Nations Office of Drug and Crime,2017.

ELECTRICITY, MEGNETISM AND EMT

Subject Code: **L T P C**   **Duration: 60 Hrs.**
                                4 0 0 4

Course Objective: To understand vector analysis, Electrostatic, Magnetism Maxwell's equations, propagation of EM waves, production and detection of EM waves.

Course Outcome:

1. Understand the concepts related with Electrostatic, Magnetism, Maxwell's equations, and propagation of EM waves.
2. Skill enhancement to solve numerical problems related with Electrostatic, Magnetism, Electromagnetic Theory
3. Apply knowledge to go for higher studies in diverse fields.
4. To inculcate and develop the ability to think abstractly.

UNIT-I

VectorAnalysis   **(13Hrs)**

Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

UNIT-II

Electrostatics   **(16Hrs)**

Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectricmedium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

UNIT-III

Magnetism   **(16Hrs)**

Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials. Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magneticfield.

UNIT-IV

Maxwell`s equations and Electromagneticwave propagation   **(15 Hrs)**

Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector,

~~energy density in electromagnetic field, electromagnetic wave propagation through vacuum and~~ isotropic dielectric medium, transverse nature of EM waves,polarization.

Recommended Books:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-HillEducation.
2. Mechanics Berkeley Physics course,volume.1: Charles Kittel, et. Al. 2007, TataMcGrawHill.
3. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ.Press.
4. Electricity and Magnetism, D C Tayal, 1988, Himalaya PublishingHouse.
5. University Physics, Ronald Lane Reese, 2003, ThomsonBrooks/Cole.
6. D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, BenjaminCummings.

ELECTRICITY, MEGNETISM AND EMT

Subject Code: **L T P C**   **Duration: 60 Hrs.**
                                 0 0 4 2

Course Objective: To understand the experiments related with the Electricity, Magnetism and Electromagnetic Theory Lab.

Course Outcome:
1. Able to understand computationally and experimentally the various concepts of Electricity, Magnetism and Electromagnetic Theory Lab.
2. To inculcate and develop scientific aptitude by performing the various experiments.
3. Learn to draw conclusions from data and develop skills in experimental design.
4. To inculcate the spirit of teamwork.

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DCCurrent, and (d) checking electrical fuses.

2. Ballistic Galvanometer: (i) Measurement of charge and current sensitivity (ii) Measurement Of CDR (iii) Determine a high resistance by Leakage Method (iv) To determine Self Inductance of a Coil by Rayleigh'sMethod.

3. To compare capacitances using De'Sauty'sbridge.

4. Measurement of field strength B and its variation in a Solenoid (DeterminedB/dx).

5. To study the Characteristics of a Series RCCircuit.

6. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) QualityFactor

7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor.

8. To determine a Low Resistance by Carey Foster'sBridge.

9. To verify the Thevenin and Norton Theorem

10. To verify the Superposition, and Maximum Power TransferTheorem.

RecommendedBooks:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann EducationalPublishers.

PHYSICAL CHEMISTRY-I

SubjectCode: **L T P C**   **Duration: 45 Hrs.**
                                3 0 0 3

Course Objectives:

1. To familiarize with the basic phenomenon/concepts of properties of gases, liquids and solids.

2. To understand the nature of solid state, crystal systems and defects in crystals.

3. To familiarize with statistical treatment of analytical data.

4. To introduce the concept of liquid crystals.

Course Outcomes: On completion of this course students will be able to:

1. Comprehend the kinetic modular model of gases, behaviour of ideal and real gases.

2. Apply the statistical treatment to real data.

3. Analyse a solid and its defects for their applications.

4. Relate different states of matter with their observable properties.

Unit-I
Evaluation ofAnalyticalData   **(10   Hrs.)**

Terms of mean and median, precision and accuracy in chemical analysis, determining accuracy of methods, improving accuracy of analysis, data treatment for series involving relatively few measurements, linear least squares curve fitting, types of errors, standard deviation, confidence limits, rejection of measurements (F-test and Q-test) numerical problems related to evaluation of analyticaldata.

Unit-II
LiquidState   **(8   Hrs.)**

Intermolecular forces, structure of liquids (a qualitative description) Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquid crystal, solid and liquid, Classification, structure of nematic and eholestric phases. Thermography and seven segment cell.

Unit-III
GaseousState   **(15Hrs.)**

Postulates of kinetic theory of gases, deviation from ideal behaviour, van der Waals equation of

states, the isotherms of van der Waals equation, relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state. Molecular velocities: Root mean square, average and most probable velocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter, Liquifacation of gases (based on Joule-Thomson effect).

Unit-IV

Solidstate: **(12Hrs.)**

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Analysis of powder diffraction patterns of $NaCl$, $CsCl$ and KCl. Defects incrystals.

Recommended Books:

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co.,2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Inc,1996.
4. Rao, C.N.R., University General Chemistry; Pubs: Macmillan India,1985.
5. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford UniversityPress, 2000.
6. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley & Sons Inc.,1992.
7. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems; Pubs:Wiley Eastern Limited, 1991.
8. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd.,2002.
9. Moore, W. J., Basic Physical Chemistry; Pubs: Prentice Hall of India Pvt. Ltd,1983.
10. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book company,1989.

ORGANICCHEMISTRY-II

SubjectCode: **L T P C** **Duration: 45 Hrs.**
3 0 0 3

1. To understand the basic concepts of stereochemistry of organic compounds

2. To familiarize with the fundamentals of aromatic compounds

3. To introduce the reactions involving aromatic compounds

4. To understand the preparation and reactions of aromatic and aliphatic halides

Course outcomes:

After the completion of course, students will be able to :

1. Understand the concepts in stereochemistry and aromaticity of organic molecules

2. Recognize the stereoisomers and aromatic compounds among the organic compound

3. Write mechanistic pathways of various organic reactions involving aromatic compounds

4. Differentiate between the reaction pathways followed by stereoisomers and aromatic compounds.

Unit-I

Stereochemistry ofOrganicCompounds   **(15   Hrs.)**

Concept of isomerism. Types of isomerism Optical isomerisin-elements of symmetry, molecular chirality, enantiomers, stereogenic centrec, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & Land R & S systems of nomenclature. Geometric isomerism-determination of configuration of geometric isomers, E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds. Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedgeformulae.

Unit-II

ArenesandAromaticity   **(7   Hrs.)**

Nomenclature of benzene derivatives. The aryl group. Aromatic nucleus and side chain. Structure of benzene: molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO diagram, the Huckel rule, aromatic ions..

Unit-III

AromaticElectrophilicSubstitution: **(11Hrs.)**

Aromatic electrophilic substitution-general pattern of the mechanism, role of σ and π complexes. Mechanism or nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Methods of formation and chemical reaction of alkylbenzenes alkynylbenzenes.

Unit-IV

Alkyl andarylhalides   **(12   Hrs.)**

Nomenclature and classes of alkyl halides, methods of formation chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams. Methods of formation of aryl halides, nuclear and side chain reactions. The addition elimination and the elimination-additional mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

Recommended Books:

1. Morrison and Boyd, 'Organic Chemistry', PrenticeHall.
2. Solomons, 'Fundamentals of Organic Chemistry', JohnWiley.
3. F.A. Carey, 'Organic Chemistry', McGraw Hill,Inc.
4. L.G. Wade Jr., 'Organic Chemistry', PrenticeHall.
5. S.M. Mukherji, S.P. Singh and R.P. Kapoor, 'Organic Chemistry', Vol.-I, II & III, Wiley Eastern Ltd. (New Age International).

CHEMISTRYLAB-II

SubjectCode: **L T PC**   **Duration: 60 Hrs.**
                                     0 0 4 2

Course objectives:
1. To develop basic understanding of various lab practices involved while handling organic compounds.
2. To familiarize with the basics of measurement of physicochemical properties of organic compounds.
3. To understand principles of purification and separation techniques.

Course Outcomes: The students will be able to:
1   Calibrate the small instrument used in organic lab.
2. Purify and separate the mixture of organic compounds.
3. Measure and calculate physico-chemical properties of organic compounds.

Laboratory Techniques
1. Checking the calibration of the thermometer
2. Purification of organic compounds by crystallization using the followingsolvents:
a. Water
b. Alcohol
c. Alcohol-Water
3. Determination of the melting points of above compounds and unknown organic compounds (Kjeldahl method and electrically heated melting pointapparatus)
4. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds
5. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillarymethod)

Physical Chemistry
ExperimentChemical Kinetics

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at roomtemperature.
2. To study the effect of acid strength on the hydrolysis of anester.
3. To determine the viscosity and surface tension of C_2H_5OHandglycerine   solution in water
4. Calculation of the enthalpy of ionization of ethanoicacid.

Recommended Books:

1. H. Denny, W. Roesky, 'Chemical Curiosites', WILEY VCH,1996.
2. J. Mendham, R.C. Denney, J.D. Barnes, M.Thomas, 'Vogel's Textbook of Quantitative Analysis', 5thEdn., Pearson Education,2006.
3. G. Svehla, 'Vohel's Textbook of Quantitative Analysis', Pearson Education,2006.

DIFFERENTIAL EQUATIONS-I

Subject Code: L T P C   **Duration: 45 Hrs.**
                                      3 0 0 3

Course objectives:

To introduce the theoretical concepts of ordinary and partial differential equations.

Course Outcomes

1. Understand the concept of ordinary differential equation, formation and order and degree of differential equation etc.

2. Apply various methods to Solve first order non-linear differential equation and linear differential equations of higher order

3. Apply various power series methods to find series solution of differential equations

4. Apply differential equations to significant applied and theoretical problems.

Unit-I (12Hrs.)

First order differential equations, Order and degree of ordinary differential equations, Formation of ordinary differential equations, Variable separable differential equations, Homogeneous differential equations, equations reducible to Homogenous differential equations, First order exact differential equations. Integrating factors, rules to find an integrating factor.

Unit-II (11Hrs.)

Linear homogeneous and non- homogeneous equations of higher order with constant coefficients, The method of variation of parameters, First order higher degree equations solvable for x, y, p, Clairaut's form.

Unit-III (12Hrs.)

Linear non-homogeneous differential equations with variable coefficients, Method of undetermined coefficients, Differential operator method, The Cauchy-Euler linear equations and Legendre linear equations, solutions of simultaneous equations.

Unit-IV (10Hrs.)

Power Series solution about an ordinary point, solutions about singular points, The method of Frobenius, Bessel equation and Legendre equation, its properties and their recurrence relations, Rodrigue's formula.

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Recommended Books:

1.   Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons,1984.
2.   I. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition, 1967.
3.   E.L.Ince: Theory of Ordinary Differential Equations. Dover,**1956**.
4.   M. Braun, 'Differential Equations and Their Applications', 4th Edn., Springer,2011.
5.   F. Braue and J.A. Nohel, 'The Qualitative Theory of Ordinary Differential Equations', Dover Publications,1989.
6.   E.A. Coddington, 'Ordinary Differential Equations', Tata McGraw Hill,2002.

DIFFERENTIAL EQUATIONS-II

Subject Code: **L T P C**   **Duration: 45 Hrs.**
                                      3 0 0 3

Course Objectives:

To introduce the theoretical concepts of partial differential equations and Classification of linear partial differential equations of Second order.

Course Outcomes

Students will be able to:

1. Understand the concept of partial differential equations of first order (linear and nonlinear).
2. Solve partial differential equations (linear and nonlinear) using various methods and apply these methods in solving some physical problems.
3. Understand the formation and solution of some significant PDEs like wave equation, heat equation and diffusion equation
4. Undertake any advanced course on ordinary as well as partial differential equation

Unit-I (10Hrs.)

Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations, Formation of first order partial differential equations, Linear partial differential equation of first order, Lagrange's method.

Unit-II(13Hrs.)

Solution of PDE by Cauchy method of characteristics, Compatible system of first order PDE, Charpit's method and Jacobi's method of solution.

Unit-III(12Hrs.)

Classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only, Homogeneous and non-homogeneous PDE with constant coefficients, Monge's method of solution of non-linear PDE of second order.

Unit-IV (10Hrs.)

Method of Separation of variables in a partial differential equation, Solution of Wave, Heat and Laplace equations.

Recommended Books:

1. W.E.Boyce and P.C.Diprima : Elementary Differential Equations and Boundary value problems, John Wiley, **1986.**
2. R. K. Jain and S.R.K.Iyengar: Advanced Engineering Mathematics, 2nd Edition, Narosa

Publishing House,**2003**.

3.   E.L.Ince: Theory of Ordinary Differential Equations. Dover,**1956**.

4.   M. Braun, 'Differential Equations and Their Applications', 4th Edn., Springer,2011.

5.   F. Braue and J.A. Nohel, 'The Qualitative Theory of Ordinary Differential Equations',Dover Publications,1989.

6.   E.A. Coddington, 'Ordinary Differential Equations', Tata McGraw Hill,2002.

Total Contact Hours= 450   **Total Marks= 800**

Total Credits= 30

Semester : First		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**		
GNADS1-101	Nutritional Biochemistry	4	0	0	20	80	100	4
GNADS1-102	Food Microbiology	4	0	0	20	80	100	4
GNADS1-103	Human Physiology	4	0	0	20	80	100	4
GNADS1-104	Practical 1	0	0	4	-	-	50	2
Total		12	0	4	60	240	350	14

Semester : Second		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**		
GNADS1-201	Dietetics & Diet Counseling	4	0	0	20	80	100	4
GNADS1-202	Clinical & Community Nutrition	4	0	0	20	80	100	4
GNADS1-203	Food Production Costing & Hospital& Mgt.	4	0	0	20	80	100	4
GNADS1-204	Practical-2	0	0	4	-	-	50	2
GNADS1-205	Project			2			100	2
Total		12	0	6	60	240	450	16

Overall Marks / Credits

Semester	Marks	Credits
1st	350	14
2nd	450	16
Total	800	30

NUTRITIONAL BIOCHEMISTRY				
Subject Code:GNADS1-101	**L T P C**			**Duration: 60 (Hrs.)**
	4 0 0 4			

UNIT-I (15 Hours)

Carbohydrates: Definition., classification, physical and chemical properties, sources ,biological role, metabolism, deficiency diseases, inborn errors of carbohydrate metabolism. Nutritional aspects of carbohydrate.

Proteins: Definition, classification, physical and chemical properties, sources, biological role, biological value   of protein., protein metabolism, protein deficiency diseases, and inborn errors of protein metabolism.

UNIT-II (15 Hours)

Lipids: Definition, classification, physical and chemical properties, sources, biological role, metabolism, and inborn errors of lipid metabolism. Nutritional aspects of lipids.

Vitamins: Definition, classification, characteristics, absorption & role of vitamins in metabolism, deficiency diseases.

UNIT-III (15 Hours)

Minerals Definition., types, absorption & role of minerals, minerals deficiency diseases.

Enzymes Definition, classification, mechanism of enzyme action., enzyme specificity, enzyme activity, factors affecting enzyme activity, uses of enzymes, enzymes in clinical diagnosis.

UNIT-IV (15 Hours)

Nucleic acids DNA & RNA, structure & function. metabolism. genetic disorders. e.g. cancer, autoimmune diseases, Role of Hormones, Interrelation between Nutrients.

Recommended Text Books / Reference Books:

1. Yadav S. 'Food Chemistry' New Delhi, Anmol Publications Pvt. Ltd.
2. Meyer 'Food Chemistry' New Delhi, C. B. S. Publications & distributors

3. Lubert Stryer 'Biochemistry'

4. Lehninger A. L. (1990) 'Principles of Biochemistry' New Delhi - CBS Publisher and

    Distributor .
5. Potter N. N. (1987), 'Food Science, New Delhi, CBS Publication and Distributor

6. Sukumar De. (1997), 'Outlines of Dairy Technology' New Delhi, Oxford University Press.

7. Syed etal (1997), , Experimental Methods in Food Engineering', New Delhi, CBS

8. Yadav S. 'Food Chemistry' New Delhi, Anmol Publications Pvt. Ltd.

9. Meyer 'Food Chemistry' New Delhi, C. B. S. Publications & distributors

10. Lubert Stryer 'Biochemistry'

11. Lehninger A. L. (1990) 'Principles of Biochemistry' New Delhi - CBS Publisher and

Distributor .

12. Potter N. N. (1987), 'Food Science, New Delhi, CBS Publication and Distributor

13. Sukumar De. (1997), 'Outlines of Dairy Technology' New Delhi, Oxford University Press.

14. Syed etal (1997), , Experimental Methods in Food Engineering', New Delhi, CBS

FOOD MICROBIOLOGY

Subject Code: GNADS1-102	L T P C	Duration: 60 (Hrs.)
	4 0 0 4	

UNIT-II (15 Hours)

History of Food Microbiology, Micro-organisms, Importance of Microorganisms, General classification, study of the morphological, cultural characteristics and bio-chemical activities of bacteria.

Growth curve of typical bacterial cell, Growth requirement of bacteria, sterilization by physical and chemical methods.

UNIT-II (15 Hours)

Different sources of contamination, intrinsic and extrinsic parameters of Food which effect Microbial growth. General principles underlying Food spoilage, chemical changes caused by Microorganism. Spoilage changes in different Food stuffs in brief.

UNIT-III (15 Hours)

Microbiology of Water - number and kinds of Microorganisms present, test for contamination of bacteria.Food Hazards, Food Poisoning, Food borne, Diseases, Food intoxication, Study of causative agent, symptoms of disease, prevention, control and vaccination.

UNIT-IV (15 Hours)

Microbes in fermented Food - Alcoholic beverages, Indigenous fermented foods like Idli, Dosa, Kaman Dhokla, Bread, Soya Bean Fermented Foods and other oriented fermented foods.

Recommended Text Books / Reference Books:

1] Geooge J. Banwart 'Basic Food Microbiology', Delhi, CBS Publishers and distributors.

2] Anantanarayan CKJ Panikar, 'Text Book of Microbiology' Origent Longman.

3] James M. Jay 'Modern Food Microbiology' New Delhi, CBS Publishers and
   distributors.

4] Reeta Arora'Microbiology and diseases', New Delhi, Anmol Publications Pvt. Ltd.

5] Frazier W.e. (1974), 'Food Microbiology' New Delhi Iind edition Tata Mc Graw Hill

6] Pelczar Micheal J. JR and Robert D. (1974) , Reid Microbiology' Iind edition Tata Me Graw Hill.

HUMAN PHYSIOLOGY

Subject Code: GNADS1-103	L	T	P	C	Duration: 60 (Hrs.)
	4	0	0	4	

UNIT-I (15 Hours)

Definition of anatomy physiology, general anatomy of human body. Protoplasm Chemical, Physical and physiological properties of protoplasm. Animal Cell: Structure, composition and function of Cell membrane. Structure and functions of Mitochondria, Endoplasmic reticulum, Ribosomes, Gol apparatus and Lysosomes;Structure of Nuclear envelope and its functions; Nucleolus - structure and function

Concept of Euchromatin, Heterochromatin; Barr body, Tissues Structure and functions of various types of tissues. Organs and organ systems an integrated approach.

UNIT-II (15 Hours)

Digestive System. Brief study of the anatomical organization of the digestive tract and process of dige absorption and assimilation of food. Circulatory System: Heart Structure and working of heart-Blood vessels, lymph vessels and their functions. Lymphatic system Concept of circulation at tissue level. Composition and functions of blood and lymph. Mechanism of blood coagulation- blood grouping and blood transfusion.

Defense Mechanisms of the body: Localization of infection; Inflammation, Active and Passive immunity, Introduction to T -lymphocytes and B-Iymphocytes; Immunization, Failure of immunity, DiGeorge syndrome, Common Variable Immuno deficiency syndrome (CVID), Acquired Immuno deficiency syndrome (AIDS).

UNIT-III (15 Hours)

Respiratory System: Basic anatomy of the respiratory system. Process of respiration-Transport and exchange of oxygen and carbon dioxide in the body.

Excretory System: Excretory organs- Structure and functions of Kidneys, Formation of urine composition of urine, Role of Skin and Liver in excretion.

Body Fluids, Water and Electrolytic

Balance.Nervous system: Physiology of the nerve cell, Parts of the Central Nervous System and functions. Origin and propagation of nerve impulse, Synaptic transmission, neurotransmitters, Parts of Brain and their functions, Spinal cord-structure and function, Importance of Automatic nervous system.

UNIT-IV (15 Hours)

Endrocrine Glands: Structure and endocrine functions of - Hypothalamus Pituitary gland Thyroid gland, Pancreas (Islets), Adrenal gland, Testis, Ovary, General introduction to mode of hormones on target cells.

Reproductive System.: Anatomy and functions of male reproductive organs, Anatomy and functions of Female reproductive organs. Menstrual cycle, Conception, Parturition. Contraception, Menopause and associated physiological problems.

Recommended Text Books / Reference Books:

1.   L Antony, C.A (1963), 'Text Book of Anatomy and Physiology', The c.v. Moshy Co., Saint Louis
2.   Bell G.H., Davidson, J.N., and Scarborough H. (1972) 'Textbook of Physiology and Biochemistry' London E.S. Livingston Ltd.
3.   Best. C.H., and Taylor, R. B. (1965) 'The Living Body', London, Chapman & Hall Ltd..
4.   Best. c.H., and Taylor. R.B. (1975), 'The Physiological Basis for Medical Practice' Calcutta ,The Williams and Wilkinson Scientific Book Agency.
5.   Guytons, AC. (1966), 'Text book of Medical Physiology', London, W.B. Saundes & Co.
6.   Rogers, T.S, Elementry (1961), 'Human Physiology', New York, John Willey and Sons, Inc.
7. Green, lH.(1972), 'An Introduction to Human Physiology' London, Oxford University Press.

PRACTICAL-I				
Subject Code: GNADS1-104	**L**	**T P**	**C**	**Duration: 30 (Hrs.)**
	0	0 4	2	

1. Weights and measures

2. Preparation of therapeutic diets -liquid diet, full fluid, solid and semisolid diet.

3. Diet in fever.

4. Diet in gastro intestinal diseases

5. Diet in liver diseases.

6. Diet in cardiovascular diseases

7. Diet in kidney diseases

8. Diet in disease of metabolic disorder such as arthritis, diabetes and gout.

9. Diet in cancer

10. Diet in Aids.

11. Quantity cookery

DIETETICS AND DIET COUNSELLING				
Subject Code: GNADS1-201	**L T**	**P**	**C**	**Duration: 60 (Hrs.)**
	4 0	0	4	

UNIT-I (15 Hours)

Introduction to therapeutic diets: Basic concepts, principles, factors considered, classification, special feeding methods, pre and post operative diet. Role of dietitian, the Hospital and Community. Routine Hospital diets: Regular diet, light diet, soft diet, full liquid diet, clear liquid diet and tube feedings. Therapeutic adaptation of normal diet.

UNIT-II (15 Hours)

Feeding infants and children Problems in feeding in the Hospital. Feeding the patient, Psychology of feeding the patient, assessment of patients need.Nutrition and diet clinics.Patients check up and counseling, education of the patient and follow- up.Diet in fevers, typhoid fever, influences and tuberculosis, Rheumatic fever & Counseling.

UNIT-III (15 Hours)
Disease of Gastro Intestinal tract, Constipation dysentery diarrhea, colitis.

Diet in Cancer & Counselling: Risk factors, general reaction, nutritional problems, nutritional requirements, Role of food in prevention of Cancer. Diet in Liver Diseases. & Counseling Cirrhosis, hepatitis, hepatic coma, diseases of gall bladder, pancreatitis, Diet in Cardiovascular diseases& Counseling Atherosclerosis, coronary heart disease, lipidaemia, hypertension, congestive heart failure, myocardial infarction

UNIT-IV (15 Hours)

Diet in kidney diseases& Counseling, Nrphrits, Acute chronic and reneal failure, renal calculi.

Diseases of metabolic disorder. Arthritis,Diabetes mellitus and Gout.Diseases of Nervous system. & Counseling

Polyneuropathy, burning feet syndrome, anorexia nervosa and epiplisy. Diseases of Endocrine disorders. & Counseling Hypothyroidism, Hyperthyroidism, hypocalcimia, Anemia.

Recommended Text Books / Reference Books:

1. Joshi S. A. 'Nutrition and Dietetics', New Delhi, Tata Mc Graw Hill Publishing Co. Ltd.

2. Robinson 'Nonnal and Therapeutic Nutrition' New Delhi, Tata Mc Graw Hill Publishing Co. Ltd.

3. Crampton E.W. and L. E. Lloyd (1915), 'Fundamentals of Nutrition', San Francisco W. H. Freeman

4. Davidson S.R, Passmore and IF. Brock (1986), 'Human Nutrition and Dietetics' London Churchill, Livingstone

5. Antia F.P (1986), 'Clinical Dietetics and Nutrition', Bombay, 3rd edition, Oxford University Press.

6. Jelliffee B.B. 'Assessment of Community Nutriion Status'

CLINICAL AND COMMUNITY NUTRITION				
Subject Code: GNADS1-202	L	T	P	C	Duration: 60 Hrs.)
	4	0	0	4	

UNIT-I(15 Hours)

Introduction to Nutrition, Principles of Foods and Nutrition, Food groups, Diet and balanced diet, Meal planning, meal pattern, selection of adequate diet, BDA, RDA of different age groups, use of Food exchange list.

Nutritional requirements for infancy, pre-school, school going and adolescents and adult hood. Factors affecting nutritional status, Nutritional problems, Packed lunch, and school lunch programmes, Food habits.

UNIT-II (15 Hours)

Nutritional requirements for expectant and nourishing mother, dietary modification, - dietary problems, complications of pregnancy and Indian nourishing mother. Geriatric Nutrition: Nutritional requirement, physiological changes, Nutritional changes, Nutritional problems during old age.Nutritional problems in India. Anemia, overweight, underweight, vito A- deficiency, PEM, goiter, thiamin deficiency.

UNIT-III (15 Hours)

Food selection purchase, storage, Food handling, sanitation and hygiene. Assessment of nutritional status by Population sampling, Anthropometry, Biophysical assessment, Radiographic examination, Nutritional adequacy of diet consumed, Clinical assessment, Biochemical assessment. Diet survey methods: Population sampling & duration of survey, diet survey methods, Questionnaire, Food list method, Interview method, Food inventory of log book method, Weightment of raw food, Weightment of cooked food, Analysis of cooked food method, Adult consumption unit.

UNIT-IV (15 Hours)

Nutrition and health education: Definition, Importance, channels of nutrition education methods, Planing for nutrition and health education,. Techniques of Nutrition Education.

Evaluation of nutritional programmes: Role of nutrition education programmes in eradication of malnutrition. Role of National and International agencies nto overcome malnutrition (ICDS, UNICEF, WHO, FAO, ICAR). Food fads and fallacies. Applied nutrition programmes ANP. MMP, SNPJCDS, FWPJPP, BNP.

Recommended Text Books / Reference Books:

1. Swaminthan M. 'Essentials of Food and Nutrition', Bangalore, printing and Publishing Co. Ltd.

2. Srilakshmi B. 'Dietetics' New Delhi, Newage International publishing Co. Ltd.

3. Joshi S. 'Nutriton and Dietetics' New Delhi, Tata McGrawHill Publishing Co. Ltd.

4. Crampton E.W. and L.E.Lloyd, (1915), 'Fundanentals of Nutrition' W.H.Freeman, San Francisco.

5. Davidson S.R, Passmore and J.F. Brock, (1986), 'Human Nutrition and Dietetics' London 8th edition, Churchill, Livingstone.

6. Antia F.P, (1986), 'Clinical Dietetics and Nutrition' 3rd edition, Bombay Oxford University Press.

7. Devadas R.P. (1972) 'Nutrition in Tamil Nadu Sangam' Publishers.

8. Meyer J,Human (1972) 'Nutrition Charles Thomas'

9. *King* M. and Morley 0, (1976), 'Nutrition for Developing Countries, Oxford University Press.

10. Lowenberg E.M. Todhunter N.E. Wilson Eva D Savage and Jane R. (1970), 'Food and Man Wiley' Eastern Pvt. Ltd.

11 Wesna D. (1981). 'Where There is No Doctor', The Voluntary Health Association of India.

12 Rajalakshmi R. (1981), 'Applied Nutrition Oxford & IDH Publishers' .

13 ICMR, 'Technical Report Series'.

14. Applied Nutritional Programmes ANP.MMP.SNPJCDS.FWPJPP.BNP.

FOOD PRODUCTION, COSTING AND HOSPITAL MANAGEMENT

Subject Code: GNADS1-203	L T P C	Duration: 60 (Hrs.)
	4 0 0 4	

UNIT-I (15 Hours)

Foundation Ingredients; Carbohydrates, fats, Proteins, Minerals, Vitamins, Seasonings, Flavorings,   Liquids, Thickening agents, Fats & Oils, Sweetening & Raisings agents.
Various cooking methods & Culinary terms (Western & Indian) :- Principles of cooking food with special application to fish, egg, meat, vegetables, cheese, pulses & cereals. Salads: - Importance, types, common salad dressing. Soups: - Importance, types, Seasoning & flavoring

Menu & Meal planning, rules for compilation of menu.Standardization of recipes & portion control.

UNIT-II (15 Hours)

Food Production Management – establishing purchase specification, volume forecasting, dealing with suppliers, receiving methods, stores organization, inventory control of stock, imienting portion control, yield testing standard recipes. Quantity Food Production :-Objectives of food preparation, working

methods, cooking methods, food preservation, food spoilage. Service Management: Table Service, dining room management.

Delivery and service of food in different systems. Development of new recipes and modified recipes.

UNIT-III (15 Hours)

Organization: Organizational Chart, Organizational Charts of Dietary/food service department, line of staff, authority, responsibility, power, delegation of authority, centralization and decentralization of food service

Leadership, motivation and communication. Dietitian as a leader, leadership qualities that a dietitian should possess, styles of leadership and their effect on subordinates. Relation between motivation and performance, Maslow's Theory of Motivation, Fredrik Hedburg Motivation – Hygieno Theory, Application of Above theories to motivate subordinates communication, need for communication, process of communication, upward, downward and lateral communication, barriers to effective communication, listening.

UNIT-IV (15 Hours)

Staffing and Personnel Management: Manpower Planning, Recruitment, Selection, Induction, Performance Appraisal, Training Development. Planning and Equipment Purchase.

Layout Design: Physical Plant – Floor Planning and Layout, Physical features necessary for efficient and sanitary food service area, design and construction of building equipments and its installation, wall and floor surfaces, lighting and ventilation, cost, quality and quantity.Factors affecting selection of equipment, features of equipment, installation operation and performance, care, maintenance and replacement.

Layout Design - space allowances, design development, space relationships, flow of traffic.

Recommended Text Books / Reference Books:

1. Thangum Philip – (1994)   Modern Cookery for Teaching and Trade (Volume 1 & II), Bombay Orient Langman's.

2. Shankuntala Mane – (1987) – Food Facts and Principles , Bombay, Willey Eastern Ltd.,

3. Angela Kay (1978) – Shining Cook Book, London Octopus Books Ltd.

4. B. B. Weste & L. Wood – (4th Ed.) – Food Service in Institutions - New York, John Willey & Sons,

5. Mohini Sethi & Surjeeet Mathan – (1993) – Catering Management & Integrated Approach, Bombay, Willey Eastern. Ltd.

PRACTICAL-II				
Subject Code: GNADS1-204	**L**	**T**	**P**	**C**	**Duration: 30 (Hrs.)**
	0	0	4	2	

1. Anthropometric measurements
2. Clinical assessment of subjects
3. Growth monitoring
4. Nutrition Education
    - Teaching aids
    - Nutrition messages
    - Street plays
5. Planning, preparation and Demonstration of Low cost nutrient rich recipes
6. Estimation of Blood Glucose
7. Estimation of Blood Urea.
8. Estimation of Serum Creatinine
9. Estimation of Bilirubin
10. Estimation of Serum protein
11. Estimation of Hemoglobin
12. Urine analysis
13. Preparation of Culture media
14. Culture methods
15. Gram Staining
16. Adulteration of various food samples

Semester 1st		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Agro-Techniques of Principal Field Crops-I(Kharif)	4	-	-	40	60	**100**	**4**
	Fundamentals of Soil Science	4	-	-	40	60	**100**	**4**
	Production Management of Important Fruit Crops	4	-	-	40	60	**100**	**4**
	Information and Communication Technology	**2**	**-**	**-**	**40**	**60**	**100**	2
	Principles of Management and Agribusiness	**4**	**-**	**-**	**40**	**60**	**100**	**4**
	Comprehensive and Communication Skills in English	**2**	**-**	**-**	**40**	**60**	**100**	2
	Fundamentals of Soil Science Lab	**-**	**-**	**2**	**60**	**40**	**100**	1
	Information and Communication Technology Lab	-	-	2	60	40	**100**	1
Total		**20**	**-**	**4**	**360**	**440**	**800**	**22**

Semester 2nd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Agro-Techniques of Principal Field Crops-II(Rabi)	3	-	-	40	60	**100**	3
	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops	3	-	-	40	60	**100**	3
	Principles of Plant Biotechnology	3	-	-	40	60	**100**	3
	Soil, Water and Plant Analysis	3	-	-	40	60	**100**	3
	Value Addition in Animal Products	**3**	**-**	**-**	**40**	**60**	**100**	3
	Money, Banking and International Trade	**3**	**-**	**-**	**40**	**60**	**100**	3
	Agro-Techniques of Principal Field Crops-II(Rabi) Lab	**-**	**-**	**2**	60	40	**100**	1
	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops Lab	**-**	**-**	**2**	60	40	**100**	1
	Principles of Plant Biotechnology Lab	**-**	**-**	**2**	60	40	**100**	1
	Soil, Water and Plant Analysis Lab	**-**	**-**	2	60	40	**100**	1

Total	18	-	8	480	520	1000	22

Agro-Techniques of Principal Field Crops-I
(Kharif)

Subject Code:	**L T P C**	**Duration: 60 (Hrs.)**
	4 0 0 4	

Course Objectives:

    1. Students will get familiar with the various elements influencing crop production.

    2. Share information about the history, geography, variations, and cultural customs associated with various Kharif crops.

    3. The origin, distribution, variety, and cultural techniques of several oilseeds, legumes, and other fodder crops will be covered in class.

Course Outcomes:

    1. Students will learn about the different factors effecting crop production.

    2. Provide knowledge about the origin, distribution, varieties and cultural practices of different Kharif crops.

    3. Students will learn about the origin, distribution, varieties and cultural practices of different oilseeds, Legumes and other fodder crops.

    Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1										
CO2			2									
CO3			2									

UNIT-I (15 Hrs)

Importance of agricultural meteorology – weather and climatic factors affecting crops

UNIT-II (15 Hrs)

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of kharif crops. Cereals: Rice, maize, kharif sorghum, pearl millet and minor millets

UNIT-III (15 Hrs)

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Pulses: Pigeon pea, mung bean, urid bean, horse gram, moth bean, cowpea Oil seeds: Groundnut, sesame, soybean, castor and niger

UNIT-IV (15 Hrs)

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Fibre crops: Cotton, jute, sun hemp and dhaincha Forage crops : Sorghum, pearl millet, maize, cowpea, cluster bean, rainfed and irrigated grasses

Recommended Text Books / Reference Books:

1. HandbookofAgriculture,ICARPublication,6thedition,2006.
2. ChhidaSingh,PremSinghandRajbirSinghModernTechniquesofraisingfieldcrops,, 2ndedition
3. RajendraPrasadFieldCrops,
4. ReddySR,PrinciplesofAgronomy,KalyaniPublishersThirdedition
5. S.S.Cheema,B.K.DhaliwalandT.S.SahotaTheoryandDigestAgronomy
6. M.M.Hosmani,B.M.ChittarpurandH.B.Babalad.FarmProductivityNewCenturyNewChallenges
7. V.G.Vaidya,K.R.SahasrabuddheandV.S.Khuspe,CropproductionandfieldexperimentationContinentalPrakashan,Pune.

Fundamentals of Soil Science				
Subject Code:	**L**	**T**	**P**	**C**	**Duration: 60 (Hrs.)**
	4	**0**	**0**	**4**	

Course Objectives:

1. Students will get knowledge of how soil is formed.

2. To educate people on the various characteristics of soil and the variables that effect it.

3. The C:N ratio, soil microorganisms, and classification of soils according to various parameters will all be taught to students.

Course Outcomes:

1. Students will learn about the origin of soil formation.

2. To impart knowledge about the different properties of soil and factors effecting it.

3. Students will learn about the composition of soil, C:N ratio, soil micro-organisms and classification of soils

Based on different criteria's.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2		2										
CO3				2								

UNIT-I (15 Hrs.)

Soil pedological and edapholigical concept. Origin of the earth Earth's crust composition Study of soil forming rocks and minerals, Weathering of rocks and minerals, Soil forming factors and processes, Components of soils

UNIT-II (15 Hrs.)

Study of soil profile, Soil physical properties: Soil texture, textural classes, particle size analysis, Soil structure Classification, soil aggregates, significance of soil consistency, Soil crusting. Bulk density and Particle density. Soil porosity, their significance and manipulation. Soil compaction and soil colour

UNIT-III (15 Hrs.)

Soil water: Retention and potentials, Drainage: Soil temperature, Soil air: Gaseous exchange. Influence of soil temperature, air on plant growth, Soil colloids: Properties, nature, types and significance, Ion exchange. CEC and AEC. Factors influencing ion exchange and its significance

UNIT-IV (15 Hrs.)

Soil organic matter: composition, C:N ratio, Soil biology: Definitions oil Biomass, soil organisms and their beneficial and harmful roles, Soil survey and USDA Soil classification. L and Capability classification Soils of India, Soils of Maharashtra, Soil erosion. Types, universal soil loss equation &control measures

Recommended Text Books / Reference Books:

1) **TextBook:**

   1. ByJ.A.DajiTextbookofSoilScience.

2) **Referencebooks:**

   1. ByC.C.ShahandNK.Narayana(1966)Physicalpropertiesofsoil

   2. ByHenry.D.FothkFundamentalsofSoilScience(8thedition)1990.

   3. ByBiswasandMukharjieeTextbookofSoilScience(Secondedition)1994

Production Management of Important Fruit Crops				
Subject Code:	**L**	**T**	**P**	**C**	**Duration: 60 (Hrs.)**
	4	**0**	**0**	**4**	

Course Objectives:

1. Students will gain knowledge about the significance, range, and current state of India's fruit production.

2. To educate people on the nutritional benefits of fruit.

3. To learn about various orchard training and trimming techniques.

Course Outcomes:

1. Students will learn about importance, scope and present status of fruit production in India.

2. To impart knowledge about the nutritive values of fruits.

3. To provide knowledge about the different training and pruning methods in orchard.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2						2						
CO3					2							

UNIT-I (15 Hrs.)

Classification of fruit crops on horticultural basis. Importance, present status and future scope for fruit growing in Maharashtra and India. Area and production, export, import scenario of fruit crops and plantation crops in Maharashtra and India.

UNIT-II (15 Hrs.)

Nutritive value of fruits, importance of selection of site, fencing, planting systems, high density planting, wind breaks and shelter belts in fruit production. Propagation methods and use of rootstocks, methods of training and pruning.

UNIT-III (15 Hrs.)

Special horticultural practices like bahar treatment, ringing, girdling, bending, notching, etc. Nutrient management, water management, weed control, mulching, intercropping, use of growth regulators in fruit production, physiological disorders in fruit crops.

UNIT-IV (15 Hrs.)

Package of practices for cultivation of major fruit crops like, mango, banana, citrus, grape, papaya, sapota, guava, pomegranate, minor fruit crops like ber, fig, coconut, are canut, etc.

Industrial value of plantation crops (Give brief cultivation information in tabular form for minor crops).

Recommended Text Books / Reference Books:

1) **TextBook:**

2) **Referencebooks:**

1. Hayes,W.B.FruitGrowinginIndia.KitabPublishingCo.,Allahabad.

2. Shanmugavelu, K.G.Production TechnologyofFruitCrops,SBAPublishers,Kolkatta.

3. Singh,Ranjeet.Fruits.NationalBookTrustLtd.,NewDelhi.

4. ShamSingh.FruitGrowing.KalyaniPublishers,NewDelhi.

5. Bose,T.K.andS.K.Mitra.PropagationofTropicalandSubtropicalHorticul turalCrops,NayaUdyog,206,BidhanSavani,Kolkatta-700016.

6. Baker,H.Fruits.MitchellMeagrelyPublications,London.

7. Singh,A.FruitProductionandTechnology.KalyaniPublishers,NewDelhi.

8. Yadav, P. K. Fruit Production Technology.International Book Distributing Co.,Division,Lucknow,Inida.

9. Sharma,R.R.FruitProductionProblemsandSolutions.InternationalBook DistributingCo.,Division,Lucknow,India.

10. Kumar, P. Management of Horticultural Crops. (HortSciene Series Vol. 11, NewIndia Publishing Agency, NIPA). Kumar, P. Management of Horticultural Crops.(HortScieneSeriesVol.11,NewIndiaPublishingAgency,NIPA).

11. Kunte, Y. N, Kawthalkar, M.   P., Yawalkar, K.S. Principles of Horticulture andFruitgrowing,Agro-HorticulturalPub.House,Nagpur.

Information and Communication Technology

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:

1. To explain the significance of IT and the many information technology industries.

2. The merits and disadvantages of machine language, assembly language, and high-level language will be taught to students.

3. To impart knowledge about Microsoft Office, including Word, Excel, and Power Point, as well as audio visual tools, etc.

Course Outcomes:

1. To provide importance of IT and the different sectors of information technology.

2. Student will learn about machine language, assembly language, high-level language and their advantages and Disadvantages.

3.To provide knowledge about MS Office - Word, Excel, Power Point; Audio visual aids etc.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2					2							
CO3					2							

<div align="center">

UNIT-I (7 Hrs.)
</div>

IT and its importance; IT tools; IT-enabled services and their impact on society; Computer fundamentals; Hardware and software; Input and output devices; Word and character representation

<div align="center">

UNIT-II (7 Hrs.)
</div>

Features of machine language, assembly language, high-level language and their advantages and disadvantages; Principles of programming-algorithms and flowcharts.

<div align="center">

UNIT-III (8 Hrs.)
</div>

Operating systems (OS) - definition, basic concepts; Introduction to WINDOW Sand LINUX Operating Systems; Local area network (LAN); Wide area network (WAN); Internet and World Wide Web; HTML and IP

<div align="center">

UNIT-IV (8 Hrs.)
</div>

Introduction to MS Office - Word, Excel, Power Point; Audio visual aids - definition, advantages, classification and choice of A.V. aids; Criteria for selection and evaluation of aids; Video conferencing; Communication process, Berlo's model, feedback and barriers to communication.

Recommended Text Books / Reference Books:

1. Gurvinder Singh, Rachhpal Singh &Saluja KK. 2003. Fundamentals of Computer Programming and Information Technology.Kalyani Publishers.

2. Harshawardhan P. Bal. 2003. Perl Programming for Bioinformatics.Tata McGraw-Hill Education.

3. Kumar A 2015. Computer Basics with Office Automation. IK International Publishing House Pvt Ltd.

4. RajaramanV &AdabalaN.2015.FundamentalsofComputers.PHI Recommended Latest Online Tutorials (over Internet).

PrinciplesofManagementandAgribusiness

Subject Code:	L T P C	Duration: 60 (Hrs.)
	4 0 0 4	

Course Objectives:

1. Students will gain knowledge of the significance, application, and scope of agribusiness in the Indian economy.

2. To impart knowledge about the significance, range, and many functions of management.

3. To spread knowledge about the fundamentals, significance, traits, and nature of organisations.

Course Outcomes:

1. Students will learn about the meaning importance and scope agribusiness in Indian economy.

2. To provide the knowledge about importance, scope and different functions of management.

3. To impart knowledge about the principles, importance, characteristics and nature of organization.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2	2											
CO3	2											

UNIT-I (15 Hrs.)
Agri-business: Meaning, definition, history and scope of agri-business (Input, Farm Product Sectors). Importance of agri-business in the Indian economy. Changing dimension of agricultural business. Agri-business Management-distinctive features, nature and components

UNIT-II (15Hrs.)
Introduction to management-Management functions-Management levels-Managerial roles-Management skills-Definitions of management-Role of management. Elements, Levels, Process of Management
UNIT-III (15 Hrs.)
Functions of Management: Planning: Definition importance, characteristics, Steps in planning Types of planning Nature and importance-Purpose of planning-Forms of planning- types of planning-Steps in planning-Limitations of planning. Organizing: Meaning-definition, importance, Characteristics/Nature of organization. Principles & Process of organization.
UNIT-IV (15 Hrs.)
Functions of Management: Directing-definition, functions, techniques, qualities of good supervisor. Controlling–Definition, Elements, Process of control, Techniques/Tools of control. Farm business analysis-Farm efficiency measures, farm financial & cash accounts, Net worth statement, systems of book keeping.

Recommended Text Books / Reference Books:

1. K.Loknandhan,K.Mani,K.MahendranInnovationsinAB
2. D.K.TripathiPrinciples&PracticesofManagement.
3. S.S.Johl,T.R.KapoorFundamentalsoffarmbusinessmanagement

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Comprehensive and Communication
Skills in English

Subject Code:	**L T P C**	**Duration: 30 (Hrs.)**
	2 0 0 2	

Course Objectives:

1. To convey the value of education.

2. The applications of the English language in daily life will be taught to the students.

3. To impart knowledge about the current scenario around community.

Course Outcomes:

1. To impart importance of education.

2. Students will learn about the uses of English language in their daily lives.

3. To provide knowledge about the current scenario around community.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2										2		
CO3										2		

The following Lessons from the *textbook-Current English for Colleges* (by N Krishnaswamy and T. Sriraman;Macmillan;2007Rs.*951-)-are* for the theory classes along with the Exercises at the end of each lesson.

UNIT-I (08 Hrs.)

1.Education 2. Employment 3. Unemployment 4.Application 5.Planning

UNIT-II (08 Hrs.)

6.CurriculumVitae 7. Interview 8 .Reporting 9.General Knowledge 10.Stress

UNIT-III (07 Hrs.)

11. Short Story 12.Environment 13.Computerecy 14.ADilemma

UNIT-IV (07 Hrs.)

15.Entertainment 16.You and Your English 17.Usage and Abusage 18.War

Minus Shooting

Recommended Text Books / Reference Books:

1. Krishnaswamy,.NandSriraman,T.1995.CurrentEnglishfor Colleges.MacmillanIndiaLtd.Madras.

2. BalasubrmanyamM.1985.BusinessCommunication.VaniE ducationalBooks,NewDelhi.

3. Naterop,Jean,B.andRodRevellTelephoninginEnglish.1997 .CambridgeUniversityPress,Cambridge.

4. MohanKrishnaandMeeraBanerjee.1990.DevelopingComm unicationSkills.MacmillanIndiaLtd.NewDelhi.

5. NarayanaswamyVR.1979.Strengthenyourwriting.OrientLongman,NewDelhi.

6. SharmaRCandKrishnaMohan.1978.BusinessCorresponde nce.TataMeGrawHillPublishing Company,NewDelhi.

7. Carnegie,Dale.2012.HowtoWinFriendsandInfluencePeopl

eintheDigitalAge.Simon&Schuster.

8. CoveyStephenR.1989.TheSevenHabitsofHighlySuccessfulPeople.FreePress.

9. SpitzbergB,BargeK&Morreale,SherwynP.2006.HumanCommunication:Motivation,Knowledge&Skills.Wadsworth.

10. Verma,KC.2013.TheArtofCommunication.Kalpaz.

11. MamathaBhatnagarandNitinBhatnagar.2011.EffectiveCommunicationandSoftSkills.PersonEducation.

12. MeenakshiRaman,SangeetaSharma.TechnicalCommunicationPrinciplesandPractice

13. HaroldWallaceandAnnMasters.PersonalityDevelopment.CengagePublishers.

Fundamentals of Soil Science Lab				
Subject Code:	**L**	**T**	**P**	**C**

Duration: 30 (Hrs.)

	L	T	P	C
	0	0	2	1

Course Objectives:

1. The preparation of various soils and plant samples will be examined with the students.

2. Students will be able to identify soil's fundamental characteristics.

3. Students will be able to assess the soil's nutritional condition.

Course Outcomes:

1. Students will learn about the preparation of different soil and plant samles.
2. Students will be able to determine the basic properties of soil.
3. Students will be able to determine nutrient status of soil.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2										
CO2				2								
CO3		2										

Practical

1. Basic analytical concepts, techniques and calculation.
2. Collection and preparation of soil samples for horticultural crops
3. Determination of moisture content in soil by gravimetric method

4 Determination of pH and EC of soil sample
5 Determination of calcium carbonate by Rapid Titration method
6 Determination of Organic carbon by Walkely and Black method
7 Determination of Bulk density and porosity of soil
8 Textural analysis of soil by Boucouyos hydrometer method
9 Determination of available nitrogen content in soil
10 Determination of available Phosphorus from soil
11 Determination of available Potassium from soil
12 Determination of available sulphur from soil
13 Determination of DTPA extractable micronutrient from soil
14 Description of soil profile in field
15 Determination of soil colour using Munsell colour chart, Estimation of water holding capacity ,
   Field capacity, Permanent wilting point and
16 Determination of soil water potential characteristic curve by tensiometer and pressure plate
   apparatus
17 Visit to Soil and Water Clinic

Recommended Text Books / Reference Books:

   3) TextBook:

   1. ByJ.A.DajiTextbookofSoilScience.

   4) Referencebooks:

   1. ByC.C.ShahandNK.Narayana(1966)Physicalpropertiesofsoil

   2. ByHenry.D.FothkFundamentalsofSoilScience(8thedition)1990.

   3. ByBiswasandMukharjieeTextbookofSoilScience(Secondedition)1994

Information and Communication Technology Lab		
Subject Code: L T P C		**Duration: 30 (Hrs.)**
0 0 2 1		

Course Objectives:

1. The binary number system, algorithms, flowcharts, and other topics will be taught to students.

2. Teach how to use MS Word, MS Excel, MS Power Point, and MS Excel for data analysis.

3. Share information on poster and chart development, presentation, and equipment handling.

Course Outcomes:
1. Students will learn about binary number system, Algorithm and flow chart etc.

2. Provide knowledge about MS Word, MS Excel and MS Power Point and analysis of data using MS Excel.

3. Provide knowledge about preparation, presentation of posters, charts and handling of different equipment.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					1							
CO2					2							
CO3					2							

Practical

1. Exercises on binary number system
2. Algorithm and flow chart;
3. Working on Microsoft office such as MS Word, MS Excel, MS Power Point
1. Internet applications: web browsing, creation and operation of email account
2. Analysis of data using MS Excel
3. Handling of audio visual equipment
4. Planning, preparation, presentation of posters, charts, overhead transparencies and slides
5. Organization of an audio visual programme.

Recommended Text Books / Reference Books:

1. Gurvinder Singh, Rachhpal Singh &Saluja KK. 2003. Fundamentals of Computer Programming and Information Technology.Kalyani Publishers.
2. Harshawardhan P. Bal. 2003. Perl Programming for Bioinformatics.Tata McGraw-Hill Education.
3. Kumar A 2015. Computer Basics with Office Automation. IK International Publishing House Pvt Ltd.
4. Rajaraman V & Adabala N. 2015. Fundamentals of Computers. PHI Recommended Latest Online Tutorials (over Internet).

MRSPTU M.SC. (AGRICULTURE) AGRONOMY SYLLABUS
2022 BATCH ONWARDS

Total Contact Hours= 21   **Total Marks= 700**   **Total Credits= 16**

Semester 1st		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Modern concepts in Crop Production	3	-	-	40	60	**100**	**3**
	Fertilizer use in Crop Production	2	-	-	40	60	**100**	**2**
	Principles and Practices of Weed Management	**2**	**-**	**-**	**40**	**60**	**100**	**2**
	Technical Writing and Communication Skills, Library and Information Services	**2**	**-**	**-**	**40**	**60**	**100**	**2**
	Intellectual Property Management, Biodiversity and Biosafety	**2**	**-**	**-**	**40**	**60**	**100**	**2**
	Principles and Practices of Weed Management lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
	Technical Writing and Communication Skills, Library and Information Services lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
	Master's research	**-**	**-**	**6**	**-**	**-**	**-**	**3**
Total		**11**		**10**	**320**	**380**	**700**	**16**

Total Contact Hours= 28   **Total Marks= 800**   **Total Credits= 18**

Semester 2nd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Principles and Practices of Water Management	2	-	-	40	60	**100**	**2**
	Field Plot Techniques	2	-	-	40	60	**100**	**2**
	Statistical Methods for Research Workers	2	-	-	40	60	**100**	**2**
	Soil Fertility and Fertilizer Use	2	-	-	40	60	**100**	**2**
	Principles and Practices of Water Management lab	-	-	2	60	40	**100**	**1**
	Field Plot Techniques lab	-	-	2	60	40	**100**	**1**
	Statistical Methods for Research Workers lab	-	-	2	60	40	**100**	**1**
	Soil Fertility and Fertilizer Use lab	-	-	2	60	40	**100**	**1**
	Master's research	-	-	12	-	-	-	**6**
Total		8	**-**	20	400	400	800	18

MRSPTU M.SC. (AGRICULTURE) AGRONOMY SYLLABUS
2022 BATCH ONWARDS

Total Contact Hours= 26 **Total Marks= 800** **Total Credits= 17**

Subject Code	Subject Name	L	T	P	Int.	Ext.	Total Marks	Credits
	Semester 3rd	**Contact Hours**			**Max Marks**		**Total Marks**	**Credits**
		L	T	P	Int.	Ext.		
	Agronomy of Major Cereals and Pulses	2	-	-	40	60	100	2
	Agronomy of Fodder and Forage Crops	2	-	-	40	60	100	2
	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis	2	-	-	40	60	100	2
	Management of Problem Soils and Water	2	-	-	40	60	100	2
	Agronomy of Major Cereals and Pulses lab	-	-	2	60	40	100	1
	Agronomy of Fodder and Forage Crops lab	-	-	2	60	40	100	1
	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis lab	-	-	2	60	40	100	1
	Management of Problem Soils and Water lab	-	-	2	60	40	100	1
	Master's research	-	-	10	-	-	-	5
	Total	8	-	18	400	400	800	17

Total Contact Hours= 25 **Total Marks= 400** **Total Credits= 16**

Subject Code	Subject Name	L	T	P	Int.	Ext.	Total Marks	Credits
	Semester 4th	**Contact Hours**			**Max Marks**		**Total Marks**	**Credits**
		L	T	P	Int.	Ext.		
	Master Seminar	-	-	-	100	100	200	3
	Research and Publication Ethics	1	-	-	40	60	100	1
	Research and Publication Ethics (practical)	-	-	2	60	40	100	1
	Master's research	-	-	22	-	-	-	11
	Total	1	-	24	200	200	400	16

Overall Marks / Credits

Semester	Marks	Credits
1st	700	16
2nd	800	18
3rd	800	17
4th	400	16
Total	2700	67

MODERN CONCEPTS IN CROP PRODUCTION

Subject Code:	L T P C	Duration: 45 (Hrs.)
	3 0 0 3	

Course Objectives:

The main objective of soil management for agriculture is to **create favourable conditions for good crop growth**, seed germination, emergence of young plants, root growth, plant development, grain formation and harvest. Sustained productivity goes in hand with good management practices.

Course Outcomes:

1. Students will learn about the modern concepts of crop growth and productivity with regards to climate change.
2. To know about the modern concepts of tillage and farm mechanization.
3. To learn about the fundamentals and components of organic farming, vermiculture, and resource-conservation technology.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			2									
CO2					3							
CO3						2						

UNIT-I (10 Hours)

Crop growth analysis in relation to environment.
Geo-ecological zones of India, Quantitative agro-biological principles and inverse yieldnitrogen law.

UNIT-II (12 Hours)

Mitscherlich yield equation, its interpretation and applicability. Baule unit. Effect of lodgingin cereals. Physiology of grain yield in cereals.
Optimization of plant population and planting geometry in relation to different resources,concept of ideal plant type and crop modelling for desired crop yield.

UNIT-III (13 Hours)

Scientific principles of crop production. Crop response production functions.
Concept of soil plant relations. Yield and environmental stress.
Integrated farming systems, organic farming and resource conservation technologyincluding modern concept of tillage; dry farming.

UNIT-IV (10 Hours)

Determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management. Precision agriculture.

Recommended Text Books / Reference Books:

1. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. Soil Fertility and Fertilizers. 7th Ed. Prentice Hall.
2. Paroda R.S. 2003. Sustaining our Food Security. Konark Publ.

3.	Reddy SR. 2000. Principles of Crop Production. Kalyani Publ.
4.	Sankaran S & Mudaliar TVS. 1997. Principles of Agronomy. The Bangalore Printing & Publ.
5.	Singh SS. 2006. Principles and Practices of Agronomy. Kalyani.

Fertilizer use in Crop Production

Subject Code:	L T P C	Duration: 30(Hrs.)
	2 0 0 2	

Course Objectives:
1. The making of various organic manures will be covered with the students**.**
2. To understand the importance of plant nutrients, how they are delivered to plants, and the variables that affect their availability.
3. To comprehend how crops react to various fertilisers.

Course Outcomes:
1. Students will learn about the preparation and composition of different organic manures.
2. To recognize the significance of plant nutrients, their mechanisms of transport to plants, and the factors that control their availability.
3. To understand the crop responses to different fertilizers.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			3									
CO2				2								
CO3				2								

UNIT-I (7 Hours)

Crop response to fertilizer-effect on germination, growth and nutrient removal. Problems of supply and availability of nutrients, relation between nutrient supply and crop growth. Organic farming - basic concept and definitions.

UNIT-II (7 Hours)

Preparation and use of farmyard manure, compost, green manures, vermin-compost, bio-fertilizers and other organic concentrates their composition, availability and crop responses, recycling of organic wastes and residue management. Commercial fertilizers, composition, relative fertilizer value and cost.

UNIT-III (8 Hours)

Crop response to different nutrients, residual effects and fertilizer use efficiency, fertilizer mixtures and grades. Agronomic, chemical and physiological methods of increasing fertilizer use efficiency. Nutrient interactions. Time and methods of manures and fertilizers application. Foliar fertilizer application and its concept.

UNIT-IV (8 Hours)

Relative performance of organic and inorganic manures. Economics of fertilizer use. Integrated nutrient management. Site specific nutrient management. Effect of fertilizers on environment, Nutrient cycling integrated farming systems, Long effects of fertilizers use on crop yield and soil productivity.

Recommended Text Books / Reference Books:

1. Brady NC & Weil R.R 2002. The Nature and Properties of Soils. 13th Ed. Pearson Edu.
2. Fageria NK, Baligar VC & Jones CA. 1991. Growth and Mineral Nutrition of Field Crops. Marcel Dekker.
3. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. Soil Fertility and Fertilizers. 7th Ed. Prentice Hall.
4. Prasad R & Power JF. 1997. Soil Fertility Management for Sustainable Agriculture. CRC Press. Yawalkar KS, Agrawal JP & Bokde S. 2000. Manures and Fertilizers. Agri-Horti Publ.
5. Prasad R & Power JF. 1997. Soil Fertility Management for Sustainable Agriculture. CRC Press.
6. Yawalkar KS, Agrawal JP & Bokde S. 2000. Manures and Fertilizers. Agri-Horti Publ.

PRINCIPLES AND PRACTICES OF WEED MANAGEMENT

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
1. The biology of weeds and their ecological cycle will be taught to students.
2. Disseminating information on how various herbicides are applied.
3. To comprehend various weed-control strategies that preserve ecological harmony.

Course Outcomes:
1. Students will learn about the weed biology and ecological cycle of weeds.
2. Providing knowledge about the different herbicides application .
3. To understand different methods of weed control with maintaining ecological balance.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					2							
CO2				2								
CO3							3					

UNIT-I (7 Hours)

Weed biology, ecology and crop-weed competition including allelopathy. Principles and methods of weed control. Weed indices. History and development of herbicide.

UNIT-II (8 Hours)

Classification and selectivity of herbicides based on chemical, physiological application and selectivity. Mode and mechanism of action of important herbicides. Herbicide structure- activity relationship and factors affecting the efficiency of herbicides. Herbicide formulations and mixtures.

UNIT-III (7 Hours)

Weed control through bio-herbicides, myco-herbicides and allelochemicals, Degradation of herbicides in soil and plants. Herbicide resistance in weeds and crops herbicide rotations. Weed management in major crops and cropping systems.

UNIT-IV (8 Hours)

Management of parasitic weeds and special weed problems. Weed shifts in cropping systems. Aquatic and perennial weed control. Integrated weed management. Cost: benefit analysis of weed management.

Recommended Text Books / Reference Books:

1. Aldrich RJ & Kramer RJ. 1997. Principles in Weed Management. Panima Publ.

2. Ashton FM & Crafts AS. 1981. Mode of Action of Herbicides. 2nd Ed. Wiley Inter-Science.

3. Gupta OP. 2007. Weed Management – Principles and Practices. Agrobios.

4. Mandal RC. 1990. Weed, Weedicides and Weed Control - Principles and Practices. AgroBotanical Publ.

5. Rao VS. 2000. Principles of Weed Science. Oxford & IBH.

6. Subramanian S, Ali AM & Kumar RJ. 1997. All About Weed Control. Kalyani.

7. Zimdahl RL. 1999. Fundamentals of Weed Science. 2nd Ed. Academic Press. 4

Technical Writing and Communication Skills, Library and Information Services

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
1. Skill in written and vocal communication.
2. The competence in English.
3. The ability to use the English language well through word power

Course Outcomes: 1. Competency in communication both written and oral
1. The ability to speak English well.
2. Word power to effectively use the English language

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

UNIT-I (7 Hours)

Technical Writing-Various forms of technical writing-theses, technical papers, reviews, electronic communication etc; qualities of technical writing

UNIT-II (8 Hours)

Parts of research communications- titlepage, content page, authorship, preface, introduction, review of literature, materials and methods, experimental results, documentation; photographs and drawings with suitable captions; pagination, citations; writing of abstracts; précis; synopsis

UNIT-III (7 Hours)

Editing and proof reading. Communication Skills-defining communication; types of communication-verbal and non-verbal; assertive communication; assertive communication; using language for effective

communication;

UNIT-IV (8 Hours)

Techniques of dyadic communication- message pacing and message chunking, self-disclosure, mirroring, expressing conversational intent; paraphrasing; vocabulary building- word roots, prefixes, Greek and Latin roots.

Recommended Text Books / Reference Books:

1. Raman M and Sharma S (2015) Technical Communication Principles and Practice. *Oxford University Press, 3rd edition*.

2. Farhathullah T M (2017) *Communication Skill for Technical Students.* Sangam Books Ltd.

Intellectual Property Management, Biodiversity and Biosafety

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	2	0	0	2	

Course Objectives:
1. Students will study the background, principles, and varieties of international treaties and conventions for the protection of intellectual property.
2. To educate people on the importance that intellectual property plays in trade, commerce, and growth.
3.   The many ecosystems and their sustainable applications will be taught to students.

Course Outcomes:
1. Students will learn about the history, concepts and types, international treaties and conventions for protection of IP'S.
2. To provide knowledge about the role of intellectual property in growth, development, trade and commerce.
3. Students will learn about the different ecosystems and their sustainable uses.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2												1
CO3							2					

UNIT-I (8 Hours)

Introduction to Intellectual Property: history, concepts and types. International treaties and conventions for protection of IP'S. Role of intellectual property in growth, development, trade and commerce; Indian legislations for the protection of various types of Intellectual Property with a special reference to history and evolution of the concepts of geographical indicators, variety protection and patents.

UNIT-II (8 Hours)

R & D expenditure visà-vis patents. PPVFRA: Process for protection of plant varieties, issues related to compliance sand infringements. GI: Process for protection of goods, community involvement and benefit sharing. Patents: Search, process of filing patents, infringement and compliances. Biodiversity: Definition,

importance, historical and geographical causes for diversity. Species and population biodiversity,

UNIT-III (7 Hours)
Maintenance of ecological biodiversity. Biodiversity hot spots in India, Collection, conservation, documentation and characterization of biodiversity, development and maintenance of live repositories, community gene banks. Convention on biological diversity. National biodiversity protection initiatives; sustainable use of bio-diversity, benefit sharing, Bio-safety guidelines for the development and protection of genetically modified organisms

UNIT-IV (7 Hours)
Cartagena Protocol of Bio-safety, its objective, salient features, risk assessment and risk management for GMO's, Bio-safety guidelines, rules and regulations and regulatory frame work for GMO in India; institutional arrangements at national level, procedure for direct use of GMO's in India. Licensing of technologies, Material transfer agreements, Research collaboration agreement, License Agreement.

Recommended Text Books / Reference Books:
1. Sibi G (2021) Intellectual Property Rights, Bioethics, Biosafety and Enterpreneurship in Biotechnology. *Dreamtech Press*.   2. Goel D and Parashar S (2013) IPR Biosafety and Bioethics.

PRINCIPLES AND PRACTICES OF WEED MANAGEMENT LAB

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
 1. Herbarium sheets can be made to identify weeds.
 2. The formulation of various spray solutions and the economics of weed control will be taught to the students.
 3. Different herbicide requirements and their aftereffects will also be taught to the students.

Course Outcomes:
 1. Identification of weeds by preparing herbarium sheets.
 2. Students will learn about formulation of different spray solutions and economics of weed control.
 3. Students will also learn about different herbicides requirements and their residual effects.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1											2	
CO2				2								
CO3					3							

PRACTICALS
1. Identification of important crop weeds.   2. Preparation of a weed herbarium.   3. Weed survey in crops and cropping systems.   4. Crop-weed competition studies.

5. Weed indices.

6. Preparation of spray solutions of herbicides for high and low-volume sprayers.

7. Use of various types of spray pumps and nozzles and calculation of swath width.

8. Economics of weed control.

9. Herbicide residue analysis in plant and soil.

10. Bioassay of herbicide residue.

11. Calculation of herbicidal requirement.

Technical Writing and Communication Skills, Library and Information Services lab											
Subject Code:			**L T P C**					**Duration: 30(Hrs.)**			
			0 0 2 1								

Course Objectives: :
1. Skill in written and vocal communication.
2. Having good English language skills.
3. Word strength to use the English language well

Course Outcomes: -
1. Competency in communication both written and oral
2. The ability to speak English well.
3. Word power to effectively use the English language.

Mapping

CO/PO	PO1	PO2	PO3	PO	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

PRACTICALS

1. Editing and Proof-reading technical articles using language tools for effective writing

2. Listening to audio-video conversations aimed at testing the comprehension of the students

3. Oral presentations on a given topic related to agriculture

4. Evaluation of body language and communication skills based on group discussions and interviews

5. Role plays and pronunciation exercises using eye contact and visual clues for effective listening skills

6. Word stress application and voice modulation

7. Soft skills; rhetoric skills; self-assessment exercises.

8. Introduction to Library and its services; Five laws of library science; type of documents

9. Classification and cataloguing

10. Organization of documents

11. Sources of information-primary, secondary and tertiary

12. Current awareness and SDI services

13. Tracing information from reference sources

14. Library survey

15. Preparation of bibliography

16. Use of Online Public Access Catalogue

17. Use of CD-ROM databases and other computerized library services, CeRA, J-Gate

18. Use of Internet including search engines and its resources; e-resources and access methods.

MRSPTU M.SC. (HORT.) VEGETABLE SCIENCE SYLLABUS
2022 BATCH ONWARDS

Total Contact Hours = 22   **Total Marks= 900**   **Total Credits= 16**

Semester 1ST		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Production Technology of Winter Season Vegetable Crops	2	-	-	40	60	100	2
	Production Technology of Summer Season Vegetable Crops	2	-	-	40	60	100	2
	Breeding of Self Pollinated and Vegetatively Propagated Vegetable Crops	2	-	-	40	60	100	2
	Technical Writing and Communication Skills, Library and Information Services	2	-	-	40	60	100	2
	Intellectual Property Management, Biodiversity and Biosafety	2	-	-	40	60	100	2
	Production Technology of Winter Season Vegetable Crops lab	-	-	2	60	40	100	1
	Production Technology of Summer Season Vegetable Crops lab	-	-	2	60	40	100	1
	Breeding of Self Pollinated and Vegetatively Propagated Vegetable Crops lab	-	-	2	60	40	100	1
	Technical Writing and Communication Skills, Library and Information Services lab	-	-	2	60	40	100	1
	Master's research	-	-	4	-	-	-	2
	Total	10	-	12	440	460	900	16

Total Contact Hours = 28   **Total Marks= 800**   **Total Credits= 18**

Semester 2nd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Breeding of Cross Pollinated Vegetable Crops	2	-	-	40	60	100	2
	Systematics of Vegetable Crops	2	-	-	40	60	100	2
	Statistical Methods for Research Workers	2	-	-	40	60	100	2

	Subject Name	L	T	P	Int.	Ext.	Total Marks	Credits
	Principles of Plant Breeding	2	-	-	40	60	100	2
	Breeding of Cross Pollinated Vegetable Crops lab	-	-	2	60	40	100	1
	Systematics of Vegetable Crops lab	-	-	2	60	40	100	1
	Statistical Methods for Research Workers lab	-	-	2	60	40	100	1
	Principles of Plant Breeding Lab	-	-	2	60	40	100	1
	Master's research	-	-	12	-	-	-	6
	Total	8	-	20	400	400	800	18

Total Contact Hours = 28   **Total Marks= 800**   **Total Credits= 18**

Semester 3rd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Organic Vegetable Production Technology	2	-	-	40	60	100	2
	Post-harvest Handling of Vegetable Crops	2	-	-	40	60	100	2
	Breeding Field Crops	2	-	-	40	60	100	2
	Principles of Genetics	2	-	-	40	60	100	2
	Organic Vegetable Production Technology (practical)	-	-	2	60	40	100	1
	Post-harvest Handling of Vegetable Crops(practical)	-	-	2	60	40	100	1
	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis(practical)	-	-	2	60	40	100	1
	Management of Problem Soils and Water(practical)	-	-	2	60	40	100	1
	Master's research	-	-	12	-	-	-	6
Total		8	-	20	400	400	800	18

Total Contact Hours = 25   **Total Marks= 900**   **Total Credits= 16**

Semester 4th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Master Seminar	-	-	-	100	100	200	3
	Research and Publication Ethics	1	-	-	40	60	100	1

Research and Publication Ethics (practical)	-	-	2	60	40	100	1
Master's research	-	-	22	-	-	-	11
Total	1	-	24	200	200	400	16

Overall Marks / Credits

Semester	Marks	Credits
1st	900	16
2nd	800	18
3rd	800	18
4th	400	16
Total	**2900**	**68**

Production Technology of Winter Season Vegetable Crops

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
1. To teach learners about the taxonomy, botany, and nutritional value of vegetables grown in various places.
2. Students will study various vegetable post-harvesting methods and plant protection strategies.
3. Providing information on the winter crop seed production process.

Course Outcomes:
1. To impart knowledge to students about the botany, taxonomy and nutritional value of vegetables growing in different regions.
2. Students will learn about different plant protection measures and post harvesting techniques in vegetables.
3. Providing knowledge of seed production of winter season crops.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2				2								
CO3			3									

UNIT-I (8 Hours)

Introduction, nutritional value, origin, botany and taxonomy, important countries and states growing vegetables along with area, climate and soil requirements

UNIT-II (8 Hours)

Commercial varieties/hybrids evolved by private and public sector, sowing/ transplanting time, seed rate and seed treatment, nutritional and irrigation requirements,

UNIT-III (7 Hours)

Chemical weed control, mulching, physiological disorders, harvesting techniques, postharvest management, plant protection measures and seed production of potato

UNIT-IV (7 Hours)

Seed production of cole crops; cabbage, cauliflower, knol khol, broccoli, brussels' sprout, chinese cabbage, root crops; carrot, radish, turnip, beet root, bulb crops; onion and garlic, peas and beans, green leafy cool season vegetables.

Recommended Text Books / Reference Books:

1. Bose TK & Som MG. (Eds.). 1986. Vegetable Crops in India. Naya Prokash.
2. Bose TK, Som G & Kabir J. (Eds.). 2002. Vegetable Crops. Naya Prokash.
3. Chadha KL & Kalloo G. (Eds.). 1993-94. Advances in Horticulture Vols. V-X. Malhotra Publ. House.
4. Chadha KL. (Ed.). 2002. Hand Book of Horticulture.
5. ICAR. Chauhan DVS. (Ed.). 1986. Vegetable Production in India. Ram Prasad & Sons.

Production Technology of Summer Season Vegetable Crops

Subject Code:	L T P C	Duration: 30(Hrs.)
	2 0 0 2	

Course Objectives:
1. To teach learners about the nutritional value, taxonomy, and botany of summer vegetable crops that grow in various places.
2. Students will study various vegetable post-harvesting methods and plant protection strategies.
3. Providing information on the summer crop seed production.

Course Outcomes:
1. To impart knowledge to students about the botany, taxonomy and nutritional value of summer vegetable crops growing in different regions.
2. Students will learn about different plant protection measures and post harvesting techniques in vegetables.
3. Providing knowledge of seed production of summer season crops.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											

CO2				2							
CO3			3								

UNIT-I (7 Hours)

Introduction, nutritional value, origin, botany and taxonomy, important countries and states growing vegetables along with area, climate and soil requirements

UNIT-II (8 Hours)

Commercial varieties/hybrids evolved by private and public sector, sowing/ transplanting time, seed rate, seed treatment, nutritional and irrigation requirements

UNIT-III (8 Hours)

Chemical weed control, mulching, physiological disorders, harvesting techniques, postharvest management, plant protection measures, Poly-house, net- house and low tunnel technology for off-season production of summer vegetables

UNIT-IV (7 Hours)

Seed production of warm season vegetable crops i.e. solanaceous crops, okra, cucurbitaceous crops, cowpea, sweet potato, cluster beans, amaranth, basella, kang-kong, tapioca.

Recommended Text Books / Reference Books:

Choudhary BR & Dhaka RS. 2000. Vegetable Crops: Production Technology. Vol. II. Kalyani. Gopalakrishanan TR. 2007. Vegetable Crops. New India Publ. Agency.

Hazra P & Som MG. (Eds.). 1999. Technology for Vegetable Production and Improvement. Naya Prokash.

Kalloo G & Singh K (Ed.). 2000. Emerging Scenario in Vegetable Research and Development. Research Periodicals & Book Publ. House.

Nayer NM & More TA 1998. Cucurbits. Oxford & IBH Publ. Palaniswamy & Peter KV. 2007. Tuber Crops. New India Publ. Agency.

Breeding of Self Pollinated and Vegetatively Propagated Vegetable Crops

Subject Code:	L T P C	Duration: 30(Hrs.)
	2 0 0 2	

Course Objectives:
1. Students will study the various vegetable crop breeding techniques.
2. To inform students on the various aspects that affect the growth of vegetable crops.
3. The use of biotechnology and its application in plant breeding will be taught to the students.

Course Outcomes:
1. Students will learn about the different breeding methods in vegetable crops.
2. To provide knowledge about the different factors effecting growth of vegetable crops.
3. Students will learn about the use of biotechnology and their use in plant breeding**.**

Mapping CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				1								
CO2			2									
CO3					2							

UNIT-I (7 Hours)

History of vegetable breeding. Origin, botany, taxonomy, cytogenetic, genetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation)

UNIT-II (8 Hours)

Resistance breeding for biotic and abiotic stress, quality improvement in self-pollinated crops viz. tomato, brinjal, cowpea, pea, beans, okra, salad crops and asexually propagated crops like potato, sweet potato, colocasia and tapioca.

UNIT-III (7 Hours)

Molecular marker, marker assisted breeding and QTLs, biotechnology and their use in breeding in self pollinated and vegetatively propagated vegetable crops.

UNIT-IV (8 Hours)

Issue of patenting, PPV& FRA. Concept of ideotypes. Present status of varietal/hybrid development in India. New approaches in breeding of self pollinated vegetables.

Recommended Text Books / Reference Books:

1. Chopra GL. 1968. Angiosperms - Systematics and Life Cycle. S. Nagin37 Dutta AC. 1986. A Class Book of Botany. Oxford Univ. Press. Pandey BP. 1999. Taxonomy of Angiosperm.
2. S. Chand & Co. Peter KV & Pradeepkumar T. 2008. Genetics and Breeding of Vegetables. (Revised), ICAR. Soule J. 1985. Glossary for Horticultural Crops. John Wiley & Sons.
3. Srivastava U, Mahajan RK, Gangopadyay KK, Singh M & Dhillon BS. 2001. Minimal Descriptors of Agri Horticultural Crops. Part-II: Vegetable Crops. NBPGR, New Delhi. Vasistha. 1998. Taxonomy of Angiosperm. Kalyani.
4. Vincent ER & Yamaguchi M. 1997. World Vegetables. 2nd Ed. Chapman & Hall

Technical Writing and Communication Skills, Library and Information Service

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
1. Skill in written and vocal communication.
2. The competence in English.
3. The ability to use the English language well through word power

Course Outcomes :
1. Competency in communication both written and oral

2. The ability to speak English well.
3. Word power to effectively use the English language

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

UNIT-I (7 Hours)

Technical Writing-Various forms of technical writing-theses, technical papers, reviews, electronic communication etc; qualities of technical writing

UNIT-II (8 Hours)

Parts of research communications- titlepage, content page, authorship, preface, introduction, review of literature, materials and methods, experimental results, documentation; photographs and drawings with suitable captions; pagination, citations; writing of abstracts; précis; synopsis

UNIT-III (8 Hours)

Editing and proof reading. Communication Skills-defining communication; types of communication- verbal and non-verbal; assertive communication; assertive communication; using language for effective communication;

UNIT-IV (7 Hours)

Techniques of dyadic communication- message pacing and message chunking, self-disclosure, mirroring, expressing conversational intent; paraphrasing; vocabulary building- word roots, prefixes, Greek and Latin roots.

Recommended Text Books / Reference Books:

1. Raman M and Sharma S (2015) Technical Communication Principles and Practice. *Oxford University Press, 3rd edition.*

2. Farhathullah T M (2017) *Communication Skill for Technical Students.* Sangam Books Ltd.

Intellectual Property Management, Biodiversity and Biosafety

Subject Code:		L	T	P	C		Duration: 30(Hrs.)
		2	0	0	2		

Course Objectives:
1. Students will study the background, principles, and varieties of international treaties

and conventions for the protection of intellectual property.
2. To educate people on the importance that intellectual property plays in trade, commerce, and growth.
3. The many ecosystems and their sustainable applications will be taught to students.

Course Outcomes:
1. Students will learn about the history, concepts and types, international treaties and conventions for protection of IP'S.
2. To provide knowledge about the role of intellectual property in growth, development, trade and commerce.
3. Students will learn about the different ecosystems and their sustainable uses.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2												1
CO3							2					

UNIT-I (8 Hours)

Introduction to Intellectual Property: history, concepts and types. International treaties and conventions for protection of IP'S. Role of intellectual property in growth, development, trade and commerce; Indian legislations for the protection of various types of Intellectual Property with a special reference to history and evolution of the concepts of geographical indicators, variety protection and patents.

UNIT-II (8 Hours)

R & D expenditure visà-vis patents. PPVFRA: Process for protection of plant varieties, issues related to compliance sand infringements. GI: Process for protection of goods, community involvement and benefit sharing. Patents: Search, process of filing patents, infringement and compliances. Biodiversity: Definition, importance, historical and geographical causes for diversity. Species and population biodiversity,

UNIT-III (7 Hours)

Maintenance of ecological biodiversity. Biodiversity hot spots in India, Collection, conservation, documentation and characterization of biodiversity, development and maintenance of live repositories, community gene banks. Convention on biological diversity. National biodiversity protection initiatives; sustainable use of bio-diversity, benefit sharing, Bio-safety guidelines for the development and protection of genetically modified organisms

UNIT-IV (7 Hours)

Cartagena Protocol of Bio-safety, its objective, salient features, risk assessment and risk management for GMO's, Bio-safety guidelines, rules and regulations and regulatory frame work for GMO in India; institutional arrangements at national level, procedure for direct use of GMO's in India. Licensing of technologies, Material transfer agreements, Research collaboration agreement, License Agreement.

Recommended Text Books / Reference Books:

1. Sibi G (2021) Intellectual Property Rights, Bioethics, Biosafety and Enterpreneurship in Biotechnology. *Dreamtech Press*.

2.   Goel D and Parashar S (2013) IPR Biosafety and Bioethics.

PRODUCTION TECHNOLOGY OF WINTER SEASON VEGETABLE CROPS LAB

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
1. Students will be able to identify various deficiencies in vegetable crops.
2. To spread awareness about weed management techniques for vegetable crops.
3. After analysis, the student will be able to assess the quality indicators of vegetable harvests.

Course Outcomes:
1. Students will able to recognise different deficiency symptoms in vegetable crops.
2. To impart knowledge about the weed control methods in vegetable crops.
3. Student will able to evaluate the quality parameters of vegetable crops after analysis.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2										
CO2					2							
CO3				2								

PRACTICALS

1. Study of nutrient deficiency symptoms.

2. Experiments on improved water use efficiency through mulching and different irrigation methods.

3. Different methods of weed control and herbicide sprays.

4. Preparation of cropping scheme for commercial farms.

5. Quality evaluation for carotene, protein and ascorbic acid.

6. Visit to an established vegetable farm in the region.

Production Technology of Summer Season Vegetable Crops lab

Subject Code:	L	T	P	C	Duration: 30(Hrs.)
	0	0	2	1	

Course Objectives:
1. The function of minerals in crops and plant growth regulators will be taught to students.
2. To spread knowledge about fertigation and other irrigation techniques.

Course Outcomes:

1. Students will learn about the plant growth regulators and the role of minerals in crops.

2. Imparting knowledge about other cultural practises, such as how to raise vegetables in the off-season

3. To provide knowledge about the different irrigation practices including fertigation.

4. To impart knowledge how to grow vegetables during off seasons and other different cultural operations.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						2						
CO2			3									
CO3					2							

PRACTICALS

1. Experiments to demonstrate the role of mineral elements.

2. Fertigation.

3. Chemical weed control.

4. Hybrid seed production of summer vegetables.

5. Use of growth regulators.

6. Seed extraction techniques.

7. Identification of pests and diseases and their control.

8. Forcing techniques for raising summer vegetables.

9. Pruning, grafting and staking.

10. Quality determination for sugar, capsaicin and minerals using atomic absorption

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Breeding of Self Pollinated and Vegetatively Propagated Vegetable Crops lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
1. To impart information on how to choose planting material for breeding reasons.
2. To investigate various flowering induction techniques.
3. With the use of various breeding techniques, students will be able to identify the beneficial features in vegetable crops.

Course Outcomes:
1. To provide knowledge about the selection of planting material for breeding purposes.
2. To study about the different methods of flowering inducing.
3. Students will able to recognise the useful traits in vegetable crops using different breeding

approaches.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				2								
CO2				2								
CO3					1							

PRACTICALS

1. Selection of desirable plants from breeding population.

2. Observations and analysis of various qualitative and quantitative traits in germplasm, hybrids and segregating generations.

3. Induction of flowering.

4. Selfing and crossing techniques in vegetable crops.

5. Hybrid seed production of vegetable crops in bulk.

6. Screening techniques for insect-pests, disease and environmental stress resistance in above mentioned crops.

7. Demonstration of sib-mating and mixed population.

8. Molecular marker techniques to identify useful traits in the vegetable crops and special breeding techniques.

Technical Writing and Communication Skills, Library and Information Services lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
1. Skill in written and vocal communication.
2. Having good English language skills.
3. Word strength to use the English language well.

Course Outcomes:
1. Competency in communication both written and oral
2. The ability to speak English well.
3. Word power to effectively use the English language.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		

										2			
CO2										2			
CO3											2		

PRACTICALS

1. Editing and Proof-reading technical articles using language tools for effective writing

2. Listening to audio-video conversations aimed at testing the comprehension of the students

3. Oral presentations on a given topic related to agriculture

4. Evaluation of body language and communication skills based on group discussions and interviews

5. Role plays and pronunciation exercises using eye contact and visual clues for effective listening skills

6. Word stress application and voice modulation

7. Soft skills; rhetoric skills; self-assessment exercises.

8. Introduction to Library and its services; Five laws of library science; type of documents

9. Classification and cataloguing

10. Organization of documents

11. Sources of information-primary, secondary and tertiary

12. Current awareness and SDI services

13. Tracing information from reference sources

14. Library survey

15. Preparation of bibliography

16. Use of Online Public Access Catalogue

17. Use of CD-ROM databases and other computerized library services, CeRA, J-Gate

18. Use of Internet including search engines and its resources; e-resources and access methods.

Semester-2nd

Breeding of Cross Pollinated Vegetable Crops	
Subject Code: **L T P C** 2 0 0 2	**Duration: 30 (Hrs.)**
Course Objectives: **Course Outcomes:**	
UNIT-I (8 Hours)	
History of vegetable breeding. Origin, botany, taxonomy, cytogenetic, genetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation)	
UNIT-II (7 Hours)	
Quality improvement, in crosspollinated crops viz. capsicum, chilli, cucurbits (muskmelon, watermelon, cucumber, bottle gourd, long melon, bitter gourd, sponge gourd, summer squash)	
UNIT-III (8 Hours)	
Quality improvement, in cole crops (cabbage, cauliflower, broccoli, brussels' sprouts), root crops (carrot radish, turnip), bulb crops (onion, garlic), asparagus, leafy vegetables and spices (black pepper, turmeric, cardamom, coriander).	
UNIT-IV (7 Hours)	
Molecular marker, marker assisted breeding and QTLs, biotechnology and their use in breeding cross pollinated vegetable crops. Present status of varietal/ hybrid development in India. New approaches in breeding of cross pollinated vegetables.	
Recommended Text Books / Reference Books: a.	

Systematics of Vegetable Crops	
Subject Code: **L T P C** 2 0 0 2	**Duration: 30 (Hrs.)**
Course Objectives: **Course Outcomes:**	
UNIT-I (7 Hours)	
Principles of classification, different methods of classification, salient features of international code of nomenclature of vegetable crops.	
UNIT-II (8 Hours)	
Origin, history, evolution and distribution of vegetable crops, botanical description of families, genera and species covering self and cross pollinated vegetable crops viz. brinjal chilli, tomato,	

muskmelon,

UNIT-III (8 Hours)

Botanical description of families, genera and species covering self and cross pollinated vegetable crops water melon, bottle gourd, cucumber, bitter gourd, onion, cabbage, cauliflower, carrot, radish, turnip, amaranth, palak, peas, beans, okra

UNIT-IV (7 Hours)

Botanical description of families, genera and species of vegetatively propagated vegetables like potato, garlic, sweet potato and spices (turmeric, coriander); cytological level of various vegetable crops, descriptive blanks for describing various varieties of important vegetable crops.

Recommended Text Books / Reference Books:

   b.

STATISTICAL METHODS FOR RESEARCH WORKERS

Subject Code:	**L T P C**	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
Course Outcomes:

UNIT-I (7 Hours)

Probability and probability distributions. Principle of least squares. Linear and non-linear regression. Multiple regression. Correlation analysis. Selection of variables. Validation of models.

UNIT-II (8 Hours)

Sampling techniques. Determination of sample size. Sampling distribution of mean and proportion. Hypothesis testing. Concept of p-value. Student's t-test. Chi- square test and large sample tests. Confidence intervals

UNIT-III (8 Hours)

ANOVA and testing of hypothesis in regression analysis. Analysis of variance for one way and two-way classification (with equal cell frequency). Transformation of data. Advantages and disadvantages of non-parametric statistical tests.

UNIT-IV (7 Hours)

Scales of measurements. Sign test. Median test. Run-test. Wilcoxon-Mann-Whitney test. Chi-square test for two independent samples. Kruskal-Walli's one way and Friedman's two-way ANOVA by ranks. Kendall's Coefficient of concordance.

Recommended Text Books / Reference Books:

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Principles of Plant Breeding

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
Course Outcomes:

UNIT-I (7 Hours)

History of Plant Breeding, objectives and achievements. Centres of origin, biodiversity and its significance. Plant introduction and role of plant genetic resources in plant breeding.

UNIT-II (7 Hours)

Genetic basis of breeding self- and cross-pollinated crops, Mating systems and response to selection. Pure line theory. Breeding methods in self-, cross-pollinated and asexually reproducing crops.

UNIT-III (8 Hours)

Heterosis and inbreeding. Concept of plant ideotype. Transgressive breeding. Hybrid breeding. Self-incompatibility and male sterility in crop plants and their commercial exploitation. Mutation breeding.

UNIT-IV (8 Hours)

Breeding for abiotic and biotic stresses. Testing, release and notification of varieties. Maintenance breeding. Participatory Plant Breeding. Plant Breeders' Rights and regulations for plant variety protection and farmers' rights.

Recommended Text Books / Reference Books:

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Breeding of Cross Pollinated Vegetable Crops lab

Subject Code:	L T P C	Duration: 30 (Hrs.)
	0 0 2 1	

Course Objectives:
Course Outcomes:

PRACTICALS

1. Selection indices in cole crops, cucurbitaceous crops, bulb crops, root crops, leafy vegetables and spices.

2. Selfing and crossing techniques in cross pollinated vegetable crops.

3. Biometrical analysis-Line x tester analysis, North Carolina Designs, Stability analysis, Triple test cross analysis, generation mean analysis, diallel analysis.

4. Estimation of heritability, heterosis and combining ability.

Systematics of Vegetable Crops lab

Subject Code:	L	T	P	C	Duration: 30(Hrs.)
	0	0	2	1	

Course Objectives:
Course Outcomes:

PRACTICALS

1. Identification, description, classification and maintenance of vegetable species and varieties.

2. Survey, collection of allied species and genera locally available.

3. Preparation of keys to the species and varieties.

4. Methods of preparation of herbarium and specimens.

Statistical Methods for Research Workers lab

Subject Code:	L	T	P	C	Duration: 30(Hrs.)
	0	0	2	1	

Course Objectives:
Course Outcomes:

PRACTICALS

1. Fitting of distributions. Sample and sampling distributions.

2. Correlation analysis.

3. Regression analysis (exponential, power function, quadratic, multi-variate, selection of variables, validation of models, ANOVA and testing of hypothesis).

4. Tests of significance (Z-test, t-test, F-test and Chi-square test).

5. Analysis of variance. Non-parametric tests.

Principles of Plant Breeding lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
Course Outcomes:

PRACTICALS

1. Floral biology of self- and cross-pollinated species.

2. Selfing and crossing techniques.

3. Selection methods in segregating populations and evaluation of breeding material.

4. Maintenance of experimental records.

5. Estimation of heterosis and inbreeding depression.

6. Techniques in hybrid seed production using male-sterility in field crops.

Total Contact Hours= 22		Total Marks= 900			Total Credits= 16		
Semester 1st		**Contact Hours**			**Max Marks**	**Total Marks**	**Credits**
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	
	Tropical and Dryland fruit Production	2	-	-	40	60	100	2
	Sub-tropical and Temperate Fruit Production	2	-	-	40	60	100	2
	Nutrient and Canopy Management in Fruit Crops	2	-	-	40	60	100	2
	Technical Writing and Communication Skills, Library and Information Services	2	-	-	40	60	100	2
	Intellectual Property Management, Biodiversity and Biosafety	2	-	-	40	60	100	2
	Tropical and Dryland fruit Production lab	-	-	2	60	40	100	1
	Sub-tropical andTemperate Fruit Production lab	-	-	2	60	40	100	1
	Nutrient and Canopy Management in Fruit Crops lab	-	-	2	60	40	100	1
	Technical Writing and Communication Skills, Library and Information Services lab	-	-	2	60	40	100	1
	Master's research	-	-	4	-	-	-	2
	Total	10		12	440	460	900	16

Total Contact Hours=28   Total Marks= 800   Total Credits= 18

Semester 2nd		**Contact Hours**			**Max Marks**	**Total Marks**	**Credits**
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	
	Principles and Practices of Plant Propagation	2	-	-	40	60	100	2

	Subject Name	L	T	P	Int.	Ext.	Total Marks	Credits
	Breeding of Fruit Crops	2	-	-	40	60	100	2
	Statistical Methods for Research Workers	2	-	-	40	60	100	2
	Soil Fertility and Fertilizer Use	2	-	-	40	60	100	2
	Principles and Practices of Plant Propagation lab	-	-	2	60	40	100	1
	Breeding of Fruit Crops lab	-	-	2	60	40	100	1
	Statistical Methods for Research Workers lab	-	-	2	60	40	100	1
	Soil Fertility and Fertilizer Use lab	-	-	2	60	40	100	1
	Master's research	-	-	12	-	-	-	6
	Total	8		20	400	400	800	18

Total Contact Hours=28   **Total Marks= 800**   **Total Credits= 18**

Semester 3rd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Growth and Development of Horticultural Crops	2	-	-	40	60	100	2
	Orchard Management and Organic Horticulture	2	-	-	40	60	100	2
	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis	2	-	-	40	60	100	2
	Management of Problem Soils and Water	2	-	-	40	60	100	2
	Growth and Development of Horticultural Crops (practical)	-	-	2	40	60	100	1
	Orchard Management and Organic Horticulture(practical)	-	-	2	40	60	100	1
	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis(practical)	-	-	2	60	40	100	1

		L	T	P	Int.	Ext.	Total Marks	Credits
	Management of Problem Soils and Water(practical)	-	-	2	60	40	100	1
	Master's research	-	-	12	-	-	-	6
	Total	8		20	360	440	800	18

Total Contact Hours= 25	Total Marks=400	Total Credits= 16

Semester 4th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Master Seminar	-	-	-	100	100	200	3
	Research and Publication Ethics	1	-	-	40	60	100	1
	Research and Publication Ethics (practical)	-	-	2	60	40	100	1
	Master's research	-	-	22	-	-	-	11
	Total	1	-	24	200	200	400	16

Overall Marks / Credits

Semester	Marks	Credits
1st	900	16
2nd	800	18
3rd	800	18
4th	400	16
Total	2900	68

TROPICAL AND DRYLAND FRUIT PRODUCTION

Subject Code:	L T P C	Duration:30(Hrs.)
	2 0 0 2	

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Course Objectives:
 1. To impart basic knowledge about the importance and management of Tropical and dry

   land fruits grown in India.

 2. To know the concept of IPM and recognizing the physiological disorders of fruit plants.

 3. To Impart knowledge about inflorescence, pollination and fruit bearing in orchard.

Course Outcomes:
1. Students will learn about the importance and management of tropical and dry land fruits.
2. To provide knowledge about IPM, diseases and others physiological disorders effecting
   fruit production.
3. Provide knowledge about flowering, pollination and fruit setting in fruit crops.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			2									
CO2		2										
CO3			2									

UNIT-I (7Hrs)

Origin, distribution, commercial importance and export potential. Eco physiological
requirements.

UNIT-II (7Hrs)

Species and varieties. Rootstocks and propagation. Planting, root zone, training and
pruning. Nutrition and water requirements, fertigation, role of bio- regulators,

UNIT-III (8Hrs)

Major pests, diseases, physiological disorders and their control measures. Abiotic factors
limiting fruit production. Flowering, pollination and fruit set. Quality improvement.
Storage and ripening techniques.

UNIT-IV (8Hrs)

Industrial and export potential, Agri. Export Zones (AEZ) and industrial support. Fruit

crops- citrus, mango, papaya, pineapple, banana, avocado, sapota, guava, ber, amla, Jack

fruit, annonas and minor fruits of tropics.

Recommended Text Books / Reference Books:

1. Bose TK, Mitra SK & Rathore DS. (Eds.). 1988. Temperate Fruits -Horticulture. Allied
   Publ.
2. Bose TK, Mitra SK & Sanyal D. 2001. (Eds.). Fruits -Tropical and Subtropical. Naya
   Udyog. • 3. Chadha KL & Pareek OP. 1996 (Eds.). Advances in Horticulture. Vols. IIIV
   Mallotra Publ. House.
3. Nakasone HY & Paul RE. 1998. Tropical Fruits. CABI. • Peter KV. 2008 (Ed.). Basis of

Horticulture. New India Publ. Agency.
4. Pradeep Kumar T, Suma B, Jyothibhaskar & Satheesan KN. 2008. Management of Horticultural Crops. Parts I, II. New India Publ. Agency.
5. Radha T & Mathew L. 2007. Fruit Crops. New India Publ. Agency.
6. Singh HP, Negi JP & Samuel JC. (Eds.) 2002. Approaches for Sustainable Development of Horticulture. National Horticulture Board.
7. Singh HP, Singh G, Samuel JC & Pathak RK. (Eds.). 2003. Precision Farming in Horticulture. NCPAH, DAC/PFDC, CISH, Lucknow. 12

Sub-tropical and Temperate Fruit Production

Subject Code:	L	T	P	C	Duration:30 (Hrs.)
	2	0	0	2	

Course Objectives:

1. To provide basic knowledge about the importance and management of sub-tropical and temperate fruits grown in India.

2. To provide knowledge about IPM, diseases and others physiological disorders effecting fruit production.

3. Provide knowledge about the propagation techniques, planting system, cropping, root zone and canopy management in fruit crops.

Course Outcomes:

1. Students will learn about the importance and management of sub- tropical and temperate fruits.

2. To provide knowledge about IPM, diseases and others physiological disorders effecting fruit production

3. To gain knowledge about the recent trends in propagation, rootstock influence, planting system, cropping systems, root zone and canopy management.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			2									
CO2		2										
CO3					2							

UNIT-1(8 Hours)

Origin, distribution, commercial importance and export potential. Ecophysiological requirements. Speciesand varieties. Rootstocks and propagation.

UNIT-II (8 Hours)

Planting, root zone, training and pruning. Nutrition and water requirements, fertigation, role of bio- regulators, major pests, diseases, physiological disorders and their control measures.

UNIT-III (7 Hours)
Abiotic factors limiting fruit production. Flowering, pollination and fruit set. Quality improvement. Storage and ripening techniques. Industrial and export potential, Agri. Export Zones (AEZ) and industrial support.
UNIT-IV (7 Hours)
Fruit crops- Apple, pear, quince, grapes, plum, peach, apricot, cherries, hazelnut, litchi, loquat, persimmon, kiwifruit, strawberry, walnut, almond, pistachio, pecan, mangosteen, carambola, bael, wood apple, fig, jamun, rambutan and pomegranate.
Recommended Text Books / Reference Books: 1. Chadha KL & Shikhamany SD. 1999. The Grape : Improvement, Production and Post- Harvest Management. Malhotra Publ. House.   2. Janick J & Moore JN. 1996. Fruit Breeding. Vols. I-III. John Wiley & Sons.   3. Nijjar GS, 1977 (Eds.). Fruit Breeding in India. Oxford & IBH.   4. Radha T & Mathew L. 2007. Fruit Crops. New India Publ. Agency.   5. Singh S, Shivankar VJ, Srivastava AK & Singh IP. (Eds.). 2004. Advances in Citriculture. Jagmander Book Agency.

NUTRIENT AND CANOPY MANAGEMENT IN FRUIT CROPS

Subject Code:	**L**	**T**	**P**	**C**	**Duration:30(Hrs.)**
	2	0	0	2	

Course Objectives:
1. To impart nature, sources and criteria of essentiality nutrients in plants.
2. To know about the different training and pruning systems to give attractive shapes to the plant.
3. To know about land utilization and selection of planting material for propagation.

Course Outcomes:
1. Provide knowledge about the nature, sources and essentiality of plant nutrients.
2. To impart knowledge about the different training and pruning methods of fruit crops.
3. To gain knowledge about utilization of land and selection of planting material.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2					2							
CO3		1										

UNIT-I (7Hrs)
Essential elements, criteria of essentiality. Natural sources and fertilizers. Role of essential elements infruit plants.Interaction of nutrients.

UNIT-II (7Hrs)
Canopy management, importance and advantages. Factors affectingcanopy development. Canopy types and structures. Light interception and distribution in different types oftree canopies.

UNIT-III (8Hrs)
Spacing and utilization of land area. Canopy management through the use of rootstockand scion, plant growth inhibitors, training and pruning and management practices.

UNIT-IV (8Hrs)
Canopy developmentin relation to growth, flowering, fruiting and fruit quality in temperatefruits, grapes, pomegranate, mango,sapota, guava, citrus and ber.

Recommended Text Books / Reference Books:

1. Chadha KL & Shikhamany SD. 1999. The Grape, Improvement, Production and Post Harvest Management. Malhotra Publ. House.
2. Pradeepkumar T, Suma B, Jyothibhaskar & Satheesan KN. 2008. Management of Horticultural Crops. New India Publ. Agency.
3. K K Srivastava (2007) *Canopy management in fruit crops.*

TECHNICAL WRITING AND COMMUNICATION SKILLS, LIBRARY AND INFORMATION SERVICE

Subject Code:	**L T P C**	**Duration: 30 (Hrs.)**
	2 0 0 2	

Course Objectives:
1. To improve fluency in the language.
2. Able to speak English well.
3. Use English language while talking.

Course Outcomes:
1. Competency in communication both written and oral
2. The ability to speak English well.
3. Word power to effectively use the English language

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

										3		
CO1										3		
CO2									2			
CO3										2		

UNIT-I (6 Hours)

Technical Writing-Various forms of technical writing-theses, technical papers, reviews,electronic communication etc; qualities of technical writing

UNIT-II (8 Hours)

Parts of research communications- titlepage, content page, authorship, preface, introduction, review of literature, materials and methods,experimental results, documentation; photographs and drawings with suitable captions; pagination, citations; writing of abstracts; précis; synopsis

UNIT-III (8 Hours)

Editing and proof reading. Communication Skills-definingcommunication; types of communication- verbal and non-verbal; assertive communication; assertive communication; using language for effective communication;

UNIT-IV (8 Hours)

Techniques of dyadic communication- messagepacing and message chunking, self-disclosure, mirroring, expressing conversational intent; paraphrasing;vocabulary building-word roots, prefixes, Greek and Latin roots.

Recommended Text Books / Reference Books:

1. Raman M and Sharma S (2015) Technical Communication Principles and Practice. *Oxford University Press, 3rd edition*.
2. Farhathullah T M (2017) *Communication Skill for Technical Students*. Sangam Books Ltd.

INTELLECTUAL PROPERTY MANAGEMENT, BIODIVERSITY AND BIOSAFETY

Subject Code:	**L T P C**	**Duration: 30(Hrs.)**
	2 0 0 2	

Course Objectives:

1. To impart knowledge about the history, concepts and types, international treaties and conventions for protection of IP'S.

2. To know the role of intellectual property in growth, development, trade and commerce.
3. To impart knowledge about the different ecosystems and their sustainable uses.

Course Outcomes:

1. Students will learn about the history, concepts and types, international treaties and conventions for protection of IP'S.
2. To provide knowledge about the role of intellectual property in growth, development, trade and commerce.
3. Students will learn about the different ecosystems and their sustainable uses.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2												1
CO3							2					

UNIT-I (7 Hours)

Introduction to Intellectual Property: history, concepts and types. International treaties and conventions forprotection of IP'S. Role of intellectual property in growth, development, trade and commerce; Indianlegislations for the protection of various types of Intellectual Property with a special reference to history andevolution of the concepts of geographical indicators, variety protection and patents.

UNIT-II (8 Hours)

R & D expenditure visà-vis patents. PPVFRA: Process for protection of plant varieties, issues related to compliance sandinfringements. GI: Process for protection of goods, community involvement and benefit sharing. Patents:Search, process of filing patents, infringement and compliances. Biodiversity: Definition, importance, historicaland geographical causes for diversity. Species and population biodiversity,

UNIT-III (8 Hours)

Maintenance of ecologicalbiodiversity. Biodiversity hot spots in India, Collection, conservation, documentation and characterizationof biodiversity, development and maintenance of live repositories, community gene banks. Convention onbiological diversity. National biodiversity protection initiatives; sustainable use of bio-diversity, benefit sharing,Bio-safety guidelines for the development and protection of genetically modified organisms

UNIT-IV (7 Hours)

CartagenaProtocol of Bio-safety, its objective, salient features, risk assessment and risk management for GMO's,Bio-safety guidelines, rules and regulations and regulatory frame work for GMO in India; institutionalarrangements at national level, procedure for direct use of GMO's in India. Licensing of technologies,Material transfer agreements, Research collaboration agreement, License Agreement.

Recommended Text Books / Reference Books:

1. Sibi G (2021) Intellectual Property Rights, Bioethics, Biosafety and Enterpreneurship in Biotechnology. *Dreamtech Press*.
2. Goel D and Parashar S (2013) IPR Biosafety and Bioethics.

TROPICAL AND DRYLAND FRUIT PRODUCTION LAB

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. To identify different species of fruit crops.
2. To impart knowledge about the nutrient management in fruit crops.
3. To know different methods of training and pruning to give attractive shape to the plants.

Course Outcomes:

1. Students will be able to identify the different species of fruit crops.
2. To provide knowledge about the nutrient management in fruit crops.
3. To impart knowledge about the different methods of training and pruning.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2			2									
CO3			2									

PRACTICALS

1. Description and identification of species and varieties.

2 Observations on growth and development of tropical & dry land fruit crop.

3. Practices in growth regulation of tropical & dry land fruit crops.

4. Nutritional and physiological disorders and their control.

5. Rejuvenation of old and unproductive Trees

6. Visit to commercial orchards.

7. Project preparation for establishing commercial orchards.

SUB-TROPICAL AND TEMPERATE FRUIT PRODUCTION LAB

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. To identify the different plant species and varieties.
2. Impart knowledge about the Preparation of different planting material for establishment of orchard.
3. To assess the nutritional and physiological disorders and their prevention.

Course Outcomes:

1. The students will able to identify the different plant species and varieties.
2. Preparation of different planting material for establishment of orchard
3. To recognise the nutritional and physiological disorders and their control.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2				2								
CO3			2									

PRACTICALS

1. Description and identification of species and varieties.
2. Observations on growth and development of sub-tropical & temperate fruit crop.
3. Practices in growth regulation of sub-tropical & temperate fruit crop.
4. Nutritional and physiological disorders and their control.
5. Rejuvenation of old and unproductive trees.
6. Visit to commercial orchards.
7. Project preparation for establishing commercial orchards.

NUTRIENT AND CANOPY MANAGEMENT IN FRUIT CROPS LAB

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. Provide knowledge the different techniques of sampling.
2. To know about canopy management and geometry of plants.
3. Making varying sizes of plant samples to know nutrient status through analysis.

Course Outcomes:

1. Students will learn about the different techniques of sampling.
2. To get knowledge about the different canopy types and regulating geometry of plants.
3. Preparation of different sizes of plant samples to estimate nutrient status through analysis.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					2							
CO2			1									
CO3		2										

PRACTICALS

1. Leaf sampling techniques
2. Determination of nutrient status through soil and plant analysis.
3. Study of different types of canopies.
4. Training of plants for different canopy types.
5. Canopy development through pruning, use of plant growth inhibitors and, geometry of planting.
6. Effect of canopy types on production and quality of fruits.

TECHNICAL WRITING AND COMMUNICATION SKILLS, LIBRARY AND INFORMATION SERVICES LAB

Subject Code:	L	T	P	C	Duration: 30(Hrs.)
	0	0	2	1	

Course Objectives:
1. Fluency both in written and oral.
2. Able to speak English well.
3. Use English language while talking.

Course Outcomes:
1. Competency in communication both written and oral
2. The ability to speak English well.
3. Word power to effectively use the English language.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

PRACTICALS

1. Editing and Proof-reading technical articles using language tools for effective writing
2. Listening to audio-video conversations aimed at testing the comprehension of the students
3. Oral presentations on a given topic related to agriculture
4. Evaluation of body language and communication skills based on group discussions and interviews
5. Role plays and pronunciation exercises using eye contact and visual clues for effective listening skills
6. Word stress application and voice modulation
7. Soft skills; rhetoric skills; self-assessment exercises.
8. Introduction to Library and its services; Five laws of library science; type of documents
9. Classification and cataloguing
10. Organization of documents
11. Sources of information-primary, secondary and tertiary
12. Current awareness and SDI services
13. Tracing information from reference sources
14. Library survey
15. Preparation of bibliography
16. Use of Online Public Access Catalogue
17. Use of CD-ROM databases and other computerized library services, CeRA, J-Gate
18. Use of Internet including search engines and its resources; e-resources and access methods.

Total Contact Hours =30   **Total Marks= 1300**   **Total Credits= 22**

Semester V		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Principles of Integrated Pest and Disease Management	2	0	0	40	60	**100**	**2**
	Manures, Fertilizers and Soil Fertility Management	2	0	0	40	60	**100**	**2**
	Pests of Crops and Stored Grain and their Management	2	0	0	40	60	**100**	**2**
	Diseases of Field and Horticultural Crops and their Management -I	**2**	**0**	**0**	**40**	**60**	100	2
	Crop Improvement-I *(Kharif Crops)*	**1**	**0**	**0**	**40**	**60**	**100**	**1**
	Entrepreneurship Development and Business Communication	**1**	**0**	**0**	**40**	**60**	**100**	**1**
	Geoinformatics and Nano-technology and Precision Farming	**1**	**0**	**0**	**40**	**60**	**100**	**1**
	Intellectual Property Rights	1	0	0	40	60	**100**	**1**
	Principles of Integrated Pest and Disease Management Lab	0	**0**	2	20	30	**50**	**1**
	Manures, Fertilizers and Soil Fertility Management Lab	0	**0**	2	20	30	**50**	**1**
	Pests of Crops and Stored Grain and their Management Lab	0	**0**	2	20	30	**50**	**1**
	Diseases of Field and Horticultural Crops and their Management -I Lab	0	**0**	2	20	30	**50**	**1**
	Crop Improvement-I *(Kharif Crops)* Lab	0	0	2	20	30	**50**	**1**
	Entrepreneurship Development and Business Communication Lab	0	0	2	20	30	**50**	**1**
	Geoinformatics and Nano-technology and Precision Farming Lab	0	0	2	20	30	**50**	**1**
	ELECTIVE							
	Landscaping/ System Simulation and Agroadvisory/ Protected Cultivation/ Micro propagation Technologies	**2**	**0**	**0**	**40**	**60**	100	**2**
	Landscaping/ System Simulation and Agroadvisory/ Protected Cultivation/ Micro propagation Technologies Lab	0	0	2	20	30	**50**	**1**
Total		14	0	16	520	780	1300	22

Total Contact Hours = 31   **Total Marks= 1450**   **Total Credits= 22**

Semester VI		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Rainfed Agriculture & Watershed Management	1	0	0	40	60	**100**	**1**
	Protected Cultivation and Secondary Agriculture	1	0	0	40	60	**100**	**1**
	Diseases of Field and Horticultural Crops and their Management-II	2	0	0	40	60	**100**	**2**
	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	0	40	60	**100**	**1**
	Management of Beneficial Insects	**1**	**0**	**0**	**40**	**60**	**100**	**1**
	Crop Improvement-II *(Rabi crops)*	**1**	**0**	**0**	**40**	**60**	**100**	**1**
	Principles of Organic Farming	**1**	**0**	0	**40**	**60**	**100**	**1**
	Farm Management, Production & Resource Economics	**1**	**0**	0	**40**	**60**	**100**	**1**
	Principles of Food Science and Nutrition	**2**	**0**	0	40	60	**100**	**2**
	Rainfed Agriculture & Watershed ManagementLab	**0**	**0**	2	20	30	**50**	**1**
	Protected Cultivation and Secondary Agriculture Lab	**0**	**0**	2	20	30	**50**	**1**
	Diseases of Field and Horticultural Crops and their Management-II Lab	**0**	**0**	2	20	30	**50**	**1**
	Post-harvest Management and Value Addition of Fruits and Vegetables Lab	**0**	**0**	2	20	30	**50**	**1**
	Management of Beneficial Insects Lab	**0**	**0**	2	20	30	**50**	**1**
	Crop Improvement-II *(Rabi crops)* Lab	**0**	**0**	2	20	30	**50**	**1**
	Principles of Organic Farming Lab	**0**	**0**	2	20	30	**50**	**1**
	Farm Management, Production & Resource Economics Lab	**0**	**0**	2	20	30	**50**	**1**
	ELECTIVE							
	Hi-tech. Horticulture/ Agricultural Journalism/ Food Safety and Standards/ Agri-business Management	2	0	0	40	60	100	2
	Hi-tech. Horticulture/ Agricultural Journalism/ Food Safety and Standards/ Agri-business Management Lab	0	0	2	20	30	50	1
Total		13	0	18	580	870	1450	22

Overall Marks / Credits

Semester	Marks	Credits
V	1300	22
VI	1450	22
Total	**2750**	**44**

Principles of Integrated Pest and Disease Management

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Outcomes:
1. To aware students about various insect and pest of agriculture.
2. To familiarize students with agricultural insects.
3. To create awareness about biological analysis of insects and implementation of strategies for successful pest management

Course Outcomes:
1. Providing knowledge about various types of insects and pests in agriculture.
2. Students will able to recognise the agricultural important insects.
3. The students will be able to examine insects deeply up to biological level of analysis and make different strategies for successful pest management.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1										
CO2				3								
CO3				2								

UNIT-I (7 Hours)

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis.

UNIT-II (7 Hours)

Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level.

UNIT-III (8 Hours)

Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases

UNIT-IV (8 Hours)

Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

Recommended Text Books / Reference Books:

1. Singh RS. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Co., New Delhi.

2. Pathak, V. N. Essentials of plant pathology. Prakash Pub., Jaipur

3. Agrios, G. N. Plant Pathology. 5th edition, Published by a division of Reed Elsvier India Pvt., Ltd., New Delhi (2005)

4. Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur

5. Stakman EC & Harrar JG. 1957. Principles of Plant Pathology. Ronald Press, USA.

6. Tarr SAJ. 1964. The Principles of Plant Pathology. McMillan, London.

7. Vander Plank, JE. 1975. Principles of Plant Infection. Acad. Press

8. Verma JP, Varma A & Kumar D. (Eds). 1995. Detection of Plant Pathogens and their Management. Angkor Publ., New Delhi

9. Mehrotra RS & Aggarwal A. 2003. Plant Pathology. 2nd Ed. Oxford & IBH,

10. Dhingra OD & Sinclair JB. 1986. Basic Plant Pathology Methods. CRC Press

11. Fox RTV. 1993. Principles of Diagnostic Techniques in Plant Pathology. CABI Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. Oxford & IBH, New Delhi.

12. Palti J. 1981. Cultural Practices and Infectious Crop Diseases. Springer- Verlag, New York.

13. Vyas SC. 1993 Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw

Manures, Fertilizers and Soil Fertility Management

Subject Code:		L	T	P	C	Duration: 30 (Hrs.)
		2	0	0	2	

Course Outcomes:
1. To familiarize students with different manures and fertilizers
2. To aware students about different fates of fertilizers.
3. To develop ability of students in evaluating soil fertility and nutrient uptake by plants

Course Outcomes:
1. Providing knowledge about different types of manures and fertilizers and their application.
2. Providing knowledge about the different fates of fertilizers.
3. Students will able to evaluate fertility of soil and plant nutrients uptake.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2		2										
CO3		2										

UNIT-I (6 Hours)

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management

UNIT-II (6 Hours)

Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order.

UNIT-III (8 Hours)
History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants
UNIT-IV (10 Hours)
Chemistry of soil nitrogen, phosphorus, potassium,calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Recommended Text Books / Reference Books:

1. Mariakulandi and Manickam: 1975 : Chemistry of fertilizers and manures.

2. Mariakulandi and Manickam (1975) : Chemistry of manures an fertilizers

3. Tandon H. L. S. (1994) : Recycling of crop, animal, human and industrial Wastes in Agriculture.

   FDCO, Delhi Krishna and Murthy (1978) : Manual on compost and other organic manures .

4. Rakshit A. 2015.Manures Fertilizers and Pesticides Paperback – Import. CBS Publishing; 1ST

   edition, pp. 266.

Pests of Crops and Stored Grains and their Management

Subject Code:	**L T P C**	**Duration: 30 (Hrs.)**
	2 0 0 2	

Course Outcomes:
1. To aware students about various types of insects and pests
2. To familiarize students with families families and orders of class Insecta and economic losses caused by them

3. To develop ability for identification of agriculturally important insect-pest based on morphological characteristics, feeding habit and habitat

Course Outcomes:
1. Providing knowledge about various types of insects and pests in agriculture.
2. To be able to understand about different families and orders of class Insecta which cause economic losses for human beings.
3. To be able to identify morphological characteristics, feeding habit and habitat of agriculturally important insect-pest.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2										
CO2				3								
CO3		3										

UNIT-I (6 Hours)

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics

UNIT-II (9 Hours)

Nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various

Insect pests of cotton: Cotton jassid, whitefly, aphid, spotted bollworm, pink boll worm, American bollworm, tobacco caterpillar, mealy bug, red cotton bug, dusky cotton bug, grey weevil.

Insect pests of sugarcane: Early shoot borer, top borer, Gurdaspur borer, stalk borer, pyrilla, whitefly, black bug and mealy bug.

Insect pests of rice: Stem borer, rice leaf folder, white backed planthopper, brown plant hopper, rice hispa, rice bug.

Insect pests of wheat, maize and sorghum: Wheat aphid, army worm, maize borer, Pink stem borer, sorghum shoot fly.

Insect pests of pulses: gram cut worm, gram pod borer, lentil pod borer, tur pod fly,pea leaf miner, pea green aphid, pea blue butterfly, bean thrips, red hairy caterpillar,Bihar hairy caterpillar, spotted pod borer and blister beetle.

Insect pests of brinjal and okra: brinjal hadda, brinjal shoot and fruit borer, cotton jassid, cotton whitefly, spotted bollworms.

Insect pests of cruciferous and cucurbitaceous vegetables: cabbage butterfly, diamond back moth, cabbage semilooper, cabbage head borer, mustard aphid, mustard sawfly, painted bug, red pumpkin beetle, melon fruit fly.

Insect pests of tomato, potato and onion: tomato fruit borer, potato tuber moth, whitefly, onion thrips, onion maggot.

Insect pests of mango: mango hopper, mealy bug, mango stem borer, bark eating caterpillar, fruit fly.

Insect pests of citrus: citrus caterpillar, leaf miner, citrus psylla, whitefly, fruit sucking moth.

Insect pests of grapevine and cashew: grapevine leaf hopper, thrips, leaf roller, cashew tree borer, cashew leaf miner.

Insect pests of banana and pomegranate: banana scale moth, banana weevil, anar butterfly.

UNIT-III (6 Hours)

Insect pests of chillies, garlic, turmeric, ginger, coriander, spices and condiments :chilli thrips, whitefly, castor capsule borer, Bihar hairy caterpillar, cardamom thrips, pollu beetle.

Insect pests of oilseeds (mustard, sunflower, groundnut, castor): mustard aphid, mustard saw fly, painted bug, leaf miner, Bihar hairy caterpillar, green peach aphid, cabbage semilooper, tobacco caterpillar, sesamum leaf webber, sunflower head borer, tobacco caterpillar, cutworms. groundnut aphid, white grub, castor capsule borer, castor hairy caterpillar

Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.

UNIT-IV (9 Hours)

Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Recommended Text Books / Reference Books:

1. A.S. Atwal and G.S. Dhaliwal :Agricultural Pests of South Asia and their Management

2. B.V. David and V.V. Rammurthy: Elements of Economic Entomology

3. Manishekharan and Sudarrajan : Pest Management in Field Crops.

4. Pedigo L.P. : Entomology and Pest Management.

5. VenuGopal Rao: Insect Pest Management.

6. B.P. Khare : Storage Entomology

Diseases of Field & Horticultural Crops & their Management-I

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:
1. To make students able in recognizing the various diseases of horticultural crops.
2. To aware students about causes of diseases and their symptoms
3. To encourage them to use economical and environmentally friendly techniques for management of diseases

Course Outcomes:
1. To be able to recognise the various diseases of horticultural crops.
2. Students study about the causes of these diseases and their symptoms, which aids in the identification of diseases in horticultural and field crops.
3. Management techniques that are both economical and environmentally friendly can be used.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1										
CO2		2										
CO3							3					

UNIT-I (7 Hours)

Symptoms, etiology, disease cycle and management of major diseases of following crops:
Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro;Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose,

UNIT-II (8 Hours)

Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt
Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic, Castor: Phytophthora blight;Tobacco: black shank, black root rot and mosaic

UNIT-III (7 Hours)

Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top;Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight;

UNIT-IV (8 Hours)

Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off,wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans:anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight, Tea - blister blight; Coffee – rust.

Recommended Text Books / Reference Books:

1. Agrios, GN. 2010. Plant Pathology. Acad. Press
2. Diseases of Horticultural Crops fruits (1999) By Verma L.R and Sharma R.c,Indus Publishing company, New Delhi
3. Diseases of fruit crops (1986) By V.N.Pathak ,Oxford & IBH publication, New Delhi
4. Diseases of fruit crops (1986) By R.S.Singh ,Oxford & IBH publication, New Delhi
5. Diseases of Fruits and vegetables (2007) S.A.M.H. Naqvi,Springer Science & Business Media
6. Diseases of Plantation Crops (2014) By P.Chowdappa, Pratibha Sharma IPS 263pp
7. Diseases of Horticulture Crops and their management ,ICAR e-book for B.Sc.(Agri) & B.Tech (Agri) By TNAU pp172
8. Advances in the diseases of Plantation crops & spices (2004) P.Santha Kumari,International Book Distributing Company

Crop Improvement – I (Kharif Crops)

Subject Code:	L T P C	Duration: 15 (Hrs.)
	1 0 0 1	

Course Objectives:
1. To make students aware about the wild relatives and their value in developing unique kharif crop varieties.
2. To develop ability in students to learn about techniques used for the preservation of genetic material for use in kharif crop improvement.
3. To familiarize students about the breeding techniques used to enhance kharif crops.

Course Outcomes:
1. Learners know the value of wild relatives in developing unique kharif crop varieties.
2. The student learns how to preserve genetic material for use in kharif crop improvement.
3. The student learns how to use breeding techniques to enhance kharif crops.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			1									
CO2					2							

CO3				1								

UNIT-I (4 Hours)

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds;
fibres; fodders and cash crops; vegetable and horticultural crops

UNIT-II (4 Hours)

Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops

UNIT-III (3 Hours)

Major breeding objectives and procedures including conventional and modern innovative approaches
for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress,tolerance
and quality (physical, chemical, nutritional)

UNIT-IV (4 Hours)

Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

Recommended Text Books / Reference Books:

1. Crop Breeding and Biotechnology, HariHar Ram KalyaniPublication, New Delhi.

2. Breeding of Asian Field crops D. A. Sleper J.M., Poehlman ,Blackwell Publishers

3. Principle and Procedures of Plant Breeding Biotechnological and Conventional Approach, G. S. Chahal, S. S. Gosla Narosa Publishers House. New Delhi.

Entrepreneurship Development and Business Communication

Subject Code:		**L T P C**	**Duration: 15 (Hrs.)**
		1 0 0 1	

Course Outcomes:
1. To make students familiar with business environment.
2. To aware students about entrepreneurial tactics.
3. To enable students in developing business plan.

Course Outcomes:
1. Identify business prospects by analysing the business environment.
2. Analyze the efficiency of various entrepreneurial tactics.
3. Making sense of their own business plan

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2					2							
CO3											2	

UNIT-I (3 Hours)

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; , Impact of economic reforms on Agribusiness/ Agrienterprises
UNIT-II (3 Hours)
SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development
UNIT-III (6 Hours)
Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skil
UNIT-IV (3 Hours)
Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agrientrepreneurship and rural enterprise

Recommended Text Books / Reference Books:

1. Akhouri, M.M.P., Mishra, S.P. and Sengupta, Rita (1989). Trainers Manual on Developing Entrepreneurial Motivation, NIESBUD, New Delhi

2. Betty, Gorddan B. (1979). Entrepreneurship, Playing to Win, Taraporewala, Mumbai

3. Entrepreneurship Development Institute in India (1987). Developing New Entrepreneurs, EDII, Ahmedabad, NISIET, Library : 338.93/EDI/87/25104.

4. Mancuso, Joseph (1974). The Entrepreneurs Handbook, Vol.I& II, Artech House Inc. USA.

5. Patel, V.G. (1987). Entrepreneurship Development in India and its relevant Developing Countries, Entrepreneurship Development Institute of India, Ahmedabad, NISIET, Library : 338.93 (540)/PAT/87/25103.

6. Singh, A.K., Lakhan Singh, R. and Roy Berman (2006). Dimensions of Agricultural Extension, Aman Publishing House, Meerut.

7. Mondal Sagar and G.L.Ray (2009). Text Book of Entrepreneurship and Rural Development. Kalyani Publishers, Ludhiana. ISBN 978-81-272-5599-2

Geoinformatics, Nano-technology and Precision Farming				
Subject Code:	**L T P C**			**Duration: 15 (Hrs.)**
	1 0 0 1			

Course Objectives:
1. To develop the ability of motivating the farmers to use original data from the field.
2. To familiarize students about the balanced and unbalanced amount of agricultural inputs.
3. To make them aware about sustainable crop production.

Course Outcomes:
1. Motivate the farmers to use original data from the field to analyse the spatial and temporal variability of the input factors.
2. Trying to educate farmers on the effects of using unbalanced amounts of agricultural inputs such irrigation, fertiliser, insecticides, and pesticides.
3. Effectively uses of inputs for sustainable crop production without harming environment.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				2								
CO2						3						
CO3							3					

UNIT-I (3 Hours)

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.

UNIT-II (3 Hours)

Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies

UNIT-III (5 Hours)

Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture

UNIT-IV (4 Hours)

Nanotechnology,Definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

Recommended Text Books / Reference Books:

1. GIS : Fundamentals, Applications & Implementations – Dr. K Elangovan New India publishing Agency, New Delhi.

2. Remote sensing , GIS and wet land management - Er Tasneem Abbasi & Prof. S.A. Abbasi

Intellectual Property Rights

Subject Code:	L T P C	Duration: 15 (Hrs.)
	1 0 0 1	

Course Objectives:
1. Students will study the background, principles, and varieties of international treaties and conventions for the protection of intellectual property.
2. To educate people on the importance that intellectual property plays in trade, commerce, and growth.
3. The many ecosystems and their sustainable applications will be taught to students.

Course Outcomes:
1. Students will understand the concept of intellectual property rights.
2. Builds procedural understanding of the legal system and problem-solving with regard to intellectual property rights.
3. Development of a legal consultancy and service company.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								1				
CO2						1						
CO3											1	

UNIT-I (4 Hours)

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

UNIT-II (3 Hours)

Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

UNIT-III (5 Hours)

Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders.

UNIT-IV (3 Hours)

Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

Recommended Text Books / Reference Books:

1. Introduction to Intellectual Property Rights by H.S. Chawla, Oxford & IBH Publishing Co. Pvt. Ltd. 113-B ShahpurJat, 2nd Floor, Asian Games Village side New Delhi 110 049, India

2. Encyclopedia of Intellectual Property rights Volume No. 1 to 10 by Priyanjan Trivedi (2008)

3. Plant Breeding by B.D. Singh (2006), Kalyani Publication

4. Intellectual Property Right Under Golbalization by Tawar S. Serials Publication, New Delhi.   **..**

Principles of Integrated Pest and Disease Management Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. Students will be able to identify several plant diseases and pathogens.
2. Identification of various pests' and pathogens' life cycles for the purpose of management

measures.

3. Develop various IPM techniques to control pests and diseases without contaminating the soil, water, or environment.

Course Outcomes:

1. Students will able to detect the different pathogens and diseases in plants.
2. Identification of life cycle of different pests and pathogens for control measures.
3. Make different IPM strategies so that the pests and diseases can be controlled without soil, water and environment pollution.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM,Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma, Pseudomona*s, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases .Awareness campaign at farmers fields.

Manures, Fertilizers and Soil Fertility Management Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. Providing information on the many types of manure and fertilisers used in various crops depending on soil conditions.
2. To understand the significance of plant nutrients, how they are delivered to plants, and the variables that affect their availability.
3. Should build a soil testing laboratory and be knowledgeable about the soil testing process in order to give farmers with correct information

Course Outcomes:

1. Providing knowledge about different kinds of manure and fertilizers used in different crops according to soil condition.
2. To comprehend the importance of plant nutrients, their mechanisms of transport to plants, and

the factors that control their availability.
3. To be able about procedure of soil testing and establish soil testing laboratory to provide accurate knowledge to farmers.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS

1. Determination of organic carbon in soils

2. Determination of alkaline hydrolysable N in soils

3. Principle of colorimeter, its calibration, application and determination of available P in soils

4. Principle of flame photometer, its calibration, application and determination of available K in soils

5. Determination of exchangeable cations in soils

6. Determination of available S in soils

7. Principle of atomic absorption spectrophotometer, its calibration, application and determination of DTPA extractable Zn, Fe, Mn and Cu in soils

8. Digestion of plant samples for determination of nutrients

9. Determination of total N in plants

10. Determination of total P in plants

11. Determination of total K and S in plants

12. Determination of Zn, Fe, Mn and Cu in plants

13. Determination of total N in urea

14. Determination of water soluble P in SSP and DAP

15. Determination of total N and P in manure

Pests of Crops and Stored Grains and their Management Lab

Subject Code:			L	T	P	C		Duration: 30 (Hrs.)
			0	0	2	1		

Course Objectives:
1. Acquainted with identifying several insect pests that affect stored grains, vegetables, and fields.
2. To determine the pest's type of damage and symptoms so that the appropriate pest management method can be used for effective control.
3. By using integrated pest management, crop pests can be managed without endangering the wellbeing of surrounding wildlife, plants, or the environment.

Course Outcomes:
1. Familiarized with identification of different insect pest of field, vegetables and stored grains at the field level.
2. To identify the type of damage and symptoms brought on by the pest so that the proper pest management strategy can be utilised for efficient control.
3. Integrated pest management can control crop pests without adversely affecting the health of plants, animals, or the environment.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory,

Department of Food., Delhi. Visit to nearest FCI godowns.

Diseases of Field & Horticultural Crops & their Management-I Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1.The typical pathogens that cause diseases will be addressed to the students.

2. Appropriate management techniques can be used by understanding the various means of distribution.

3. It is possible to take actions that are both economical and environmentally friendly.

Course Outcomes:

1. Students will be familiar with the typical disease-causing microorganisms.

2. By knowing the different dissemination means suitable management practices can be applied.

3. Economical and eco-friendly measures can be used.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for Herbarium; Note: Students should submit 50 pressed and well mounted specimens.

Crop Improvement – I Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. The life cycles of various crops will be taught to the students.

2. The dissemination of information on hybridization's many techniques.

3. The many techniques for producing seeds will be taught to the students.

Course Outcomes:

1. Students will learn about the life cycles of different crops.

2. Providing knowledge about the different methods of hybridization.

3. Students will learn about the different methods of seed production**.**

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Seasame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

Entrepreneurship Development and Business Communication

Subject Code:		L	T	P	C	Duration: 30 (Hrs.)
		0	0	2	1	

Course Objectives:
1. Analyze the business environment to seek business opportunities.
2. Describe the elements that contribute to the success of entrepreneurial endeavours.
3. Describe the importance of marketing and management for small businesses.

Course Outcomes:
1. To find business possibilities, analyse the business environment.
2. Describe the components that make entrepreneurial initiatives successful.
3. Describe the significance of management and marketing for small firms.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

PRACTICALS
Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

Geoinformatics, Nano-technology and Precision Farming Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:

1. Supplying GIS knowledge to evaluate spatiotemporal variability.
2. Supplying remote sensing expertise so that data may be interpreted.
3. Give fertiliser advice based on the analysis of the soil.

Course Outcomes:

1. Providing knowledge about GIS to assess the spatiotemporal variability.
2. Providing knowledge about remote sensing in order to interpret data.
3. Give fertilizers recommendation on the basis of soil mapping.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

Practical

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.

Landscaping

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	2	0	0	2	

Course Objectives:

1. Students will gain knowledge of gardening's significance, range, and various forms.
2. Choose a variety of trees, shrubs, and methods for their propagation.
3. The various establishment, care, and grass management strategies will be covered with the students.

Course Outcomes:

1. Students will learn about the importance, scope and different types of gardening.
2. Selection of different trees, shrubs and their propagation techniques.
3. Students will learn about the different principles of establishment, maintenance and lawn management practices.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

UNIT-I (7 Hours)

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes.

UNIT-II (7 Hours)

Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme

UNIT-III (6 Hours)

Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas

UNIT-IV (10 Hours)

Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Recommended Text Books / Reference Books:

1. Complete Gardening in India – Gopalswamiengar

2. Complete Home Gardening – Dey, S.C.

3. Floriculture and Landscaping – Bose, T.K.

4. Floriculture and Landscaping – Deshraj

5. Floriculture in India – Randhawa and Mukhopadhyay

6. Introduction to Landscaping, Designing, Construction and Maintenance – Ronald J.Biondo and Charles B. Schroder

7. Landscape Gardening & Design with Plants – Supriya Kumar Bhattacharjee

8. Landscaping principles and practices – Jack E. Ingels

Landscaping Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives
1. To aware students about various techniques of landscaping.
2. To familiarize them with methods used for propagation.
3. To teach them about designings of conservatory.

Course Outcomes:
1. To know about the different implements used in landscaping.
2. To know the different methods of propagation.
3. Students will learn about designing of conservatory and lathe house.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

Practical
Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

System Simulation and Agroadvisory

Subject Code:	L T P C	Duration: 30 (Hrs.)
	2 0 0 2	

Course Objectives:

1. Students will study the many methods of weather forecasting.
2. Use of weather-based agro-advisory bulletins.
3. Students must be aware of the importance of forecasting in farming.

Course Outcomes :

1. Students will learn about the different techniques of weather forcasting.
2. Use of agro-advisory bulletin based on weather forecast.
3. To know the value of forcasting in agricultural farming.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

UNIT-I (8 Hours)

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams.

UNIT-II (8 Hours)

Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity;

UNIT-III (7 Hours)

Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas

UNIT-IV (7 Hours)

Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.

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System Simulation and Agroadvisory Lab

Subject Code:	L T P C	Duration: 30 (Hrs.)
	0 0 2 1	

Course Outcomes:

1. To aware them about preparation of charts based on weather forcasting.
2. To familiarize them about weather and crop management practices.
3. To teach them about use of statistical models in weather forcasting.

Course Outcomes:
1. To prepare different working charts based on weather forcast.
2. Analysis of varying weather and crop management practices.
3. Use of statistical accurate models in weather forecasting.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

Practical

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast. Feedback from farmers about the agroadvisory.

Protected Cultivation			
Subject Code:	**L T P C**		**Duration: 30 (Hrs.)**
	2 0 0 2		

Course Objectives:
1. Students must be aware of the significance and extent of protected cultivation.
2. To be knowledgeable about various crop, soil, and water management techniques.
3. Students will get knowledge about protected growing techniques for off-season crop production.

Course Outcomes:
1 To know the importance and scope protected cultivation.
2. To know the different methods of crop, soil and water management practices.
3. Students will learn about how offseason crops can be grown under protected cultivation.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

UNIT-I (8 Hours)
Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate

UNIT-II (8 Hours)
Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers.Irrigation and fertigation management. Propagation and production of quality planting materialof horticultural crops

UNIT-III (7 Hours)
Greenhouse cultivation of important horticultural crops – rose, carnation,chrysanthemum, gerbera, orchid, anthurium, lilium, tulip, tomato, bell pepper, cucumber,strawberry, pot plants, etc

UNIT-IV (7 Hours)
Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management
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Protected Cultivation Lab

Subject Code:	L	T	P	C	Duration: 30 (Hrs.)
	0	0	2	1	

Course Objectives:
1. Students will discover how to cultivate seedlings in a protected environment.
2. Making various soil pastes to gain knowledge about measuring soil EC and pH.
3. To manage fertigation and irrigation together.

Course Outcomes:
1. Student will learn how seedlings can be raised under protected cultivation.
2. To learn about the measurement of soil EC and pH by making different soil pastes.
3. To regulate irrigation along with fertigation.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

Practical
Raising of seedlings and saplings under protected conditions, use of protrays in quality
planting material production, Bed preparation and planting of crop for production, Inter cultural
operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip,

fogging ad misting.

Micro Propagation Technologies

Subject Code:	**L T P C**	**Duration: 30 (Hrs.)**
	2 0 0 2	

Course Objectives:

1. To understand the origins, significance, and use of micro-propagation.
2. Students will discover how small portions can be used to establish new plants.
3. To learn about the variety of plants utilising various propagation techniques.

Course Outcomes:

1. To know the history, importance and scope of micro-propation.
2. Students will learn how new plants can be established by using small parts.
3. To know the diversity of plants using different method of propagation.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

UNIT-I (8 Hours)

Introduction, History, Advantages and limitations; Types of cultures (seed, embryo, organ, callus, cell)

UNIT-II (8 Hours)

Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture)

UNIT-III (7 Hours)

Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures

UNIT-IV (7 Hours)

Production of secondary metabolites, Somaclonal variation, Cryopreservation

-

Micro Propagion Technologies Lab

Subject Code:	**L T P C**	**Duration: 30 (Hrs.)**
	0 0 2 1	

Course Objectives:

1. Providing information on the many tools used in laboratories to create culture medium.
2. The various media preparation and sterilising processes will be covered with the students.
3. The various stocks and working solutions produced in labs will be taught to students.

Course Outcomes:

1. Providing knowledge about different equipments used in laboratory to prepare culture media.
2. Students will learn about the different methods of preparation and sterilization techniques of media.
3. Students will learn the different stock and working solution prepared in labs.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

Practical

Identification and use of equipments in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques forexplants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures.

MRSPTU B.Sc. (FOOD SCIENCE & TECHNOLOGY)/B.F.S.T (Hons.) SYLLABUS BATCH 2019 ONWARDS

B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.) (4th Year)
SEMESTER VII

Total Contact Hours=24   Total Marks=600   Total Credits=20

SEMESTER V		CONTACT HOURS			MARKS			CREDITS
SUBJECT CODE	SUBJECT NAME	L	T	P	INTERNAL	EXTERNAL	TOTAL	
BFOTS1-701	Food Storage Engineering	4	-	-	40	60	100	4
BFOTS1-702	Food Biotechnology	4	-	-	40	60	100	4
BFOTS1-703	Technology of Beverages	4	-	-	40	60	100	4
BFOTS1-704	Snacks and Extrusion Technology	4	-	0	40	60	100	4
BFOTS1-705	Technology of Beverages Lab	-	-	4	60	40	100	2
BFOTS1-706	Snacks and Extrusion Technology Lab	-	-	4	60	40	100	2
TOTAL	Theory=4 Lab=2	16	0	8	280	320	600	20

SEMESTER VIII

Total Contact Hours = 40   Total Marks=100   Total credits=20

SEMESTER VI		CONTACT HOURS			MARKS			CREDITS
SUBJECT CODE	SUBJECT NAME	L	T	P	INTERNAL	EXTERNAL	TOTAL	
BFOTS1-801	Project Work	-	-	40	60	40	60	20
TOTAL		-	-	-	60	40	100	20

Overall

Semester	Marks	Credits
VIIth	600	20
VIIIth	100	20
Total	**700**	**40**

SEMESTER SEVENTH

Food Storage Engineering

Subject Code: BFOTS1-601	L T P C	Duration: 60 (Hrs.)
	4 0 0 4	

UNIT I (12 Hrs.)

Introduction Importance of scientific storage systems, post-harvest physiology of semi- perishables and perishables, climacteric and non-climacteric fruits, respiration, ripening, changes during ripening, ethylene bio-synthesis. Damages Direct damages, indirect damages, causes of spoilage in storage (moisture, temperature, humidity, respiration loss, heat of respiration, sprouting), destructive agents (rodents, birds, insects, etc.), sources of infestation and control

UNIT II (17 Hrs.)

Storage structures Traditional storage structures, improved storage structures, modern storage structures, godown layout, staking pattern and rodent proof godown design; Farm silos: Horizontal silos, tower silos, pit silos, trench silos, size and capacity of silos . Storage of grains Respiration of grains, moisture and temperature changes in stored grains; conditioning of environment inside storage through ventilation. Aeration and stored grain management Purposes of aeration, aeration theory, aeration system design, aeration system operation

UNIT III (16 Hrs.)

Storage pests and control Damage due to storage insects and pests, its control, seed coating, fumigations, etc.; Damage caused by rodents and its control. Storage of perishables Cold storage, controlled and modified atmospheric storage, hypobaric storage, evaporative cooling storage, conditions for storage of perishable products, control of temperature and relative humidity inside storage

UNIT IV (15 Hrs.)

Design of storage structures Functional and structural design of grain storage structures, pressure theories, pressure distribution in the bin, grain storage loads, pressure and capacities, warehouse and silos, BIS specifications, functional, structural and thermal design of cold stores

Recommended Readings

R. Paul Singh and Dennis R. Heldman. 2014. Introduction to Food Engineering, 5th Ed. Elsevier, Amsterdam, The Netherlands.

Albert Ibarz and Gustavo V. Barbosa-Cánovas. 2003. Unit Operations in Food Engineering. CRC Press, Boca Raton, FL, USA.

George D. Saravacos and Athanasios E. Kostaropoulos. 2002. Handbook of Food Processing Equipment. Springer Science+Business Media, New York, USA. R. K. Sinnott. 1999. Chemical Engineering, Vol. 6, Chemical Engineering Design, 3rd Ed. Butterworth-Heinemann, Oxford, UK.

Kenneth J. Valentas, Enrique Rotstein and R. Paul Singh. 1997. Handbook of Food Engineering Practice. CRC Press, Boca Raton, FL, USA.

Peter F. Stanbury, Allan Whitakar and Stephen J. Hall. 1995. Principles of Fermentation Technology, 2 nd Ed. Elsevier Science Ltd., Burlington, MA, USA.

J.F. Richarson and D.G. Peacock. 1994. Coulson & Richardsons's Chemical Engineering, Vol. 3, Chemical &Biochemical Reactors & Process Control, 3rd Ed. Elsevier Butterworth-Heinemann, Amsterdam, The Netherlands.

James R. Couper, W. Roy Penney, James R. Fair and Stanley M. Walas 2012 Chemical Process Equipment: Selection and Design. Elsevier Inc

Mahajani, V. V. and Umarji, S. B., Process equipment design, Macmillan.

Bhattacharyya, B. C., Introduction to Chemical Equipment design, CBS Publishers and Distributors.

Geankoplis C. J. Transport processes and unit operations, Prentice-Hall

FOOD BIOTECHNOLOGY

Subject Code: BFOTS1-602   **L T P C**   **Duration: 60 (Hrs.)**

3 1 0 4

UNIT I (15 Hrs.)

Introduction to Food Biotechnology: basic principles of genetic engineering, improvement of the processing of various crops by genetic engineering, food safety.

UNIT II (16 Hrs.)

Natural Antimicrobials for Food Preservation: Phytoalexins, essential oils and their components, bacteriocins of Lactic acid bacteria, nisin, pediocins etc, applications of bacetriocins in food systems. Aflatoxins - production, control and reduction using molecular strategy.

UNIT III (14 Hrs.)

Protein Engineering in Food Technology: Methods, applications of protein engineering (e.g. glucose isomerase, Lactobacillus beta-galactosidase and peptide antibiotic nisin).

Biotechnology and Food ingredients: biogums, fat substitutes, biocolors, organic acids and sweeteners.

UNIT IV (15 Hrs.)

Food Biotechnology and Intellectual property rights (IPR), benefits of securing IPRs; bioethics in food biotechnology.

Transgenic Plants and Animals: Their contribution to food production enhancement.

Recommended Readings:
1. B.H. Lee, 'Fundamentals of Food Biotechnology', VCH Publishers, New York, U.S.A.
2. M.P. Tombs, 'Biotechnology in Food Industry', Wiley-Blackwell, U. K.
3. D. Knorr, 'Food Biotechnology', Marcel Dekker, INC, New York, U.S.A.
4. A. Schwartzberg and A Rao 'Biotechnology & Food Process Engineering' Marcel Dekker, INC, New York.
5. I. Goldberg and R. Williams, 'Biotechnology and Food Ingredients', Springer Science & Business Media, Germany.
6. R.D. King and P.S.J. Cheetham, 'Food Biotechnology', Elsevier Applied Science, London.

TECHNOLOGY OF BEVERAGES

Subject Code: BFOTS1-603   **L T P C**   **Duration: 60 (Hrs.)**
                          4 0 0 4

UNIT-I (15 Hrs.)

History and importance of beverages and status of beverage industry, Processing of beverages: Packaged drinking water, juice based beverages, synthetic beverages, still, carbonated, Low-calorie and dry beverages, isotonic and sports drinks Dairy based beverages Alcoholic beverages, fruit beverages, specialty beverages.

UNIT-II (15 Hrs.)

Tea, coffee, cocoa, plant extracts, etc. FSSAI specifications for beverages, Ingredients, manufacturing and packaging processes and equipment for different beverages, Water treatment and quality of process water.

UNIT III (15 Hrs.)

Sweeteners, colorants, acidulants, Clouding and clarifying and flavouring agents for beverages. Use of carbon dioxide in carbonation.

UNIT-IV (15 Hrs.)

Quality tests and control in beverages. Miscellaneous beverages: Coconut water, sweet toddy Sugar cane juice, coconut beverage, flavoured syrups.

Recommended Books:

Hans Michael Eblinger. 2009. Handbook of Brewing: Processes, Technology, Markets.Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim. Germany.

Y.H. Hui. 2007. Handbook of Food Products Manufacturing: Principles, Bakery, Beverages, Cereals, Cheese, Confectionary, Fats, Fruits, and Functional Foods. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.

Philip R. Ashurst. 2005. Chemistry and Technology of Soft Drinks and Fruit Juices, 2nd Ed. Blackwell Publishing Ltd., Oxford, UK.

Amalendu Chakraverty, Arun S. Mujumdar, G.S. Vijaya Raghavan and Hosahalli S. Ramaswamy. 2003. Handbook of Post Harvest Technology: Cereals, Fruits, Vegetables, Tea, and Spices. Marcel Dekker, Inc., NY, USA.

SNACKS AND EXTRUSION TECHNOLOGY

Subject Code: BFOTS1-604   **L T P C**   **Duration: 60 (Hrs.)**
                                      3 1 0 4

UNIT I (14 Hrs.)

Snack foods: Types, specifications, compositions, ingredients, Formulations, processing, equipment, packaging, storage and quality testing, Snack food seasonings

UNIT II (15 Hrs.)

Classification of Breakfast cereals: Raw materials, process and quality testing of vermicelli, spaghetti: and macronic products Texturized vegetable protein: Definition, processing techniques, and foods Ready to eat breakfast cereals by extrusion cooking. Specifications, compositions, ingredients Formulations, processing Packaging, storage and quality testing for breakfast cereals, macaroni and malts.

UNIT III (15 Hrs.)

Extrusion: definition, introduction to extruders, principles and types, Uses of extruders in the food industry, Single screw extruder: principle of working, factors affecting extrusion process, Twin screw extruder: counter rotating and co-rotating twin screw extruder, Process characteristics of the twin screw extruder

UNIT IV (16 Hrs.)

Pre-conditioning of raw materials used in extrusion process Use of dry extruders in extrusion Chemical and nutritional changes in food during extrusion. Extrusion technology and applications in food processing.

Recommended Readings:
NIIR Board of Consultants & Engineers. 2014. The Complete Technology Book on Bakery Products (Baking Science with Formulation & Production), 3rd Ed. NIIR, New Delhi.

Peter P. Grewling. 2013. Chocolates & Confections, 2nd Ed. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.

E.J. Pyler and L.A. Gorton. 2009. Baking Science & Technology, Vol. II: Formulation & Production, 4 th Ed. Sosland Publishing Company, Kansas City, MO, USA.

E.J. Pyler and L.A. Gorton. 2008. Baking Science & Technology, Vol. I: Fundamentals & Ingredients, 4th Ed. Sosland Publishing Company, Kansas City, MO, USA.

Y.H. Hui. 2007. Handbook of Food Products Manufacturing: Principles, Bakery, Beverages, Cereals, Cheese, Confectionary, Fats, Fruits, and Functional Foods. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.

John J. Kingslee. 2006. A Professional Text to Bakery and Confectionery. New Age International, New Delhi.

Harold Corke, Ingrid De Leyn, Nanna A. Cross, Wai-Kit Nip, Y.H. Hui. 2006. Bakery Products: Science and Technology. Blackwell Publishing Ltd., Oxford, UK.

Joseph Amendola and Nicole Rees. 2003. Understanding Baking: The Art and Science of Baking, 3rd Ed. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.

Duncan Manley. 2000. Technology of Biscuits, Crackers and Cookies, 3rd Ed. Woodhead Publishing Limited, Cambridge, England.

N.L. Kent and A.D. Evers. 1994. Kent's Technology of Cereals: An Introduction for Students of Food Science and Agriculture, 4th Ed. Elsevier Science Ltd., Oxford, UK.

E.B. Jackson. 1995. Sugar Confectionery Manufacture, 2nd Ed. Springer-Verlag, US.

B.W. Minife. 1989. Chocolate, Cocoa, and Confectinery – Science and Technology, 3rd Ed. Chapman and Hall, Inc., New York, USA.

Samuel A. Matz. 1976. Snack Food Technology, 2nd Ed. AVI Publishing Co., Inc., Westport, Connecticut, USA.

TECHNOLOGY OF BEVERAGES LAB

Subject Code: BFOTS1-605　　　　**L T P C**　　　　　　**Duration: 30 (Hrs.)**
　　　　　　　　　　　　　　　　　0 0 4 2

PRACTICAL

1 .Quality analysis of raw water

2 Determination of brix value, pH and acidity of beverages

3 Determination of density and viscosity of caramel

4 Preparation of synthetic beverage

5 Determination of colours in soft drinks by wool technique

6 Preparation of iced and flavoured tea

7 Preparation of instant tea

8 Assessment of purity of carbon dioxide

9 Preparation of carbonated and non-carbonated beverages

10 Preparation of sports drink

11 Preparation of dairy/ fruit based beverage

12 Determination of caffeine in beverages

13 Quality analysis of tea and coffee

14 Preparation of miscellaneous beverages

15 Visit to carbonation unit

16 Visit to mineral water plant.

SNACKS AND EXTRUSION TECHNOLOGY LAB

Subject Code: BFOTS1-606   **L T P C**   **Duration: 30 (Hrs.)**
                                 0 0 4 2

PRACTICAL

1 Identifications and composition of various ingredients for snacks,

2 Flours, their classifications and characterization

3 Determination of flour gluten

4 Determination of water absorption characteristics and dough development time

5 Determination of dough rising capacity

6 Determination of calcium carbonate in fortified atta

8 Quality evaluation of selected snack items

9 Preparation of pasta

10 Preparation of macroni

11 Preparation of vermicelli

12 Preparation of noodles

15 Preparation of selected extruded products

16 Packaging and quality evaluation of extruded products

18 Visit to snack units (industry)

Recommended Readings:
1. US Wheat Associates. Baker's Handbook on Practical Baking

SEMESTER

EIGHTH

Total Contact Hours= 16   **Total Marks= 400**   **Total Credits= 14**

Semester – Ist		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**		
CBCFS1-101	Bakery	4	0	0	40	60	100	4
CBCFS1-102	Confectionery	4	0	0	40	60	100	4
CBCFS1-103	Bakery Lab	0	0	4	60	40	100	2
CBCFS1-104	Confectionery Lab	0	0	4	60	40	100	2
CBCFS1-105	Industrial Training(Training Project Report +Log Book & Certificate from Hotel + Viva & Presentation)	0	0	0	60	40	100	2
	Total	8	0	8	260	240	500	14

Overall Marks / Credits

Semester	Marks	Credits
1st	500	14
Total	500	14

Bakery			
Subject Code: CBCFS1-101	**L T P C**		**Duration: 60 (Hrs.)**
	4 0 0 4		
Course Objectives:			
1. 2. 3. 4.			

Course Outcomes:
1.
2.
3.
4.
..
..

UNIT-I (15 Hours)

Introduction: Scope of Bakery & Confectionery, Bakery terms, Organisation chart of Bakery, Wheat and Different types of flours available, Constituents of flours, pH Value of flour, Water absorption power of flour, Gluten, diastatic capacity of flour, Grade of flour. Temperature/ Weight conversions I. unit; 171 QC /gms / lb serving size

UNIT-II (15 Hours)

Raw material required for bread making: - Role of flour, water, and yeast, salt - Sugar, milk and fats. Yeast an elementary knowledge of Baker's Yeast, the part it plays in the fermentation of dough and conditions influencing it's working. Effect of over and under fermentation and under proofing of dough and other fermented goods

UNIT-III (15 Hours)

Oven & Baking: Knowledge and working of various types of oven. Baking temperatures for bread and confectionery goods. Methods of bread making: Straight dough method. delayed salt methods No time dough method. Sponge and dough methods. Characteristics of good bread: External characteristics; Volume, symmetry of shapes Internal characteristics - color, • texture, aroma, clarity and elasticity. Bread faults and their remedies.

UNIT-IV (15 Hours)

Bakery layout — The required approvals for setting up of a Bakery, Government procedure and Bye-laws. Selection of site, Selection of equipment, Layout design, Electricity, Quality control of raw material of finished products.

Recommended Text Books / Reference Books:

1.

2.

3.
4.
..

Confectionary		

Subject Code: CBCFS1-102	L T P C	Duration: 60 (Hrs.)
	4 0 0 4	

Course Objectives:
   5.
   6.
   7.
   8.
   ..
   ..

Course Outcomes:
   5.
   6.
   7.
   8.
   ..
   ..

UNIT-I (15 Hours)

Ingredient used in Cake Making Types & Varieties, Flour, Sugar, Shortening — Fats and oil, Egg, Moistening agent, Leavening Agents.

UNIT-II (15 Hours)

Cake Making Methods Sugar butter process, Flour butter process, Genoise method, Blending and rubbing method, Basic Pastries Pastry making, principles & derivatives.

UNIT-III (15 Hours)

Characteristic of Cakes Balancing cake formula External characteristics Internal Characteristics, Cake Faults and remedies. Chocolate identify different forms in which coco and chocolate are

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available. Explain the process of chocolate tempering Chocolate designs, garnishes and Presentations.

UNIT-IV (15 Hours)
Preparation of cookies and biscuits. Factors affecting the quality of biscuits / cookies Various types ice creams and bombs, Storage of confectionery product

Recommended Text Books / Reference Books:

5.

6.

7.
8.
..

Bakery Lab				
Subject Code: CBCFS1-103	L	T	P	C	Duration: 30 (Hrs.)
	0	0	4	2	

1 Introduction to ingredients / Equipment Identification and uses of equipment —large, small and utilities.

2 Ingredients — Types of flour, Sugar, Nuts and Dry fruits, Shortenings, leavening etc,

3 **Mixing Methods:** Basic steps involved in mixing ingredients Kneading, stirring, whipping, creaming etc.

4 **Simple yeast fermented products**: Bread Sticks, Bread Rolls, hand and Soft Rolls, sour dough etc

5 **Flavoured Breads**: Basic Buns, Fruit Buns, Hot Cross Buns,Rich Yeast Fermented Breads Brioche, Fermented Doughnuts, Baba au Rhum, Savarin

6 **Bread Loafs**: Milk Bread, Bread Loaf, Currant Loaf, Whole Meal Bread, Masala Bread, Raisin Bread

7 Laminated Yeast Breads Danish pastry croissants Burger Buns, Pizza Base

Confectionary Lab				
Subject Code: CBCFS1-104	L T P C			Duration: 30 (Hrs.)
	0 0 4 2			

1. **Basic Cake Making** Plain Sponge Madeira Cake, Rock Cake, Fruit Cake Fatless Sponge Swiss Rolls Genoise Sponge

2. **Preparation of Biscuits & Cookies:** Plain biscuits; piping biscuits; cherry knobs; langue chats; (cats tongue) salted biscuits; nut biscuits; coconut biscuits; melting moment; macaroons; tricolour; chocolate biscuits; marble biscuits; nan-khatai; short bread biscuits. Ginger biscuits; cheese biscuits; cream fingers.

3. **Preparation of Basic Pastry & derivatives:** (i) Short Crust Pastry Jam tart, Lemon curd tart Apple Pie, Banana Flan, Fruit Tartlets(ii) Choux Pastry Chocolate Eclairs, Profit role Cream puff (iii) Puff Pastry & flaky pastry Khara Biscuits, veg patties, chicken patties Mutton patties, Cheese Straws, patty case Bouchee, vol-au-vents, Mille Feuillet, Jalousie, Creams Horns Apple Strudel Filo or phyllo pastries such as baklava.

4. **Icings and Toppings** Fondant; American frosting; butter cream icing; royal icing; gum paste; marzipan; marshmallow; lemon meringue; fudge; almond paste; glace icing.

5. **Pastry & Special Cakes** Queen cakes, Easter Egg Chocolate dippings Cheese cake, Baba-cum Rhum Savarin Chantilly, meringues chantilly. Madeline cake Pineapple pastry, chocolate pastry.

6. **Chocolate Work** Fundamentals of the science of chocolate. Established industry standards in - Tempering, moulding, modelling, enrobing, fillings. show pieces, stencils, chocolate couverture. • Chocolate candies, ganache fillings, hand-dipped. candies, molded bonbons, Danish pastry and truffles, use of an enrobing machine. Clean and store chocolate candy moulds and other. equipment used in chocolate candy making

7. **Sugar Work** Chemical properties and changes in sugars at various stages of the cooking and cooling processes. Pulled, blown, Spun, Poured, caramelized sugar. Casting of sugar. Pastillage and Saltillage fondant, gum paste and royal icing Produce sugar confectioners

Bachelor of Fine Arts

(Applied Arts)

Syllabus

Total Contact Hours = 28   **Total Marks = 800**   **Total Credits = 28**

Semester 1st		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-101	Basic Drawing & Painting From Nature	1	4	-	-	60	40	100	5	03
BFARS1-102	2 & 3 Dimensional Design-I	1	4	-	-	60	40	100	5	03
BFARS1-103	Lettering and Typography-I	1	3	-	-	60	40	100	4	No Exam (Viva-voce on portfolio)
BFARS1-104	Poster Designing	1	3	-	-	60	40	100	4	No Exam (Viva-voce on portfolio)
BFARS1-105	Print Making - I	1	3	-	-	60	40	100	4	No Exam (Viva-voce on portfolio)
BFARS1-106	History of Indian Art –I (Classic period)	2	-	-	-	40	60	100	2	3
BFARS1-107	English and Communication Skills	2	-	-	-	40	60	100	2	3
BFARS1-108	Fundamentals of Applied Art	2	-	-	-	40	60	100	2	3
Total	Theory = 11 Studio = 17 Labs = 0	11	17	-	-	420	380	800	28	-

Total Contact Hours = 26   **Total Marks = 800**   **Total Credits = 26**

Semester 2nd		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-201	Product Drawing & Painting From Objects	1	4	-	-	60	40	100	5	03 (Evaluation by External Viva-voce)
BFARS1-202	2 & 3 Dimensional Design-II	1	4	-	-	60	40	100	5	03
BFARS1-203	Computer Graphics-I	1	3	-	-	60	40	100	4	No Exam (Viva-voce on portfolio)
BFARS1-204	Lettering and Typography-II	1	2	-	-	60	40	100	3	No Exam (Viva-voce on portfolio)
BFARS1-205	Print Making- II	1	2	-	-	60	40	100	3	No Exam (Viva-voce on portfolio)
BFARS1-206	History of Indian Art –II (Modern period)	2	-	-	-	40	60	100	2	3
BFARS1-207	Art forms of Punjab	2	-	-	-	40	60	100	2	3
BFARS1-208	Time & Period of Maharaja Ranjit Singh	2	-	-	-	40	60	100	2	3
Total	Theory = 11 Studio = 15 Labs = 0	11	15	-	-	420	380	800	26	-

Total Contact Hours = 25   **Total Marks = 800**   **Total Credits = 25**

Semester 3rd		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-301	Study from Life & Illustrations	1	4	-	-	60	40	100	5	03 (Evaluation by External Viva-voce)
BFARS1-302	Product Design & Print Production	1	4	-	-	60	40	100	5	No Exam (Viva-voce on portfolio)
BFARS1-303	Corporate Identity	1	2	-	-	60	40	100	3	No Exam (External Viva-voce)
BFARS1-304	Computer Graphics-II	1	2	-	-	60	40	100	3	No Exam (Viva-voce on portfolio)
BFARS1-305	Lettering and Typography-III	1	2	-	-	60	40	100	3	No Exam (Viva-voce on portfolio)
BFARS1-306	History of Western Art-I	2	-	-	-	40	60	100	2	3
BFARS1-307	Advertising Art and Ideas	2	-	-	-	40	60	100	2	3
BFARS1-308	History of Punjab Culture & Art	2	-	-	-	40	60	100	2	3
Total	Theory = 11 Studio = 14 Labs = 0	11	14	-	-	420	380	800	25	-

*Educational Tour of duration up to 04 days during (preferably at the commencement of the semester) the semester may be undertaken

Total Contact Hours = 18   **Total Marks = 800**   **Total Credits = 18**

Semester 4th		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-401	Painting in Various Mediums	1	2	-	-	60	40	100	3	03 (Evaluation by External Viva-voce)
BFARS1-402	Packaging & Press Layout	1	1	-	-	60	40	100	2	No Exam (Viva-voce on portfolio)
BFARS1-403	Computer Graphics-III	1	2	-	-	60	40	100	3	No Exam (External Viva-voce)
BFARS1-404	Lettering and Typography-IV	1	1	-	-	60	40	100	2	No Exam (Viva-voce on portfolio)
BFARS1-405	Hoarding Designing	2	-	-	-	60	40	100	2	3
BFARS1-406	History of Western Art-II	2	-	-	-	40	60	100	2	3
BFARS1-407	Aesthetics (Indian)	2	-	-	-	40	60	100	2	3
BFARS1-408	Aesthetics (Western)	2	-	-	-	40	60	100	2	3
Total	Theory = 12 Studio = 6 Labs = 0	12	06	-	-	400	400	800	18	-

Total Contact Hours = 14   **Total Marks = 600**   **Total Credits = 14**

Semester 5th		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-501	Story board Designing	1	2	-	-	60	40	100	3	03 (Evaluation by External Viva-voce)
BFARS1-502	Press and Magazine Graphics	1	1	-	-	60	40	100	2	No Exam (Viva-voce on portfolio)
BFARS1-503	Basic Animation- I	1	2	-	-	60	40	100	3	No Exam (External Viva-voce)
BFARS1-504	History of visual communication	2	-	-	-	40	60	100	2	3
BFARS1-505	Advertising Art and Ideas	2	-	-	-	40	60	100	2	3
Total	Theory =7 Studio = 5 Labs = 0	7	5			260	240	500	12	-

*Educational Tour of duration up to 06 days during (preferably at the commencement of the semester) the semester may be undertaken

Total Contact Hours = 16   **Total Marks = 600**   **Total Credits = 18**

Semester 6th		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-601	Film & Media	1	2	-	-	60	40	100	3	03 (Evaluation by External Viva-voce)
BFARS1-602	Advertisement Campaign	1	1	-	-	60	40	100	2	No Exam (Viva-voce on portfolio)
BFARS1-603	Basic Animation- II	1	2	-	-	60	40	100	3	No Exam (External Viva-voce)
BFARS1-604	Art Festival	1	2	-	-	60	40	100	3	(External Viva-voce)
BFARS1-605	Theory Project	1	2	-	-	60	40	100	3	(External Viva-voce)
BFARS1-606	Photography -I	1	1	-	-	60	40	100	2	No Exam (Viva-voce on portfolio)
Department Elective – I (Select any one)		2	-	-	-	40	60	100	2	3
BFARD1-611	Literature (Punjabi)									
BFARD1-612	Literature (Hindi)									
Total	Theory = 8 Studio = 10 Labs = 0	8	10			400	300	700	18	-

*After the completion of 6th semester, the students shall have to undergo summer training of five weeks duration which shall be evaluated in 7th semester.

Total Contact Hours =16   **Total Marks = 800**   **Total Credits = 16**

Semester 7th		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-701	Visual Communication Design for Social Media	1	2	-	-	60	40	100	3	03 (Evaluation by External Viva-voce)
BFARS1-702	Advance Photography	1	2	-	-	60	40	100	3	No Exam (Viva-voce on portfolio)
BFARS1-703	Advance Animation	1	2	-	-	60	40	100	3	No Exam (External Viva-voce)
BFARS1-704	Practical Training	-	3	-	-	100	200	300	3	(External Viva-voce)
BFARS1-705	Research Work	2	-	-	-	40	60	100	2	3
BFARS1-706	Advertising Art and Ideas	2	-	-	-	40	60	100	2	3
Total	Theory =7 Studio = 9 Labs = 0	7	9			360	440	800	16	-

Total Contact Hours =10   **Total Marks =800**   **Total Credits =10**

8th SEMESTER		Contact Hours				Maximum Marks		Total Marks	Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.			
BFARS1-801	Animation movie or Magazine design project	1	2	-	-	100	100	200	3	03 (Evaluation by External Viva-voce)
BFARS1-802	Advertisement Project Work	1	2	-	-	100	100	200	3	(External Viva-voce)
BFARS1-803	Research Work	-	4	-	-	150	250	400	4	3
Total	Theory =2 Studio = 8 Labs = 0	2	8			350	450	800	10	-

Overall Marks / Credits

Semester	Marks	Credits
1st	800	28
2nd	800	26
3rd	800	25
4th	800	18
5th	500	12
6th	700	18
7th	800	16
8th	800	10
Total	6000	153

BASIC DRAWING & PAINTING FROM NATURE

Subject Code: BFARS1-101   **L S T P C**   **Duration: 75 Hrs.**

1 4 0 0 5

COURSE PREREQUISITES The student should have an aptitude to visualize 2-D and 3- D objects. The student should have aesthetic sense about the art elements like forms, colours, light, tones, contrast etc.

COURSE OBJECTIVES:
1. The student shall be able to learn Natural forms related to the living beings and them in still and action.
2. The student shall be able to learn various forms and their 2D and 3D and express their imagination through visual representation
3. To acquaint students about the form and colours present in the nature. So students can use the same for representational commercial designs later.
4. Understanding the art elements like forms, colours, light, tones, contrast etc.
5. Developing skill to use various media like watercolour, poster colour, tempera, pastel, wax pastels and collage.

COURSE OUTCOMES:
1. Understand human anatomy and proportions.
2. Learn similarities and differences in animals, birds and human forms.
3. Learn basic and complex visual forms of nature
4. Knowledge of basic forms
5. Develop visual sense through 2 and 3 point perspective.
6. Develop their imagination by using memory recalling method.

CONTENTS
Unit –I (25 Contact Hours)

Sketching & Painting
1. Quick & rapid sketches from Human figure Animal & Birds Nature
2. Painting from objects and nature to study color, tone and texture.
3. Use of different painting media like water color, poster colour, tempera, pastel and wax pastels.

Unit –II (50 Contact Hours)
Drawing
1. Drawing exercises to study nature to observe and acquire skills for its graphic representation.
2. Exercises to explore the expressive quality of line using different media like pencil, charcoal, crayon, pen Brush and ink etc.
3. Drawing from imagination.
4. Study of line through constructions using different media like wire, straw and thread etc.
5. Study of perspective. Difference in handling of nearer and distant objects controlled light and shade. Ability to simplify treating the essential omitting detail.

Recommended Text Books / Reference Books:

1. Tushar Moleshwari, '*Memory drawing simplified*', Jyotsna Prakashan, Mumbai
2. Pratap Mulick, '*Sketching*' Jyotsna Prakashan, Mumbai
3. Milind Mulick, '*Perspective*' Jyotsna Prakashan, Mumbai
4. Milind Mulick '*Sketchbook*' Jyotsna Prakashan, Mumbai
5. Milind Mulick '*Natural Inspiration*' Jyotsna Prakashan, Mumbai
6. Rahul Deshpande, Gopal Nandurkar '*Pencil Techniques - Graphite*' Jyotsna Prakashan, Mumbai
7. Rahul Deshpande, Gopal Nandurkar '*Pencil Techniques - Part 2*' Jyotsna Prakashan, Mumbai
8. Tushar Moleshwari, '*Figure drawing*' Jyotsna Prakashan, Mumbai
9. Rahul Deshpande '*Think 3D -Introduction to Structure Drawing'* Jyotsna Prakashan, Mumbai
10. Rahul Deshpande '*Think 3D Part II - Advanced Structure Drawing'* Jyotsna Prakashan, Mumbai
11. Gopal Nandurkar '*Approach to Drawing Animals*' Jyotsna Prakashan, Mumbai
12. Aditya Chari '*Figure Study made easy'* Jyotsna Prakashan, Mumbai
13. Shankar Modgekar '*Figure Drawing made easy*' Jyotsna Prakashan, Mumbai
14. Victor Perard '*Anatomy & Drawing*' Jyotsna Prakashan, Mumbai
15. M. M. Mehta, V. S. Adurkar '*Free Drawing*' Jyotsna Prakashan, Mumbai
16. Milind Mulick '*Watercolour*' Jyotsna Prakashan, Mumbai
17. Milind Mulick '*Watercolour Landscapes Step by Step*' Jyotsna Prakashan, Mumbai
18. Milind Mulick '*Methods and Techniques - Opaque Colour*' Jyotsna Prakashan, Mumbai
19. Rahul Deshpande, Gopal Nandurkar '*Methods and Techniques - Colour Pencil*' Jyotsna Prakashan, Mumbai
20. Milind Mulick '*Expressions In Watercolour*' Jyotsna Prakashan, Mumbai
21. Milind Mulick '*Watercolour Paintings with Photo References*' Jyotsna Prakashan, Mumbai
22. Milind Mulick '*Watercolour Demonstrations*' Jyotsna Prakashan, Mumbai
23. Rahul Deshpande '*Acrylic Explorations'* Jyotsna Prakashan, Mumbai
24. Bill Creevy *'The Pastel Book: Materials and Techniques for Today's Artist'* Watson-Guptill
25. Judy Martin '*Encyclopedia of Pastel Techniques, The: A Unique Visual Directory of Pastel Painting Techniques, With Guidance On How To Use Them*' Search Press UK
26. Alannah Moore *'The Collage Ideas Book (The Art Ideas Books)'* Ilex Press UK

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks)
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

2 & 3 DIMENSIONAL DESIGN - I

Subject Code: BFARS1-102   **L S T P C**   **Duration: 75 Hrs.**
                                  1 4 0 0 5

COURSE PREREQUISITES: The student should have an aptitude to visualize 2-D and 3-D objects.

COURSE OBJECTIVES:
1. Students explore the principles of visual perception and the meaning of form, space, function, and structure as they relate to 2 & 3-D design through a clear sequence of assignments and projects.

COURSE OUTCOMES:
1. Know formal systems of 2-D composition, using the basic principles and elements of design.
2. Acquire critical thinking skills in the development and resolution of concepts related to visual media.
3. Learn how to identify and analyze the elements, principles and vocabulary of three-dimensional design.
4. Learn to utilize and integrate the elements, principles, materials and processes of three-dimensional design to fulfill a specific intention.

CONTENTS
Unit –I (50 Contact Hours)
1. Making 2D & 3D Designs based on geometrical shapes.
2. Study of two-dimensional and three dimensional space and its organizational possibilities.
3. Converting natural shapes into geometrical designs: Study of various types of objects (natural and man-made) with a view to transform them into Regular Forms

Unit –II (50 Contact Hours)
1. Clay modeling –make basic forms with clay: To develop the sense of structure in clay (Basic form like Spherical, Conical and Cylindrical)
2. Relief sculpture.

RECOMMENDED BOOKS
1. Roger Burrows '*3D Thinking in Design and Architecture: From Antiquity to the Future*' Thames & Hudson, 2018
2. Allan Chochinov *'Designing Here Now: A Global Selection Of Objects Concepts And Spaces For The Future'* Thames and Hudson
3. Stephen Pentak, David A. Lauer '*Design Basics'* Cengage Learning, Inc
4. Bruno Munari '*Design As Art'* Penguin UK Illustrated edition
5. Alex Fowkes '*Drawing Type: An Introduction to Illustrating Letterforms'* Adams Media

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

LETTERING AND TYPOGRAPHY -I

Subject Code: BFARS1-103   **L S T P C**   **Duration: 60 Hrs.**
                                        1 3 0 0 4

COURSE PREREQUISITES: Basic knowledge of lettering system

COURSE OBJECTIVES:
This course provides students the fundamental skill to design effectively with typography for work produced in Design Communication, Typographic Design, and Portfolio.

COURSE OUTCOMES:
1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of type styles and components of typography, typographic measurement systems, typographic, and layout terminology.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color, and graphic elements to effectively communicate and support the content of a design.

CONTENTS
UNIT –I (30 Contact Hours)
1. Drawing Letterforms/Letterform Terminology
2. Nature study of Lines forms and shapes
3. Construction of letters and spacing

UNIT –II (30 Contact Hours)
1. History of Typography/Typeface Terminology
2. Scribbles with Kalam, Nib, Brush and Calligraphy Pen.
3. Viewing and analyzing fonts or different examples of creative work

RECOMMENDED BOOKS
1. Robert Bringhurst '*The Elements of Typographic Style'* Hartley & Marks Inc.,U.S.
2. Sarah Hyndman '*Why Fonts Matter*' Gingko Pr Inc.
3. Marie Lynskey '*Complete Calligraphy*' D & S Books.

INSTRUCTIONS TO THE PAPER SETTER
External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester.

POSTER DESIGNING

Subject Code: BFARS1-104   **L S T P C**   **Duration: 60 Hrs.**
                                       1 3 0 0 4

COURSE PREREQUISITES: Basics of drawing.

COURSE OBJECTIVES:
1. The aim of this course to encourage the students to think about the prospective audience, the poster content and the design considerations involved in the layout of a poster.
2. Also to use visual representations to present any given idea powerfully with the help of colours, forms, textures and using symbolic language.

COURSE OUTCOMES:
1. Be able to use colours, form, light textures etc to present any given visual idea.
2. To understand the Poster Presentation Life Cycle.
3. Collaboratively mock up a poster design
4. To understand what current technology is available to enhance your poster

CONTENTS
UNIT –I (20 Contact Hours)

1. Fundamentals of poster making
2. Working in various mediums
3. Making posters with three colors and multi colors

UNIT –II (40 Contact Hours)

1.   Poster for Public Welfare like saving water, electricity, Postal Services, Railways, Bus Services etc.
2.   Poster for Service Industry like Travel & Tours, LIC, e Shopping Malls, Paints etc.
3.   Poster for Entertainment Industry like Exhibitions, Live Shows, Mass media etc.

RECOMMENDED BOOKS
1.   John Foster '*New Masters of Poster Design: Poster Design for the Next Century*' Rockport Publishers
2.   Gill Saunders & Margaret Timmers '*The Poster: A Visual History* 'Thames and Hudson
3.   Colin Salter '*100 Posters that Changed the World*' Pavilion Books
4.   Zeixs '*Best Poster Designs (Design Cube Series)*' by Feierabend Unique Books
5.   Robert Bringhurst *'The Elements of Typographic Style*' Hartley & Marks Publishers

INSTRUCTIONS TO THE PAPER SETTER
External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester.

PRINT MAKING- I

Subject Code : BFARS1-105   **L S T P C**   **Duration: 60 Hrs.**
                                        1 3 0 0 4

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. An understanding of the basic principles of making prints, and the ability to apply these principles with specific aesthetic intent. This includes functional knowledge of the traditions, conceptual modes, and evolutions of the discipline.
2. Knowledge and skills in the use of basic tools, techniques, and processes sufficient to work from concept to finished product using traditional methods and contemporary practices in lino cut, screen print etc
3. Mastery in one or more printmaking techniques, including the ability both to experiment with technical innovation and to explore and develop personal concepts and imagery.

COURSE OUTCOMES:
1. Use the printmaking medium as a means of creative and individual expression.
2. Develop facility with the tools, materials, and techniques inherent to basic printmaking processes.
3. Safely and responsibly handle the printmaking presses, equipment, and other materials common to basic printmaking processes.
4. Manage the registration of image to print matrix, and print matrix to paper, with prints composed of both single and multiple passes or layers.
5. Understand and discuss the historical and contemporary role of printmaking media in art, design, and culture.
6. Create resolved, original, prints, using the various methods introduced.

CONTENTS
UNIT –I (20 Contact Hours)
1. Introduction and brief history of Print Making
2. Basics of Print Making
3. Anticipatory and imaginative use of gathering impressions.
4. Fundamentals of various methods of taking prints.

UNIT –II (40 Contact Hours)
1. Techniques of taking prints in Mono colour
2. Lino Cut & Printing, Mono and Color print with mounting.
3. Screen Printing Basics

RECOMMENDED BOOKS
1. Frances Stanfield '*The Printmaking Ideas Book* ' Ilex Press
2. Nick Morley '*Linocut for Artists & Designers'* The Crowood Press Ltd
3. Susan Yeates '*Beginner's Guide to Linocut: 10 Print Projects with Top Techniques to Get You Started* ' Search Press
4. Susan Yeates '*Learning Linocut: A Comprehensive Guide to the Art of Relief Printing Through Linocut'* New Generation Publishing.

5. K.K.Aggarwal 'प्रैक्टिकल स्क्रीन प्रिंटिंग विद स्टीकर्स, लीफ, लेमिनेशन *Practical Screen Printing with Stickers, Leaf, Lamination (Hindi Edition)*' Manoj Publication
6. Sarvdeep Singh '*Guide to Professional Screen Printing*' Ferntree Publishing
7. Scholastic Books '*The History of Printmaking (Voyages of Discovery)*' Scholastic

INSTRUCTIONS TO THE PAPER SETTER

External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester.

HISTORY OF INDIAN ART –I (CLASSIC PERIOD)

Subject Code : BFARS1-106   **L S T P C**   **Duration: 30 Hrs.**

                                                      2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. Identify aesthetic traits found throughout Indian art as well as various forms of art
2. The prehistoric and proto-historic phases are presented as background for the emergence of art activity in succeeding periods.

COURSE OUTCOMES:
1. The course will enable the student to appreciate the ancient aesthetics and knowledge of construction, and also stimulate interest to know the subject in detail.
2. The course helps to develop observational & systematic analytical skills and have their own opinions on different projects.
3. Students can relate present Indian and western art to the ancient Indian art.
4. Intended to familiarize the student to ancient Indian art traditions and stimulate an interest for the appraisal of ancient aesthetics

CONTENTS
UNIT –I (15 Contact Hours)

1. Pre–Historic Art:
   - Prehistoric Sites in India- (Bhimbetka Caves)
   - Discovery & Phases of Discovery
   - Characteristics of prehistoric paintings
2. Indus Valley Civilization
   - Centres of Indus valley civilization
   - Town planning
   - Important sculptures- Dancing Girls in Bronze, Bust of Priest
   - Seals- Pashupati Shiva seal
   - Terracotta figurines
3. Painting, Sculpture & Architecture under Mauryan, Shunga, Kushana, Gupta, Pallavas, Cholas, Pandyas, Vijaynagar, Chandelas, Klinga

UNIT –II (15 Contact Hours)
4. Early Satavaahanas
   - Sanchi Stupa (Great Departure from Kapilvastu and Chhadanta jataka.
   - Amaravati stupa & its sculptures/ reliefs
5. Painting and Architecture of Imperial style and Mughal style
6. Miniature art under Rajasthan and Pahari Rajputs

RECOMMENDED BOOKS
1. Heinrich Robert Zimmer *'Art of Indian Asia'* Princeton University Press
2. Ananda K. Coomaraswamy *'History of Indian and Indonesian Art'* Munshiram Manoharlal Publishers
3. Rowland, Benjamin *'The Art and Architecture of India : Buddhist, Hindu, Jain'* Penguin Books, Melbourne
4. Ananda K. Coomaraswamy *'Introduction to Indian Art'* Munshiram Manoharlal Publishers
5. Moti Chandra '*Studies in Early Indian Painting'* Asia Publishing House
6. W.G. Archer *'Indian Paintings in the Punjab Hills*' Victoria & Albert Museum, London
7. R. C Majumdar (Editor) *'History and Culture of the Indian People (Complete Set)'* Bharatiya Vidya Bhavan
8. S.K.Sarswati *'A Survey Of Indian Sculpture'* Munshiram Manoharlal Publishers
9. Percy Brown, '*Indian Architecture'*, D.B. Taraporevala Sons & Co. Private Ltd., Bombay
10. Rowland Benjamin *'The Art and Architecture of India: Buddhist - Hindu - Jain (The Pelican History of Art)'* Penguin Books
11. L.C. Sharma *'A Brief History of Indian Painting'* Krishna Prakashan Media P. Ltd.
12. Edith Tömöry '*History of Fine Arts in India & the West'* Orient BlackSwan
13. Stella Kramrisch *'Indian Sculpture'* Motilal Banarsidass
14. वाचस्पति गैरोला 'भारत की चित्रकला का संक्षिप्त इतिहास' लोकभारती प्रकाशन
15. Dr. Girraj Kishore Agrawal 'आधुनिक भारतीय चित्रकला' Sanjay Publication
16. Dr. Rita Pratap 'भारतीय चित्रकला एवं मूर्तिकला का इतिहास' Rajasthan Hindi Granth Academy

INSTRUCTIONS TO THE PAPER SETTER
1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short Answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each UNIT), out of which the Students are required to attempt any four questions (selecting at least one from each UNIT).

ENGLISH AND COMMUNICATION SKILLS

Subject Code: BFARS1-107   **L S T P C**   **Duration: 30 Hrs.**
                                 2 0 0 0 2

COURSE PREREQUISITES: The student should have basic knowledge of English Grammar.

COURSE OBJECTIVES:
1. To enhance the learner's communication skills by giving adequate exposure in listening, speaking, reading and writing skills and the related sub-skills.
2. To impart better writing skills by sensitizing the learners to the dynamics of effective writing.
3. To build up the learners confidence in oral and interpersonal communication by reinforcing the basics of pronunciation specially focusing on interviews / corporate meetings / international business travels.

COURSE OUTCOMES:
1. To sensitize students to the language, forms and types of poetry, fiction & prose.
2. To help them read, critically analyze and appreciate poetry, fiction & prose.
3. To sensitize students to the nuances of spoken and written forms of English and be enable them to produce grammatically and idiomatically correct language.
4. To help them master writing techniques to meet academic and professional needs.
5. To provide sufficient practice in Vocabulary, Grammar, Comprehension and Remedial English from the perspective of career oriented tests.

CONTENTS

Six chosen lessons from the book, 'Perceptions'
1. Pret in the House
2. My muscles Froze
3. Not just Oranges
4. A different kind of learning
5. The Election
6. A Night with the Bears

UNIT –I (15 Contact Hours)
Grammar:
1. Verbs
2. Use of Prepositions Voice
3. Narration

UNIT –II (15 Contact Hours)
Composition
1. Letter/Application Writing
2. Expansion of ideas/paragraph writing
3. Precise writing (not to be examined)
4. Article writing
5. Poster (not to be examined)

RECOMMENDED BOOKS

1. Shanta Rameshwar Rao *'Perception: A Selection of Modern English Writing'* Orient BlackSwan
2. Wren and Martin '*English Grammar and Composition'* S Chand and Company Pvt. Limited.

INSTRUCTIONS TO THE PAPER SETTER

1. Question paper will have two sections (A & B) Literature and Grammar.
2. Literature section will be of 30 Marks divided into three portions of 10 marks each (Poetry, Prose and Fiction) 10 objective type questions carrying 1 mark each, 2 questions carrying 5 marks each and one question carrying 10 marks.
3. Grammar section will be divided into two parts Simple grammar and composition carrying 15 marks each.

FUNDAMENTALS OF APPLIED ART

Subject Code: BFARS1-108   **L S T P C**   **Duration: 30 Hrs.**
                                                     2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. This course is the basic introduction to applied art, its history, potential and limitations.
2. Students examine various definitions of design elements and principals as well as advertising objectives to provide students with a fundamental understanding of advertising art in business, branding and society.

COURSE OUTCOMES:
1. Students will understand and use correctly most of the special terms used in the field of applied art.
2. Understand the use of good design and composition principles in solution to problems.
3. Able to interpret visual communication through design.
4. Understand the application of basic principles and elements of design. Typography Calligraphy Monograms Symbol, Trade Mark, Monograms, Logo Type, Book Cover & Poster.

CONTENTS
UNIT –I (15 Contact Hours)

1. Elements and forces. Line, Postulates & Tone.
2. Design : i) The origin of design
                  ii) Elements of design
                 iii) Principles of design.
3. Perspective
4. Techniques of various mediums.
5. Rendering with different mediums.
6. Colour Theory : i) Primary Colours
                            ii) Secondary Colours
                            iii) Complementary Colours

UNIT –II (15 Contact Hours)

1. Typography : Roman / Gothic
2. Calligraphy
3. Monograms
4. Symbol
5. Trade Mark / Monograms
6. Logo Type
7. Book Cover
8. Poster

RECOMMENDED BOOKS
1. Bruno Munari *'Design As Art'* Penguin UK
2. Alex Fowkes '*Drawing Type: An Introduction to Illustrating Letterforms*' Rockport Publishers
3. Alina Wheeler '*Designing Brand Identity: An Essential Guide for the Whole Branding Team'* Wiley
4. Jens Muller, R. Roger Remington '*Logo Modernism'* Taschen GmbH
5. Robert Bringhurst '*The Elements of Typographic Style*' Hartley & Marks Inc.,U.S.
6. Sarah Hyndman 'Why Fonts Matter' Gingko Pr Inc.
7. Alison Branagan '*The Essential Guide to Business for Artists and Designers*' A&C Black
8. Pedro Joseph Lemos '*Applied Art: Drawing, Painting, Design And Handicraft'* Nabu Press
9. Allan Wexler & Patricia C. Phillips '*Allan Wexler: The Fine Art of Applied Art'* Stadtgalerie Saarbrucken & Verlag fur Moderne Kunst Nurnberg
10. Kamla C. Aryan '*Simplified Applied Art: Reference Book on Human Anatomy and Lettering in English and Hindi for Commercial Artists'* Rekha Prakashan
11. Gill Saunders, Margaret Timmers (Editor) '*The Poster: A Visual History*' Thames and Hudson
12. Colin T. Salter '*100 Posters that Changed the World'* Pavilion Books
13. Alina Wheeler, Debbie Millman '*Designing Brand Identity: An Essential Guide for the Whole Branding Team'* Wiley
14. Jens Muller, R. Roger Remington *'Logo Modernism'* Taschen GmbH

INSTRUCTIONS TO THE PAPER SETTER
1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short Answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each UNIT), out of which the Students are required to attempt any four questions (selecting at least one from each UNIT)

2nd SEMESTER

PRODUCT DESIGN & PAINTING FROM OBJECTS

Subject Code: BFARS1-201   **L S T P C**   **Duration: 75 Hrs.**
                                        1 4 0 0 5

COURSE PREREQUISITES: The student should have basic knowledge of drawing.

COURSE OBJECTIVES:
1. The focus of Product Design and Development is integration of the marketing, design, and manufacturing functions in creating a new product. Confidence in your own abilities to create a new product.
2. Awareness of the role of multiple functions in creating a new product (e.g. marketing, finance, industrial design, engineering, production).
3. Ability to coordinate multiple, interdisciplinary tasks in order to achieve a common objective.
4. To acquaint students about the form, colours and composition rules present in the nature. So students can use the same for representational commercial designs later. Reinforcement of specific knowledge from other courses through practice and reflection in an action-oriented setting.

COURSE OUTCOMES:
1. Use the Product Design and Development Process, as a means to manage the development of an idea from concept through to production.
2. Employ research and analysis methodologies as it pertains to the product design process, meaning, and user experience and Apply creative process techniques in synthesizing information, problem-solving and critical thinking.
3. Demonstrate, apply, explain, employ and recognize basic engineering, mechanical, and technical principles of hand drawing and drafting principles to convey concepts.
4. Use basic fabrication methods to build prototype models for hard-goods and soft-goods and packaging.
5. Understanding the art elements like forms, colours, light, tones, contrast etc. and developing skill to use various media like watercolour, poster colour, tempera, pastel, wax pastels and collage.

CONTENTS
UNIT –I (25 Contact Hours)

1. Drawing (Line and Tonal), Use of various techniques
2. Observation and Understanding the quality of Objects.
3. Designing a new product according to the given specifications.

UNIT –II (50 Contact Hours)

1. Rendering the product.
2. Making a prototype of the designed product
3. Making paintings in various medias from objects
4. Designing a product cover in colours

RECOMMENDED BOOKS

1. Karl Ulrich , Steven Eppinger '*Product Design and Development*' McGraw Hill Education
2. Koos Eissen, Roselien Steur '*Sketching: Drawing Techniques for Product Designers*' BIS Publishers
3. Kevin Henry Drawing for Product Designers (Portfolio Skills) Laurence King Publishing
4. Rahul Deshpande '*Think 3D'* (all parts) Jyotsna Prakashan, Mumbai
5. Bruno Munari '*Design As Art'* Penguin UK Illustrated edition
6. Alex Fowkes 'Drawing Type: An Introduction to Illustrating Letterforms' Adams Media
7. Alina Wheeler '*Designing Brand Identity: An Essential Guide for the Whole Branding Team'* Wiley
8. Milind Mulick '*Sketchbook*' Jyotsna Prakashan, Mumbai
9. Milind Mulick '*Natural Inspiration*' Jyotsna Prakashan, Mumbai
10. Milind Mulick '*Watercolour'* Jyotsna Prakashan, Mumbai
11. Milind Mulick '*Watercolour Landscapes Step by Step'* Jyotsna Prakashan, Mumbai
12. Milind Mulick '*Opaque colour*' Jyotsna Prakashan, Mumbai
13. Rahul Deshpande, Gopal Nandurkar '*Colour Pencil'* Jyotsna Prakashan, Mumbai
14. Milind Mulick '*Expressions In Watercolour*' Jyotsna Prakashan, Mumbai
15. Milind Mulick '*Watercolour paintings with Photo reference'* Jyotsna Prakashan, Mumbai
16. Milind Mulick '*Watercolour Demonstrations*' Jyotsna Prakashan, Mumbai
17. Rahul Deshpande '*Acrylic Explorations'* Jyotsna Prakashan, Mumbai
18. Milind Mulick , Co written by Priya Sathe '*Journey so far...*' Jyotsna Prakashan, Mumbai
19. John Fernandes '*The Gallery'* Grace Prakashan

INSTRUCTIONS TO THE PAPER SETTER

1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).
3. Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

2 & 3 DIMENSIONAL DESIGN – II

Subject Code: BFARS1-202   **L S T P C**   **Duration: 75 Hrs.**
                                       1 4 0 0 5

COURSE PREREQUISITES: The student should have an aptitude to visualize 2-D and 3-D objects.

COURSE OBJECTIVES:
1. This subject will introduce students to fundamental topics in three-dimensional design.
2. Students explore the principles of visual perception and the meaning of form, space, function, and structure as they relate to two and three-dimensional design through a clear sequence of assignments and projects.

COURSE OUTCOMES:
1. Know and apply formal systems of two-dimensional composition, using the basic principles and elements of design.
2. Acquire critical thinking skills in the development and resolution of concepts related to visual media.
3. Learn how to identify and analyze the elements, principles and vocabulary of three-dimensional design.
4. Learn to utilize and integrate the elements, principles, materials and processes of three-dimensional design to fulfill a specific intention.

CONTENTS
UNIT –I (30 Contact Hours)

1. Using various design rules in compositions like rule of third and golden spiral
2. Activation of space through form and colour- Optical illusions. Handling of various types of material for pictorial organization and rendering, such as; Pencil, pen, brushes, water colours, poster paints, pastel crayon, inks, cellophanes, oil newsprint and other college material, gums and adhesives, wax crayon with
3. Understanding the colour qualities in its variations of warm and cool colours, harmony and contrast. Creating coloured designs with regular irregular forms with Mosaic/Mural/Flat Gradation effect..

UNIT –II (45 Contact Hours)

Cantilever construction, Flexibility and ability to stretch, Geometrical regularity, arched structure, Control of tensions, Hinge construction
Sculptural experience (round and relief) in various light conditions (Natural as well as artificial):–
  1. Carved
  2. Modelled
  3. Perforated (bored through)
  4. Mobile
  5. Various methods of joining such as interlocking, plasting etc.

RECOMMENDED BOOKS
1. Roger Burrows '*3D Thinking in Design and Architecture: From Antiquity to the Future'* Thames and Hudson
2. Allan Chochinov '*Designing Here Now: A Global Selection of Objects Concepts and Spaces for the Future'* Thames and Hudson
3. David A Lauer, Stephen Pentak '*Design Basics*'Cengage Learning, Inc
4. Bruno Munari '*Design As Art'* Penguin UK Illustrated edition
5. Alex Fowkes '*Drawing Type: An Introduction to Illustrating Letterforms'* Adams Media

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

COMPUTER GRAPHICS -I

Subject Code: BFARS1-203   **L S T P C**   **Duration: 60 Hrs.**
                                      1 3 0 0 4

COURSE PREREQUISITES: The student should have done previous computer graphic course

COURSE OBJECTIVES:
1. To learn about Adobe Photoshop interface and work with rendering techniques.
2. To understand the concept of creating textures, brushes, abstract and thematic designs. To work with color panels to create, manage and edit color and color groups.

COURSE OUTCOMES:
1. Work comfortably with the software's most common tools and panels.
2. Create and edit all sorts of print documents.
3. Insert images, draw shapes, paint, type and apply color.
4. Design and save print-ready digital files.

CONTENTS

Adobe Photoshop

UNIT –I (30 Contact Hours)
1. Introduction to Vector Shapes and Bitmaps.
2. Exploring the Photoshop Environment.
3. Using the File Browser Basic Photo Corrections - Working with Selection Tools Layer Basics.
4. Masks and Channels Retouching and Repairing,

UNIT –II (30 Contact Hours)
1. Working with Brushes, Customizing Brushes,
2. Speed Painting, Matte Painting,
3. Creating a workspace for painting, Using Colour Palette, Painting and Editing.

RECOMMENDED BOOKS
1. Edward R. Tufte *'The Visual Display of Quantitative Information'*, 2nd edition Graphics Press
2. Edward R. Tufte '*Envisioning Information'* Graphics Press

INSTRUCTIONS TO THE PAPER SETTER
External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester

LETTERING AND TYPOGRAPHY - II

Subject Code: BFARS1-204 **L S T P C** **Duration: 45 Hrs.**
  1 2 0 0 3

COURSE PREREQUISITES: Basic knowledge of lettering system

COURSE OBJECTIVES:
This course provides students the fundamental skill to design effectively with typography for work produced in Design Communication, Typographic Design, and Portfolio.

COURSE OUTCOMES:
1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of type styles and components of typography, typographic measurement systems, typographic, and layout terminology.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color, and graphic elements to effectively communicate and support the content of a design.

CONTENTS

UNIT –I (20 Contact Hours)
1. Basic calligraphic strokes of Punjabi, Hindi, English
2. Calligraphic Upper case Alphabets
3. Calligraphic Lower case Alphabets

UNIT –II (25 Contact Hours)
1. Ascending and Descending Letters
2. Alphabet, sentences and paragraph composition of different types.
3. Letters with Diagonal Lines

RECOMMENDED BOOKS
1. Robert Bringhurst '*The Elements of Typographic Style'* Hartley & Marks Inc.,U.S.
2. Sarah Hyndman '*Why Fonts Matter*' Gingko Pr Inc.
3. Marie Lynskey '*Complete Calligraphy*' D & S Books.
4. Manoj Publications '*English-Hindi Lettering Styles'* Manoj Publications
5. *Learn Devnagari Calligraphy Vol (Revised)* Akshar Sanskar Publications
6. Margaret Shepherd '*Learn Calligraphy: The Complete Book of Lettering and Design'* Watson-Guptill

INSTRUCTIONS TO THE PAPER SETTER
External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester.

PRINT MAKING- II

Subject Code: BFARS1-205   **L S T P C**   **Duration: 45 Hrs.**
                                      1 2 0 0 3

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. An understanding of the basic principles of making prints, and the ability to apply these principles with specific aesthetic intent. This includes functional knowledge of the traditions, conceptual modes, and evolutions of the discipline.
2. Knowledge and skills in the use of basic tools, techniques, and processes sufficient to work from concept to finished product using traditional methods and contemporary practices in lino cut, screen print etc

COURSE OUTCOMES:
1. Use the printmaking medium as a means of creative and individual expression.
2. Develop facility with the tools, materials, and techniques inherent to basic printmaking processes.
3. Safely and responsibly handle the printmaking presses, equipment, and other materials common to basic printmaking processes.
4. Manage the registration of image to print matrix, and print matrix to paper, with prints composed of both single and multiple passes or layers.
5. Understand and discuss the historical and contemporary role of printmaking media in art, design, and culture.
6. Create resolved, original, prints, using the various methods introduced.

CONTENTS
UNIT –I (22 Contact Hours)

Sketch and Block cutting
1. Wood Cut & Printing basics and History
2. Preparing layouts for wood cut printing.

UNIT –II (23 Contact Hours)

Block Printing
1. Process of taking out coloured relief printing
2. Experience of hand printing with wood blocks

RECOMMENDED BOOKS
1. Scholastic Books '*The History of Printmaking (Voyages of Discovery)*' Scholastic
2. George A. Walker '*The Woodcut Artist's Handbook: Techniques and Tools for Relief Printmaking (Woodcut Artist's Handbook: Techniques & Tools for Relief Printmaking)*' Firefly Books Ltd
3. The Encyclopedia of Printmaking Techniques : A Unique Visual Directory of Printmaking Techniques, with Guidance on How to Use Them by Judy Martin (Search Press Ltd)

INSTRUCTIONS TO THE PAPER SETTER
External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester

HISTORY OF INDIAN ART- II (MODERN PERIOD)

Subject Code: BFARS1-206   **L S T P C**   **Duration: 30 Hrs.**
                                        2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. Identify aesthetic traits found throughout Indian art
2. To intended to familiarize the student to Modern Indian art and stimulate an interest for the appraisal of efforts done by Indian Great Masters.
3. The course also aims to surveys through phases of Indian modern art as well as various forms of art and to introduce the students to various art movements and their present situation

COURSE OUTCOMES:
1. The course will enable the student to appreciate the Modern aesthetics and knowledge of various modern art techniques.
2. Stimulate interest to know the modern subject matter in detail.
3. The course helps to develop observational & systematic analytical skills and have their own opinions on different projects.
4. Students can relate present Indian modern art to the International Modern art.
5. Students can get an inspiration from modern art and transform the same into applied art designs.

CONTENTS
UNIT –I (15 Contact Hours)

1   Background of Indian modern art movement (Company School, British Art Colleges, Western modern art movement)
2   Bengal School of Art
3   Progressive Art Group

UNIT –II (15 Contact Hours)
1. Delhi Shilpi Chakra
2. Baroda Art Movement
3. Chola Mandalam Art Movement
4. Contemporary Art

RECOMMENDED BOOKS
1   Zimmer, Heinrich Robert, Campbell, Joseph *'The art of Indian Asia, its mythology and transformations'* Princeton University Press
2   Ananda K. Coomaraswamy *'History of Indian and Indonesian Art'* Munshiram Manoharlal Publishers
3   Rowland, Benjamin *'The Art and Architecture of India : Buddhist, Hindu, Jain'* Penguin Books, Melbourne
4   Ananda K. Coomaraswamy *'Introduction to Indian Art'* Munshiram Manoharlal Publishers
5   Rowland Benjamin '*The Art and Architecture of India: Buddhist - Hindu - Jain (The Pelican History of Art)' Penguin Books*

6   L.C. Sharma '*A Brief History of Indian Painting'* Krishna Prakashan Media P. Ltd
7   Edith Tömöry '*History of Fine Arts in India & the West'* Orient BlackSwan
8   Stella Kramrisch '*Indian Sculpture'* Motilal Banarsidass,
9   Kishore Singh '*Indian Modern Art A Visual History'* Delhi Art Gallery
10 Rakhee Balaram, Partha Mitter, Parul Dave Mukherji '*20th Century Indian Art: Modern, Post-Independence, Contemporary*' Thames and Hudson
11 Dr. Girraj Kishore Agrawal 'आधुनिक भारतीय चित्रकला' Sanjay Publication
12 Dr. Rita Pratap 'भारतीय चित्रकला एवं मूर्तिकला का इतिहास' Rajasthan Hindi Granth Academy

INSTRUCTIONS TO THE PAPER SETTER
1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short Answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each UNIT), out of which the Students are required to attempt any four questions (selecting at least one from each UNIT)

ART FORMS OF PUNJAB

Subject Code: BFARS1-207   **L S T P C**   **Duration: 30 Hrs.**
                               2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
1. To introduce local folk art to the students so they can understand folk mindset.
2. To intended to familiarize the student to the development of Punjab folk art forms
3. The course will be helpful for the students to create professional designs based on local cultural demands.

COURSE OUTCOMES:
1. The course will enable the student to appreciate the folk art forms of Punjab
2. Students will be able to apply these art forms in their professional field
3. Students will learn principles and elements of painting & Design, Art meaning, concept and paintings, Traditional and Modem mediums and materials.
4. To became familiar with the basic materials and process
5. Students can work better on the concept of 'Think local act global'.

CONTENTS

UNIT –I (15 Contact Hours)
1. Phulkari
2. Wall Painting
3. Leatherwork
4. Weaving
5. Chowk Poorna (Sanjhi)

UNIT –II (15 Contact Hours)
1. Wood work
2. Metal Work
3. Making Pranda, Naale, Innu etc
4. Mural Art

RECOMMENDED BOOKS
1. Harjeet Singh Gill '*Folk Art of Punjab'* Punjabi University Patiala
2. Dr. Harmandeep Kaur '*Significance of Mural Art of 19th Century Punjab*' Indian Books and Periodicals
3. R.P. Srivastava '*Punjab Painting'* Abhinav Publications
4. Anu H. Gupta, Shalina Mehta '*Phulkari from Punjab: Embroidery in Transition*' Niyogi Books
5. R. P. Srivastava '*Art and Archaeology of Punjab'* Sundeep Prakashan
6. ਡਾ. ਜੀਤ ਸਿੰਘ ਜੋਸ਼ੀ 'ਲੋਕ ਕਲਾ ਅਤੇ ਸਭਿਆਚਾਰ' ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ
7. ਡਾ. ਗੁਰਨਾਇਬ ਸਿੰਘ 'ਕਲਾ ਅਤੇ ਸਭਿਆਚਾਰ' ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ
8. ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਖਹਿਰਾ, ਡਾ. ਸੁਰਜੀਤ ਸਿੰਘ 'ਲੋਕਧਾਰਾ ਦੀ ਭੁਮਿਕਾ' ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ

9. ਸੋਹਿੰਦਰ ਸਿੰਘ ਬੇਦੀ 'ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ' ਨੈਸ਼ਨਲ ਬੁਕ ਟ੍ਰਸਟ ਦਿੱਲੀ

INSTRUCTIONS TO THE PAPER SETTER
1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short Answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each UNIT), out of which the Students are required to attempt any four questions (selecting at least one from each UNIT)

Subject Code: BFARS1-208　　　　**L S T P C**　　　　　　**Duration: 30 Hrs.**
　　　　　　　　　　　　　　　　　　　2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required.

COURSE OBJECTIVES:
This paper is designed to familiarize students with important developments in Punjab history of the Maharaja Ranjit Singh's period. The curriculum will acquaint the pupils with major ideas and thoughts of this period. It will give information about the artistic, social, political, economic, cultural and geographical aspects of that period. After completing this course student can professionally use this information in the field of design and work better in this region.

COURSE OUTCOMES:
1. Student will learn basic narrative of historical events, chronology, personalities and turning points of the history of the Punjab under Maharaja Ranjit Singh.
2. Through completion of a combination of courses, students become familiar with the political processes and structures, society and culture, political Ideas and institutions, historical thought and historiography, economy and society in Punjab.
3.   Understand background of the religions, customs, institutions and administration and so on.
4. By analyzing relationship between the past and the present students will understand the social, political, religious and economic conditions of the people.
5. Students will be able to apply these art forms in their professional field

CONTENTS
UNIT –I (15 Contact Hours)
1. Background (Banda Singh Bahadur to Misl Period)
2. Rise of Maharaja Ranjit Singh
3. Establishing Lahore Darbar

UNIT –II (15 Contact Hours)
1. Civil Administration
2. Secularism of Maharaja Ranjit Singh

RECOMMENDED BOOKS
1. Patwant Singh, Jyoti M. Rai '*Empire of the Sikhs: The Life and Times of Maharaja Ranjit Singh*' Peter Owen Publishers
2. Mohamed Sheikh '*Emperor of the Five Rivers: The Life and Times of Maharajah Ranjit Singh'* I.B. Tauris
3. Khushwant Singh '*Ranjit Singh - Punjab Da Maharaja*' Chatar singh Jiwan singh
4. Kirpal Singh '*Historical Study of Maharaja Ranjit Singh's Times'* National Bookshop
5. Dr. Bhagat Singh *'A History of the Sikh Misals'* Punjabi-University-Patiala
6. Dr. Jasbir Singh Ahluwalia and Dr. Param Bakhshish Singh *'An Overview of Maharaja Ranjit Singh and His Times'* Publication Bureau, Punjabi University

8. Prithipal Singh Kapur & Dharam Singh *'Maharaja Ranjit Singh - Commemorative Volume'* Publication Bureau, Punjabi University

9. Fauja Singh , A. C. Arora '*Maharaja Ranjit Singh : Politics, Society and Economy*' Publication Bureau, Punjabi University

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short Answers are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each UNIT), out of which the Students are required to attempt any four questions (selecting at least one from each UNIT)

3ʳᵈ SEMESTER

<div style="background-color: #f5a623">**STUDY FROM LIFE & ILLUSTRATIONS**</div>

Subject Code: BFARS1-301   **L S T P C**   **Duration: 75 Hrs.**
                                      1 4 0 0 5

COURSE PREREQUISITES: The student should have basic knowledge of freehand drawing.

COURSE OBJECTIVES:
1. Understand basic anatomical relationships relevant to descriptive drawing of the human form.
2. Demonstrate competence in linear and tonal methods of drawing images of the life model.
3. Understand and be able to depict basic proportional relationships of the life model.
4. Understand rhythms of the body and natural forms and how they exist in the whole and parts of the figure.

COURSE OUTCOMES:
1. Students will apply basic foundation drawing skills to principles of gesture, anatomy, and creative interpretation of the human figure.
2. Students will demonstrate knowledge of classical and contemporary drawing styles and artists.
3. Students will experiment with various drawing materials and processes to produce both accurate and creative representational works.
4. Students will appropriate related vocabulary to the analysis of finished work in a constructive and critical dialogue.

CONTENTS
UNIT –I (35 Contact Hours)

1. Practice of single figures
2. Compositions from life

UNIT –II (40 Contact Hours)

1. Make illustrations from life.
2. Make complex illustration along with perspective and nature.

RECOMMENDED BOOKS
1. Memory drawing simplified Tushar Moleshwari (Jyotsna Prakashan, Mumbai)
2. Sketching by Pratap Mulick (Jyotsna Prakashan, Mumbai)
3. Figure drawing by Tushar Moleshvari (Jyotsna Prakashan, Mumbai)
4. Figure Study made easy by Aditya Chari (Jyotsna Prakashan, Mumbai)
5. Figure Drawing made easy by Shankar Modgekar (Jyotsna Prakashan, Mumbai)
6. Anatomy by Victor Perard (Jyotsna Prakashan, Mumbai)
7. Free Drawing by M. M. Mehta (Jyotsna Prakashan, Mumbai)

INSTRUCTIONS TO THE PAPER SETTER

External marks shall be awarded through viva- voce conducted by the External Examiner appointed by the University of the Work done by the student during the semester.

PRODUCT DESIGN & PRINT PRODUCTION

Subject Code: BFARS1-302   **L S T P C**   **Duration: 75 Hrs.**
                                         1 4 0 0 5

COURSE PREREQUISITES: The student should have previously done the product design.

COURSE OBJECTIVES:
1. The Product Design and print program trains multidisciplinary designers to use their creativity, design thinking, and design process to bring new ideas, products, and value to companies, communities, and people. Educators and industry professionals experienced in a wide range of areas guide students in developing their creative process, researching user experience, and applying diverse 2-D and 3-D design skills to create well-conceived and executed objects, products, and systems that service a human need.
2. Print Production for Designers focuses on current print production procedures that can prepare designers and creative thinkers for real world situations. Understanding print (offset and digital) processes is an essential part of design that can assure a predictable outcome of deliverables.

COURSE OUTCOMES:
1. Use the Product Design and Development Process, as a means to manage the development of an idea from concept through to production.
2. Employ research and analysis methodologies as it pertains to the product design process, meaning, and user experience.
3. Apply creative process techniques in synthesizing information, problem-solving and critical thinking.
4. Demonstrate and employ hand drawing and drafting principles to convey concepts.
5. The student will demonstrate the ability to read pertinent information using industry-specific sources.
6. They will gain a thorough grounding in print production technology and procedures, including how to communicate with other print professionals, estimate costs, and deal with digital output

CONTENTS
UNIT –I (35 Contact Hours)
1. Studying various products and marketing strategies.
2. Designing simple products in 2D and 3D.
3. Making their prints

RECOMMENDED BOOKS
- Product Design And Development by Karl T. Ulrich, Steven D. Eppinger (McGraw-Hill Higher Education)
- Designing for Print Production: Essential Concepts (Graphic Design/Interactive Media) by John C. Luttropp (Author), Martin L. Greenwald
- Art and Print Production Second Edition by Sarkar N. N.
-
   INSTRUCTIONS TO THE PAPER SETTER
   1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).

2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

CORPORATE IDENTITY

Subject Code: BFARS1-303

L S T P C
1 2 0 0 3

Duration: 45 Hrs.

COURSE PREREQUISITES: The student should have
COURSE OBJECTIVES:
1. The Brand Identity & Visual Communications Design course deals with the branding and identity design of products, brands, services, and even organizations.

2. This program makes you a specialist designer who combines the function and structure of communication, strategic and operational thinking, and graphic and spatial design.

COURSE OUTCOMES:
1. After completion of the branding and identity design course students are able to identify the needs of the producer and demand of the market.
2. They will be able to design the Brand identity according to the needs and demands.
3. They will be able to use creative potentiality to design the brand material with symbolic and attractive visual language.
4. Branding done by them will be everlasting and impactful.

CONTENTS
1. Creation of Symbol & Logo.
2. Creating corporate identity with Visiting Card designing
3. Use of Logo & Symbol to create a Letter Head design as a part of Corporate Identity
4. Creating an envelope design.
5. Sticker design with a social purpose.
6. Invitation Card designing.

RECOMMENDED BOOKS
- Design As Art (1966)By Bruno Munari
- Drawing Type by Alex Fowkes (Rockport)
- Designing Brand Identity: An Essential Guide for the Whole Branding Team by Alina Wheeler (John Wiley & Sons)
- Creating a Brand Identity: A Guide for Designers: (Graphic Design Books, Logo Design, Marketing) by Catharine Slade-Brooking (Laurence King Publishing)
- LOGO Modernism by Jens Müller, R. Roger Remington (Taschen)
- Identity Designed: The Definitive Guide to Visual Branding by David Airey (Rockport Publishers)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

COMPUTER GRAPHICS -II

Subject Code: BFARS1-304   L S T P C   **Duration: 45 Hrs**
                                       1 2 0 0 3

COURSE PREREQUISITES: The student should have done previous computer graphic course
COURSE OBJECTIVES:
3. To learn about Adobe Illustrator CC interface and work with menus, tools and panels.
4. To draw and edit simple and complex shapes using shape and transform tools.
5. To work with color panels to create, manage and edit color and color groups.
6. To work with type and text formatting tools.
7. To work with documents, layers and artboards..

COURSE OUTCOMES:
Upon successful completion of this course, participants will be able to:
5. Work comfortably with the software's most common tools and panels.
6. Create and edit all sorts of print documents.
7. Insert images, draw shapes, paint, type and apply color.
8. Design and save print-ready digital files.

CONTENTS
Adobe Illustrator

1. Practice of lines, curves, cones etc
2. Making signs, masking, 3D shapes
3. Blending, gradation, patterns etc
4. Making Illustrative designs

RECOMMENDED BOOKS
- Teach yourself adobe illustrator 9 in 24 hours by Mordy golding (David M Samson)
- Adobe Illustrator CC Classroom in a Book 2022 by Brian wood (Adobe press)
- Learning Vector Illustration with Adobe Illustrator: ...through videos, projects, and more by Jodi Staniunas Hopper (Bloomsbury Visual Arts)
- Adobe illustrator for beginners 2021: learn graphic design with illustrator by Hector Grant
- Paperback - Learn Adobe Illustrator CC for Graphic Design and Illustration by Ramona Remy
- Adobe Illustrator 10 Classroom in a Book . Adobe Creative Team

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

LETTERING AND TYPOGRAPHY

Subject Code: BFARS1-305   L S T P C   **Duration: 45 Hrs**
                                 1 2 0 0 3

COURSE PREREQUISITES: Basic knowledge of lettering system
COURSE OBJECTIVES:
This course provides students the Advance typography skills to design their own new fonts to produced work in Design Communication. Students will also learn Font Design and Expressive typography.

COURSE OUTCOMES:
1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of designing new fonts.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color, and graphic elements to effectively communicate and support the content of a design.
4. Will be able to work more efficiently in expressive typography to meet the needs of the industry.

CONTENTS

1. Devnagri and Urdu sentence exercises. with Kalam, Nib, Brush and Calligraphy Pen.
2. Designing new roman fonts
3. Designing Expressive typography

RECOMMENDED BOOKS
- The Elements of Typographic Style by Robert Bringhurst (Hartley & Marks)
- Why Fonts Matter by Sarah Hyndman (Virgin Books)
- Complete Calligraphy by Marie Lynskey (D & S Books)
- इंगलिश-हिंदी लैटरिंग स्टाइल्स English-Hindi Lettering Style (Manoj Publications)
- Learn Devnagari Calligraphy Vol (Revised) (Akshar Sanskar Publications)
- Learn Calligraphy: The Complete Book of Lettering and Designby Margaret Shepherd (Watson-Guptill)
- Expressive Typography : Word as Image By Keir Elam (John Wiley and Sons Ltd)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

HISTORY OF WESTERN ART-1

Subject Code: BFARS1-306   L S T P C   **Duration: 30 Hrs**
                                      2 0 0 0 2

COURSE PREREQUISITES: No Prerequisites are required.
COURSE OBJECTIVES:
The course objective is for you to understand the major characteristics of Western art through several historical time periods.
COURSE OUTCOMES:
Upon successful completion of the course, the student will acquire the listed skills:
1. Distinguish between art historical periods, Prehistory through Medieval.
2. Accurately identify individual works of art and architecture of significance.
3. Comprehend the advancements of technology as it impacts art.
4. Sharpen analytical and critical thinking skills in examining visual art.
5. Increase knowledge of world geography and relate it to art..
6. Improve communication skills through writing, quizzing, essay exams and formal presentation.

CONTENTS

Ancient Art
1   Pre historic art
4. Egyptian Art
5. Greek Art
6. Roman Art
Medival Art
1. Early Christian Art
2. Byzantine Art
3. Romanesque Art
4. Gothic Art
5. Renaissance Art

RECOMMENDED BOOKS

- History of art by H.W. Janson
- Art by Fredrick Hartt
- Story of art by Gombreich
- History of Modern Art by Aranson
- Art and Civilization by Mayers
- Great Masters of Western Art by Jordi Vigue (Watson-Guptill Publication New York)
- आधुनिक चित्रकला का इतिहास, साखलकर (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- यूरोपीय चित्रकला का इतिहास, साखलकर (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- पश्चिमी आधुनिक चित्रकार प्रो. रामचंद्र शुक्ल (साहित्य संगम इलाहबाद)

INSTRUCTIONS TO THE PAPER SETTER

1. The examiner is required to set a question paper with sections.

2. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
3. Section A will have 20 multiple choice questions carrying 1 mark each.
4. Section A will have equal questions from both units 1 & 2.
5. Section B will have 5 Questions Carrying 3 Marks each.
6. Section C will have 5 Questions Carrying 5 Marks each.
7. Examiner should give internal choice in Sections B & C.
8. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

ADVERTISING ART AND IDEAS

Subject Code: BFARS1-307   L S T P C   **Duration: 30 Hrs**
                                 2 0 0 0 2

COURSE PREREQUISITES: No prerequisite is required.
COURSE OBJECTIVES:
1. Identify and describe advertising art
2. Differentiate between the strategies used when creating advertising art
3. Using social media for advertising.

COURSE OUTCOMES:
1. Theory - apply industry knowledge and critical thinking skills to analyze, develop, and implement effective advertising solutions that meet professional standards
2. Design - develop concepts as well as analyze and incorporate aesthetics and layout in the design process for advertising campaigns and marketing communications
3. Technology and Production - demonstrate proficiency with the tools and graphic techniques of the profession to plan and implement production of advertising media such as print collateral, audio and video spots, and Web-interactive materials
4. Critical Thinking - demonstrate knowledge of the interdependence between advertising/marketing objectives and visual expression and be able to evaluate and critique their ideas
5. Be able to articulate the vision behind their creative work and explain and promote their solutions to clients and colleagues
6. Professionalism - demonstrate professional presentation; articulation of knowledge of advertising and visual problem solving; and mastery of industry standards, professional practices and ethics

CONTENTS

1. Communication.
2. The origin of design
3. Creative Planning
4. Press advertising
5. Outdoor advertising
6. Printing or Reproduction

RECOMMENDED BOOKS
- Advertising Hand Book by D. V. Gandhi.
- A Text Book of Applied Art by Dr Mrs. Sunita Borkar (Himalaya Publishing House, Mumbai)
- Mordern Advertising by Hepner.
- Advertising made simple by Frank Jefitine.
- Advertising theory and Practices by Verman Fryburger and Kim Rotzoll.
- The creative Connection, Advertising Copy writing and Idea Visualization.By Arthur A.Winters Shirley F. Milton.
- Advertising Art and Ideas.   By M.G. Rege
- Hand Book of Applied Art. By
- Art and Advertising by Joan Gibbons (Bloomsbury Publishing India Pvt Ltd New Delhi)
- Simplified Applied Art: Reference Book on Human Anatomy and Lettering by K.C.Aryan (Rekha Prakashan)

- विज्ञापन तकनीक एवं सिद्धांत, नरेंद्र सिंह यादव (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- ललित कला के आधारभूत सिद्धांत, मीनाक्षी कासलीवाल (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- ग्राफिक डिज़ाइन, नरेंद्र सिंह यादव (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)

INSTRUCTIONS TO THE PAPER SETTER

1. The examiner is required to set a question paper with sections.
2. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
3. Section A will have 20 multiple choice questions carrying 1 mark each.
4. Section A will have equal questions from both units 1 & 2.
5. Section B will have 5 Questions Carrying 3 Marks each.
6. Section C will have 5 Questions Carrying 5 Marks each.
7. Examiner should give internal choice in Sections B & C.
8. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

HISTORY OF PUNJAB CULTURE & ART

Subject Code: BFARS1-308   L S T P C   **Duration: 30 Hrs**
                                      2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required
COURSE OBJECTIVES:
This paper is designed to familiarize students with important developments in Punjab Culture and Art.
Students will learn various fields of art and apply the same knowledge in design

COURSE OUTCOMES:
After the successful completion of the course students will be able to
Express the background of various art and cultural fields
Differentiate between various forms of folk art, dance, music, drama etc
They will be able to use the same knowledge to make better applied art designs.

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CONTENTS

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1. Folk Art
2. Folk Music
3. Folk Dance.
4. Folklore
5. Food and Textile

RECOMMENDED BOOKS
- Folk Art of Punjab Harjeet Singh Gill (Punjabi University Patiala)
- ਲੋਕ ਕਲਾ ਅਤੇ ਸਭਿਆਚਾਰ ਡਾ. ਜੀਤ ਸਿੰਘ ਜੋਸ਼ੀ (ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ)
- ਕਲਾ ਅਤੇ ਸਭਿਆਚਾਰ ਡਾ. ਗੁਰਨਾਇਬ ਸਿੰਘ (ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ)
- ਲੋਕਧਾਰਾ ਦੀ ਭੂਮਿਕਾ ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਖਹਿਰਾ, ਡਾ. ਸੁਰਜੀਤ ਸਿੰਘ (ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ)
- ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ ਸੋਹਿੰਦਰ ਸਿੰਘ ਬੇਦੀ (ਨੈਸ਼ਨਲ ਬੁਕ ਟ੍ਰਸਟ ਦਿੱਲੀ)
- ਪੰਜਾਬ ਦਾ ਇਤਿਹਾਸ (ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ)
- ਪੰਜਾਬੀ ਸੱਭਿਆਚਾਰ, ਓਮ ਪ੍ਰਕਾਸ਼ ਗਾਸੋ (ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ)

INSTRUCTIONS TO THE PAPER SETTER
1. The examiner is required to set a question paper with sections.
2. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
3. Section A will have 20 multiple choice questions carrying 1 mark each.
4. Section A will have equal questions from both units 1 & 2.
5. Section B will have 5 Questions Carrying 3 Marks each.
6. Section C will have 5 Questions Carrying 5 Marks each.
7. Examiner should give internal choice in Sections B & C.
8. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

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4th SEMESTER

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PAINTING IN VARIOUS MEDIUMS

</div>

Subject Code: BFARS1-401   L S T P C   **Duration: 45 Hrs**

1 2 0 0 3

COURSE PREREQUISITES: The student should have done watercolor painting and sketching before.

COURSE OBJECTIVES:
To acquaint students about the various art techniques Acrylics, oil and mix media. So students can use the same for representational commercial designs later.

COURSE OUTCOMES:
1. Understanding various art techniques
2. Understanding tonal, gradation values
3. Developing skill to use various media like Acrylics, Oil and Mix Media
4. Developing Eyes, muscles and brain coordination.

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CONTENTS
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1. Painting in Acrylics
2. Painting in Oil
3. Mix Media

RECOMMENDED BOOKS
- Acrylic Explorations by Rahul Deshpande (Jyotsna Prakashan, Mumbai)
- Opaque colour by Milind Mulick (Jyotsna Prakashan, Mumbai)
- Call of the Seas by Chandramohan Kulkarni (Jyotsna Prakashan, Mumbai)
- Acrylic Explorations by Rahul Deshpande (Jyotsna Prakashan, Mumbai)
- Methods and Techniques by PastelRahul Deshpande, Gopal Nandurkar (Jyotsna Prakashan, Mumbai)
- My Paintings and Thoughts Behind Them by Vasudeo Kamath (Jyotsna Prakashan, Mumbai)
- My Way of Digital Painting by Chandramohan Kulkarni (Jyotsna Prakashan, Mumbai)
- The Art of Basic Oil Painting (Walter Foster)
- Painting with Bob Ross (Walter Foster)
- Painting: Acrylic Basics (Walter Foster)
- The Art of Painting Flowers in Oil & Acrylic (Walter Foster)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

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PACKAGING & PRESS LAYOUT
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Subject Code: BFARS1-402   L S T P C   **Duration: 30 Hrs**
1 1 0 0 2

COURSE PREREQUISITES: No prerequisite is required

COURSE OBJECTIVES:
This course introduces students to the principles of packaging design and develops research, conceptual and implementation abilities and an understanding of the importance of an integrated approach to branding, visual and typographical communication for packaging design. It incorporates knowledge of structural and production considerations and the economic, environmental and sustainability issues relevant to packaging design. Students will access industry resources and information to enhance their knowledge of technical, material and marketing information.

COURSE OUTCOMES:

Students who successfully complete this unit will be able to:

1. Investigate a packaged product category in relation to a defined market.
2. Analyse the economic, environmental and social factors of packaging design
3. Apply understanding of the principles of two and three dimensional design to create a packaging design outcome
4. Review design decision making to formulate and refine design solutions.
5. Develop, document, evaluate and present the iterative design process in a packaging design project.

CONTENTS
1. Label and carton design
2. Principles of packaging
3. Knowledge of various materials,
4. Method of Packaging.
5. Latest packaging methods and its design.

RECOMMENDED BOOKS
- The Package Design Book by Julius Wiedemann & Pentawards (Taschen)
- Packaging Design: Successful Product Branding from Concept to Shelfby Marianne R. Klimchuk, Sandra A. Krasovec (John Wiley & Sons)
- the packaging and design templates sourcebook 1 by luke herriott (Rockport Publishers)
- the packaging and design templates sourcebook 2 by luke herriott (Rockport Publishers)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

COMPUTER GRAPHICS -III

Subject Code: BFARS1-403   L S T P C   **Duration: 45 Hrs**
                                       1 2 0 0 3

COURSE PREREQUISITES: The student should have done previous course of computer graphics
COURSE OBJECTIVES:
1. To learn about Coral Draw interface and work with menus, tools and panels.
2. To draw and edit simple and complex shapes using shape and transform tools in Photo Paint

3. To work with color panels to create, manage and edit color and color groups.
4. To work with type and text formatting tools.
5. To work with documents, layers and art boards.
6. Preparing professional designs

COURSE OUTCOMES:

Upon successful completion of this course, participants will be able to:

1. Work comfortably with the software's most common tools and panels.
2. Create and edit all sorts of print documents.
3. Insert images, draw shapes, paint, type and apply colour.
4. Design and save print-ready digital files.

CONTENTS

Corel Draw:

1. Use of Corel Draw
2. Photo Paint
3. Coral Trace
4. Texture and other techniques for creating graphic designs
5. Press ads
6. Posters
7. Title covers
8. Jackets etc.

RECOMMENDED BOOKS

- CorelDRAW Training Guideby Satish Jain, M. Geetha (BPB Publications)
- Basics of illustration (CorelDRAW)
- CorelDRAW 2020 - Training Book with many Exercises by Peter Schiessl
- CorelDRAW 12: The Official Guideby Steve Bain, Nick Wilkinson(McGraw-Hill/Osborne Media)

INSTRUCTIONS TO THE PAPER SETTER

1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

LETTERING AND TYPOGRAPHY- IV

Subject Code: BFARS1-404   L S T P C   **Duration: 30 Hrs**
                                      1 1 0 0 2

COURSE PREREQUISITES: Basic knowledge of lettering system
COURSE OBJECTIVES:

This course provides students the Advance typography skills to design their own new fonts to produced work in Design Communication. Students will also learn Font Design and Expressive typography.

COURSE OUTCOMES:
1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of designing new fonts.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color, and graphic elements to effectively communicate and support the content of a design.
4. Will be able to work more efficiently in expressive typography to meet the needs of the industry.

CONTENTS

1. English, Roman and Gothic type exercise.
2. Serif and San serif type,
3. Ascending and descending and Spacing
4. Character/Letter Spacing
5. Word Spacing and Making of units of different sentences.

RECOMMENDED BOOKS
- The Elements of Typographic Style by Robert Bringhurst (Hartley & Marks)
- Why Fonts Matter by Sarah Hyndman (Virgin Books)
- Complete Calligraphy by Marie Lynskey (D & S Books)
- इंगलिश-हिंदी लैटरिंग स्टाइल्स English-Hindi Lettering Style (Manoj Publications)
- Learn Devnagari Calligraphy Vol (Revised) (Akshar Sanskar Publications)
- Learn Calligraphy: The Complete Book of Lettering and Designby Margaret Shepherd (Watson-Guptill)
- Expressive Typography : Word as Image By Keir Elam (John Wiley and Sons Ltd)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

HOARDING DESIGNING

Subject Code: BFARS1-405   L S T P C   **Duration: 30 Hrs**
                                        2 0 0 0 2

COURSE PREREQUISITES: The student should have poster painting and worked in coreldraw.
COURSE OBJECTIVES:
1. To learn the design for bigger surface
2. To understand the mindset of spectators and apply the design elements according to that

COURSE OUTCOMES:
1. After the successful completion of this course students will be able to design layouts for large hoardings
2. They can understand marketing strategies better and relate it to the design
3. They can work better in the market related field

CONTENTS

1. Importance of designing hoarding advertisement
2. Establishes brand value
3. Tone of voice
4. Hoarding campaign for any consumer product
5. Hoarding campaign for social Cause

RECOMMENDED BOOKS
- CorelDRAW 2020 - Training Book with many Exercises by Peter Schiessl
- CorelDRAW 12: The Official Guideby Steve Bain, Nick Wilkinson(McGraw-Hill/Osborne Media)

INSTRUCTIONS TO THE PAPER SETTER
1. Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
2. Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).

HISTORY OF WESTERN ART -II

Subject Code: BFARS1-406   L S T P C   **Duration: 30 Hrs**
                                      2 0 0 0 2

COURSE PREREQUISITES: No Prerequisites are required.

COURSE OBJECTIVES:

The course objective is for you to understand the major characteristics of Western art through several historical time periods.
To learn the development of world modern art.

COURSE OUTCOMES:
Upon successful completion of the course, the student will acquire the listed skills:
1. Distinguish between art historical periods of modern art
2. Accurately identify individual works of art and architecture of significance.
3. Comprehend the advancements of technology as it impacts art.
4. Sharpen analytical and critical thinking skills in examining visual art.
5. Increase knowledge of world geography and relate it to art..

CONTENTS
1. Background
2. Impressionism
3. Post Impressionism
4. Fauvism
5. Expressionism
6. Cubism
7. Surrealism
8. Abstract Expressionism
9. Dada, Pop, Op and other trends

RECOMMENDED BOOKS
- History of art by H.W. Janson
- Art by Fredrick Hartt
- Story of art by Gombreich
- History of Modern Art by Aranson
- Art and Civilization by Mayers
- Great Masters of Western Art by Jordi Vigue (Watson-Guptill Publication New York)
- आधुनिक चित्रकला का इतिहास, साखलकर (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- यूरोपीय चित्रकला का इतिहास, साखलकर (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- पश्चिमी आधुनिक चित्रकार प्रो. रामचंद्र शुक्ल (साहित्य संगम इलाहबाद)

INSTRUCTIONS TO THE PAPER SETTER
1. The examiner is required to set a question paper with sections.
2. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
3. Section A will have 20 multiple choice questions carrying 1 mark each.
4. Section A will have equal questions from both units 1 & 2.
5. Section B will have 5 Questions Carrying 3 Marks each.
6. Section C will have 5 Questions Carrying 5 Marks each.
7. Examiner should give internal choice in Sections B & C.
8. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

AESTHETICS (INDIAN)

Subject Code: BFARS1-407   L S T P C   **Duration: 30 Hrs**
                                       2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required
COURSE OBJECTIVES:
1. To give an understanding on Indian Aesthetics
2. To analyse various literary arts and its specifications
3. To understand various schools of literary criticism
4. To analyse the interconnectedness of Art and emotion

COURSE OUTCOMES:

1. To get a historical understanding on Indian Aesthetics
2. To understand the aesthetic concepts from various Indian philosophers
3. To analyse the contextual relevance of aesthetic theories
4. To develop a culture of critical and analytical thinking

CONTENTS

1. Brief introduction to Indian Aesthetics and its background
2. Six limbs of Indian Painting
3. Theory of Rasa
4. Mudras, Asana, Bhangima etc
5. Religion and Art

RECOMMENDED BOOKS
- Aesthetics by Prakash Veereshwar and Nupur Sharma Krishna Prakashan Meerut
- The Bloomsbury Research Handbook of Indian Aesthetics and the Philosophy of Art by Arindam Chakrabarti (Bloomsbury Publishing India Pvt Ltd New Delhi)
- Indian Art and Aesthetics: Endeavours in Interpretation by Murti Nandan Tiwari and Kamal giri (Aryan Books International)
- सौंदर्य शास्त्र, डॉ. ममता चतुर्वेदी (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- कला कोश, साखलकर (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
- कला दर्शन , प्रकाश वीरेश्वर , (Krishna Prakashan Meerut)

INSTRUCTIONS TO THE PAPER SETTER
1. The examiner is required to set a question paper with sections.
2. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
3. Section A will have 20 multiple choice questions carrying 1 mark each.
4. Section A will have equal questions from both units 1 & 2.
5. Section B will have 5 Questions Carrying 3 Marks each.
6. Section C will have 5 Questions Carrying 5 Marks each.

7. Examiner should give internal choice in Sections B & C.
8. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

AESTHETICS (WESTERN)

Subject Code: BFARS1-408   L S T P C   **Duration: 30 Hrs**
                                 2 0 0 0 2

COURSE PREREQUISITES: No prerequisites are required
COURSE OBJECTIVES:
1. To give an understanding on Western Aesthetics
2. To analyse various literary arts and its specifications
3. To understand various schools of literary criticism
4. To analyse the interconnectedness of Art and emotion

COURSE OUTCOMES:

1. To get a historical understanding on Indian Aesthetics
2. To understand the aesthetic concepts from various Western philosophers
3. To analyse the contextual relevance of aesthetic theories
4. To develop a culture of critical and analytical thinking

CONTENTS

1. Beauty and Art
2. Art through ages
3. Art as imitation
4. Art and communication
5. Art as intuition and expression
6. Art as empathy value and design
7. Art as symbol
8. Art as wish fulfillment
9. Art and society

RECOMMENDED BOOKS
- Oxford Dictionary of Modern and Contemporary Art (Oxford University Press)
- Aesthetics: A Study of the Fine Arts in Theory and Practice (Classic Reprint) by James K Feibleman (Forgotten books)
- Aesthetics by Prakash Veereshwar and Nupur Sharma Krishna Prakashan Meerut
- History of art by H.W. Janson
- Art by Fredrick Hartt
- Story of art by Gombreich
- Art and Civilization by Mayers

INSTRUCTIONS TO THE PAPER SETTER

1. Section A (20X1=20) Section B (5X3=15) Secton C (5X5=25).
2. Section A will have 20 multiple choice questions carrying 1 mark each.
3. Section A will have equal questions from both units 1 & 2.
4. Section B will have 5 Questions Carrying 3 Marks each.
5. Section C will have 5 Questions Carrying 5 Marks each.
6. Examiner should give internal choice in Sections B & C.
7. Equal weightage should be given to the units 1 & 2 in all sections of the question paper.

BACHELOR OF DESIGN (INTERIOR DESIGN)

STUDY SCHEME

Bachelor of Design (Interior Design) (1st Semester)

Total Contact Hours = 31   **Total Marks = 700**   **Total Credits = 23**

SEMESTER 1st		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-101	Interior Design Studio – I	2	0	4	0	40	60	100	6	3
BID-102	Materials and Const.- I	2	0	3	0	40	60	100	5	3
BID-103	Manual Graphics – I	2	0	3	0	40	60	100	4	3
BID-104	History of Int. Design - I	2	0	0	0	40	60	100	2	3
BID-105	Elements of Interior Space	1	0	0	1	40	60	100	2	3
BID-106	Model Making	0	0	0	2	60	40	100	1	No Exam (External Viva -Voce)
BID-107	"Drug Abuse: Problem, Management & Prevention"	3	0	0	0	100	0	100	0	No Exam
	Introduction to Concerned Branch	2	0	0	0	100	0	100	0	No Exam
Total		14	0	10	3	460	340	800	20	

*There will be Induction Programme of 3 weeks before start of normal classes.

**Drug Abuse: Problem, Management & Prevention & Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.

Bachelor of Design (Interior Design) (2nd Semester)

Total Contact Hours = 29   **Total Marks = 600**   **Total Credits = 22**

SEMESTER 2nd		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-208	Interior Design Studio – II	2	0	4	0	40	60	100	6	6
BID-209	Materials and Const. - II	2	0	3	0	40	60	100	5	3
BID-210	Manual Graphics – II	2	0	3	0	40	60	100	5	3
BID-211	Theory of Interior Design	2	0	0	0	40	60	100	2	3
BID-212	Digital Graphics – I	1	0	0	4	40	60	100	3	No Exam (External Viva -Voce)
BID-213	"Human Values & Professional Ethics	3	0	0	0	100	0	100	0	No Exam
Total		12	0	10	4	300	300	600	23	

*Human Values & Professional Ethics is a non-credit Course; however, it is necessary to secure at least E grade in it.

** Exit Certificate of Interior Design may be given after completion of 1 year in this course.

Bachelor of Design (Interior Design) (3rd Semester)

Total Contact Hours = 28   **Total Marks = 600**   **Total Credits = 24**

SEMESTER 3rd		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-315	Interior Design Studio – III	2	0	4	0	40	60	100	6	6 (External by External viva voce)
BID-316	Materials & Construction- III	2	0	3	0	40	60	100	5	3
BID-317	Digital Graphics – II	1	0	0	4	40	60	100	3	No Exam (External Viva -Voce)
BID-318	History of Interior Design - II	2	0	0	0	40	60	100	2	3
BID-319	Interior Services- I	2	0	0	0	40	60	100	2	3
BID-320	Interior landscape	2	0	0	0	40	60	100	2	3
Total		11	0	7	4	240	360	600	20	

Bachelor of Design (Interior Design) (4th Semester)

Total Contact Hours = 26   **Total Marks = 600**   **Total Credits = 21**

SEMESTER 4th		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-421	Interior Design Studio – IV	2	0	3	2	40	60	100	6	6 (External viva voce)
BID-422	Furniture Design	2	0	0	2	40	60	100	3	3
BID-423	English Composition & Communication	1	0	0	2	40	60	100	2	3
BID-424	Interior Services- II	2	0	0	0	40	60	100	2	3
BID-425	Interior Aesthetics - I	2	0	0	0	40	60	100	2	3
BID-426	Interior Model making	3	0	0	3	60	40	100	2	No Exam (External Viva -Voce)
BID-427	Educational Tour-I	0	0	0	0	100	0	100	1	No Exam (Internal Viva -Voce)
Total		12	0	3	9	360	340	700	18	

* Educational Tour-I (BID-424) of duration up to 07 days during the semester shall be undertaken and evaluated.

Bachelor of Design (Interior Design) (5th Semester)

Total Contact Hours = 31   **Total Marks = 600**   **Total Credits = 25**

SEMESTER 5th		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-528	Interior Design Studio – V	2	0	3	2	60	40	100	6	6 (External viva voce)
BID-529	Working Drawing	2	0	2	2	40	60	100	5	No Exam (External Viva -Voce)
BID-530	Estimation and Costing	1	0	0	2	40	60	100	2	3
BID-531	Contemporary Interior Designers	2	0	0	2	40	60	100	2	3
BID-532	Interior Services- III	1	0	0	2	40	60	100	2	3
BID-533	Interior Aesthetics- II	1	0	0	2	40	60	100	2	3
Total		9	0	5	12	260	340	600	19	

Bachelor of Design (Interior Design) (6th Semester)

Total Contact Hours = 00   **Total Marks = 100**   **Total Credits = 20**

SEMESTER 6th		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-634	Practical training of 24 weeks duration	0	0	0	0	40	60	100	20	No Exam (External Viva -Voce)
Total		0	0	0	0	40	60	100	20	

** B.Sc in Interior design may give after completion of 6 semesters.

Bachelor of Design (Interior Design) (7ᵗʰSemester)

Total Contact Hours = 26   **Total Marks = 500**   **Total Credits = 24**

SEMESTER 7ᵗʰ		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-735	Interior Design Studio – VI	2	0	4	4	60	40	100	8	6 (External viva voce)
Department Elective – I (Select any one)										
BID-736	Photography and Journalism	1	0	0	2	40	60	100	3	3
BID-737	Lifestyle accessories design									
BID-738	Interior Design Codes									
BID-739	Project Management									
Open Elective – I (Select any one)		1	0	0	2	40	60	100	3	3
Total		4	0	0	8	140	160	300	14	

Bachelor of Design (Interior Design) (8ᵗʰSemester)

Total Contact Hours = 30   **Total Marks = 300**   **Total Credits = 21**

SEMESTER 8ᵗʰ		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BID-840	Interior Design Studio – VII (Thesis Project)	10	0	0	10	60	40	100	15	No Exam (External viva voce)
Department Elective – II (Select any one)										
BID-841	Green Interiors	2	0	0	2	40	60	100	2	3
BID-842	Interior Maintenance									
Department Elective – III(Select any one)										
BID-843	Product design	2	0	0	2	40	60	100	2	3
BID-844	Set Design									
Total		14	0	0	14	140	160	300	19	

Overall (For Certification)

Semester	Marks	Credits
1st	800	20
2nd	600	21
Total	1400	41

Overall (For B.Sci. Interior Design)

Semester	Marks	Credits
1st	800	20
2nd	600	21
3rd	600	20
4th	700	18
5th	600	19
6th	100	20
Total	3400	118

Overall (For Bachelor of Design (Interior Design))

Semester	Marks	Credits
1st	800	20
2nd	600	21
3rd	600	20
4th	700	18
5th	600	19
6th	100	20
7th	300	14
8th	300	19
Total	4000	151

1ST SEMESTER

MRSPTU

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INTERIOR DESIGN STUDIO – I

(BID - 101)

Uni. Exam. Marks : 60   Uni. Exam. Duration: 03 hrs

Sessional Marks : 40   (L-2, T-0, S-4, P-0, C=6)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To make students familiar with various factors affecting the aesthetic and functional aspects of design through training them in two-dimensional and three dimensional design compositions.
3. **COURSE OUTCOME**
   - Understanding various design principles such as emphasis, balance, contrast, Harmony, Unity etc., and applying them in two-dimensional and three-dimensional compositions.
   - Understanding and applying design elements such as Point, Line, shape, color, texture, area, mass, volume etc.
   - Critical analysis of design of existing manmade objects, aiding self-criticism of design and inspiration from nature as a source for design.
   - Understanding the process involved in design including analysis, synthesis and evaluation.
   - To understand the evolution of design from basic concepts to design outputs.
   - To collaborate both technical knowledge along with creativity, theme and rendering output.

Unit-I
Designs involving various elements such as point, line, shape, colour and texture – applied to compositions such as mural design, fabric design, mosaics, stained glass, engraving, block printing, collage etc. – involving all the principles of composition.

Unit-II
3D sculptures involving platonic solids, wooden sculptures applying different types of carpentry joints, design and execution of POP made objects such as: cornices, moldings, brackets, etc., Metal and terracotta sculptures.
Study and critical analysis of man-made objects – their purpose, functional suitability, formal appeal, etc. – evolving suggestions for improvement of the same.

Unit-III
Study and analysis of forms, patterns and color schemes in nature. Abstraction of natural forms and design of three-dimensional objects and two-dimensional patterns inspired by them.

RECOMMENDED BOOKS
1. Paul Laseau, Graphic Thinking for Architects and Designers, John Wiley & Sons.
2. TrewinCopplestone, Arts in Society, Prentice Hall Inc.
3. H. Gardner, Art through Ages.
4. David Fair, Design Graphics, Hodder and Stoughton.
5. Architectural arts and Sculpture, Guild Source Books.
6. Virginia Cobb Watson, Discovering the Inner Eye, Guptill Publication.
7. JohannessItten, The Art of Colour.
8. H.H. Arnason, History of Modern Art

INSTRUCTIONS TO QUESTION PAPER SETTER
1. One compulsory question is to be set from the entire syllabus.
2. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

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NOTE: Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

MRSPTU

MATERIALS AND CONSTRUCTION- I
(BID - 102)

Uni. Exam. Marks : 60	**Uni. Exam. Duration: 03 hrs**
Sessional Marks : 40	**(L-2, T-0, S-3, P-0, C=5)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To familiarize the students of Interior Design on material and construction methodology
3. **COURSE OUTCOME**
   - Understanding the process of building construction from the very first step.
   - To understanding the basic components of the buildings envelope for small buildings like Foundations, Walls, Openings, Roofs, Understanding simple roof & floor finishes.
   - Understanding masonry construction details
   - Developing the knowledge of components of the brick masonry
   - Understanding the Types, Uses & Market rates of building materials.
   - Understanding the various building materials used in construction of a building with study of their Constituents, Properties.

Unit-I
INTRODUCTION TO MATERIALS
- Wood - Soft and hardwood, plywood, laminated wood and particle boards – properties, manufacture & uses.
- Synthetic Materials – Different types of Glass, their properties, manufacturing processes and uses. Plastics – injection moulding & other manufacturing methods, etc.
- Fabrics – textile, Jute, leather etc. different types and their uses

Unit-II
WALLS - TYPES OF MASONRY
Different types - Stone walls – random rubble, coursed rubble, square rubble, polygonal rubble & Ashlar etc. Brick masonry -Types of bonds - single & double Flemish bond, header bond, stretcher bond, rat trap bond, ornamental bonding.

Unit-III
TILED ROOFS
Drawings indicating various types of sloped & hipped roof Types of sloping roof –lean to & couple roof with Mangalore tiles, country tiles & pan tiles.

STRUCTURAL SYSTEMS
Structures – Components of a load bearing wall &RCC slab roof system - RCC beams, columns and framed structure

BASIC SERVICES
Components of a toilet & bathroom – sanitary ware - W.C., wash basin, bathtub, jacuzzi etc. Sanitary fittings – taps, mixers, shower units

RECOMMENDED BOOKS

1. S. C. Rangwala - Engineering materials - Charotar Publishing, Anand
2. Francis D. K. Ching - Building Construction Illustrated, VNR, 1975
3. W.B.Mckay –Building construction Vol1 –Longmans, UK 1981
4. W.B.Mckay –Building construction Vol 3 –Longmans, UK 1981

INSTRUCTIONS TO QUESTION PAPER SETTER

The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

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MRSPTU

MANUAL GRAPHICS – I
(BID - 103)

Uni. Exam. Marks : 60
Sessional Marks : 40

Uni. Exam. Duration: 03 hrs
(L-2, T-0, S-3, P-0, C=4)

1. COURSE PREREQUISITES
Nil

2. COURSE OBJECTIVE
To make students improve their sketching skills & drawing abilities.

3. COURSE OUTCOME
- To learn rendering of textures of different building materials in pencil.
- To learn the fundamentals of drawing equipments and method of presentation
- To understand variety of forms as a medium for indoor and outdoor sketching
- To learn various colour schemes, tints and shades.
- To make them understand the use of colors& their effects in drawing.
- Isometric views of simple and complex forms.

Unit-I
INTRODUCTION TO FREE HAND DRAWING
- Basic exercises, Still life, Basic forms, effect of lines to represent textures - Understanding of different types of perspective views using vanishing points, shading exercises etc.

SKETCHING
- Outdoor sketching including Lawns, bushes, Water Bodies, Plants & trees in different media. Indoor sketching – furniture, lights, corridor, lobby, class room etc.

Unit-II
MEASURED DRAWING
- Lettering - types, Scale, measured drawing of furniture, wall panelling, flooring pattern, ceiling pattern, doors and windows.

GEOMETRICAL DRAWING
- Orthographic projections - Projection of lines, planes and solids, section of primary solids such as pyramids, cones, cylinder, prism, sphere, cuboids, etc.

Unit-III
ISOMETRIC DRAWING
- Isometric projection of all platonic solids such as cube, cuboids, hexagonal prism, pyramids, cone and sphere etc. – isometric projection of singly and doubly curve surfaces.

RECOMMENDED BOOKS
1. Drawing – A creative Process, Francis D.K. Ching, John Wiley Sons, New York
2. Geometrical drawing for art students, 2nd revised edition - I.H.Morris, Orient Longman, Calcutta, 1995.
3. Architectural drafting and design, 4th edition – Ernest R. Weidhaas, Allyn and Bacon, Boston, 1981.
4. Building drawing, 3rd edition – M G Shah, C M Kale, Tata Mcgraw – Hill publishing, New Delhi.

INSTRUCTIONS TO QUESTION PAPER SETTER
The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

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HISTORY OF INTERIOR DESIGN - I
(BID - 104)

Uni. Viva Marks   : 40   Uni. External Viva voce

Sessional Marks   : 60   (L-2, T-0, S-0, P-0, C=2)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To provide the student of Interior Design knowledge on various developments in Interior design through ages.
3. **COURSE OUTCOME**
   - To help the student understand the designs from Prehistoric Period to the Middle Ages.
   - To know more on the Modern Movements in Interior design from the beginnings of 20th century.
   - To understand the different traditional contemporary art form with different tools and techniques
   - To explore the different ornaments and accessories in historic interiors
   - To appreciate various styles learnt through individual designs across diverse range of sources
   - To understand the role of decorative styles in history of architecture and interior design.

UNIT – I

EARLY CLASSICAL PERIOD
- Prehistoric Cave paintings – Primitive Designs- Interiors during Egyptian, Greek, Roman, Gothic, Early Christian & Renaissance Periods.

MIDDLEAGES
- Interiors in Romanesque, Gothic, and renaissance periods

UNIT – II

COLONIAL TO THE BEGINNING OF THE 20TH CENTURY
- Colonial, Victorian designs, Arts & Crafts movement, Art Nouveau, Eclectism, Frank Lloyd Wright.

UNIT – III

BAUHAUS TO POST WAR MODERNISM
- Walter Gropius/ Bauhaus, De Stijl, Mies Van Der Rohe, Le Corbusier, Art Deco, Postwar Modernism.

RECOMMENDED BOOKS
1. Interior Design Course, Mary GilliatCoyran, Octopus Ltd., London
2. Interior Design & Decoration, SherrilWhiton, Prentice Hall
3. Interior Design, Francis D.K. Ching, John Wiley & Sons, New York
4. History of Architecture, Sir Banister Fletcher, CBS Publishers & distributors, New Delhi
5. Time Saver Standards for Interior Design, Joseph De Chiara, McGraw Hill, New York.

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

ELEMENTS OF INTERIOR SPACE
(BID - 105)

Uni. Exam. Marks : 60   **Uni. Exam. Duration: 03 hrs**

Sessional Marks : 40   **(L-1, T-0, S-0, P-1, C=2)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To develop an understanding of point, line & planar elements in defining an interior space.
3. **COURSE OUTCOME**
   - To develop an understanding of various degrees of enclosure, various types of relationship between spaces.
   - Understanding of the various effects that could be created by manipulating the enclosing elements such as walls, roof etc.
   - Understanding the types of the door and their implementations.
   - Knowing about the detailing doors and windows
   - Understanding on site construction work.
   - Knowing about the detailing types of walls, roofs and floors.

Unit- I
WALL PLANES
Use of wall planes to create architectural effects - Natural patterns and textures obtained in masonry walls – articulation of openings in wall planes – effect of tilting the vertical axis of wall planes - niches and alcoves - cornices and mouldings etc.
ROOF PLANES
Different types and their visual impact – articulation of skylights and roof apertures – false ceiling – materials, finishes & patterns - types of false ceiling – various types of lighting.
FLOOR PLANES
Various types of flooring – mosaic, tile, stone etc. – aesthetic effects created by flooring material and pattern - graphic patterns and their visual effects – construction details – skirting, moulding, embossing etc. Floor finishes and floor coverings.

Unit – II
DOORS, WINDOWS AND VENTILATORS, ETC.
Doors – types – flush doors, panelled doors, braced doors, carved wooden doors, metal embossed doors, glazed doors and their relevance – various materials and articulation.
Windows – various types (casement, horizontal sliding, vertical sliding, hopper, pivoted) – various shapes (arched, circular, triangular etc.) various materials (wood, aluminum, steel, PVC) and their suitability to that space – ventilators – louvered, paneled etc.

Unit – III
CASE STUDIES
Case studies for manipulation of wall, floor and roof planes to create various architectural effects – case studies of various doors, windows and ventilators – case studies of columns, beams etc. for interior effects.

RECOMMENDED BOOKS
1. The making of interiors – An introduction- Allen Tate- Harper & Row Publishers, New York, 1987.
2. Interior Design & Decoration, Fourth Edition, Sherrill Whiton- Prentice Hall, 1974.
3. Interior lighting for Designers, Third edition – Gary Gordon &Jamco L. Nuckolls – John Wiley & Sons, New York, 1995.

4. The Encyclopaedia of Decorative Styles – William Hardy & Steve Adams – New Burlington books, London, 1988.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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MODEL MAKING
(BID - 106)

Uni. Exam. Marks : 40	**Uni. Exam. Duration: No Exam**
Sessional Marks : 60	**(L-0, T-0, S-0, P-2, C=1)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To introduce the students basics of Model making with various materials.
3. **COURSE OUTCOME**
   - Understand basic carpentry techniques.
   - Knowledge of Joinery techniques and various model making techniques.
   - Understand methods using different materials.
   - Tools used in carpentry.
   - Model making techniques using different materials.
   - Methods of Preparations of Model

Unit- I
INTRODUCTION TO MODEL MAKING
Introduction to concepts of model making and various materials used for model making
BLOCK MODELLING
- Preparation of base for models using wood or boards
- Introduction to block models of buildings (or 3D Compositions) involving the usage of various materials like Thermocol, Soap/Wax, Boards, Clay etc.

DETAILED MODELLING
- Making detailed models which include the representation of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, Handrails using materials like Mount board, Snow-white board, acrylic sheets.
- Representing various surface finishes like brick/stone representation, stucco finish etc.
- Various site elements – Contour representation, Roads/Pavements, Trees/Shrubs, Lawn, Water bodies, Street furniture, Fencing etc.

Unit – II
INTERIOR MODELS OF INTERIOR SPACES
Making scaled models of the various interior spaces with furniture such as
1) Residences 2) Offices 3) Retail Spaces 4) Recreational Spaces

Unit – III
CARPENTRY
Introducing techniques of planning, chiselling & joints in timber to learn the use of hand tools.
Exercise involving the design of simple furniture and making a model of the same.

RECOMMENDED BOOKS

1. BENN, The book of the House, Ernest Benn Limited, London
2. Jannsen, Constructional Drawings & Architectural models, Karl Kramer Verlag Stuttgart, 1973.
3. Harry W.Smith, The art of making furniture in miniature, E.P.Duttor Inc., New York, 1982.
4. H.S. Bawa, 'Carpentry- A Complete Guide',
5. Miller, 'Carpentry and Construction'

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DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
(BID - 107)

Uni. Exam. Marks : 0	**Uni. Exam. Duration: 03 hrs**
Sessional Marks : 100	**(L-3, T-0, S-0, P-0, C=0)**

1. **COURSE PREREQUISITES**
    Nil
2. **COURSE OBJECTIVES**
    To make students understand the concept of quality management system and apply various techniques in the management of a construction project.
3. **COURSE OUTCOME**
    The student shall be able to apply the techniques of quality management in the various construction activities.

Unit-I

Meaning of Drug Abuse:
*   **Meaning:** Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

Unit-II

Consequences of Drug Abuse:
*   **Individual:** Education, Employment, Income.
*   **Family:** Violence.
*   **Society:** Crime.
*   **Nation:** Law and Order problem.

Unit-III

Prevention of Drug Abuse:
*   **Role of Family:** Parent-child relationship, Family support, supervision, shipping values, active scrutiny.
*   **School:** Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

Unit-IV

Treatment and Control of Drug Abuse:
*   **Medical Management:** Medication for treatment and to reduce withdrawal effects. **Psychological Management:** Counselling, Behavioural and Cognitive therapy.
*   **Social Management:** Family, Group therapy and Environmental intervention.
*   **Treatment:** Medical, Psychological and Social Management.
*   **Control:** Role of Media and Legislation.

RECOMMENDED BOOKS
1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit,

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All India Institute of Medical Sciences, New Delhi, 2003 & 2004.

8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.

9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.

10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.

11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.

12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press, 2008.

13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017.

14. 'World Drug Report', United Nations Office of Drug and Crime, 2016.

15. 'World Drug Report', United Nations Office of Drug and Crime, 2017

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MRSPTU

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2ND SEMESTER

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INTERIOR DESIGN STUDIO – II

(BID - 208)

Uni. Exam. Marks : 60   **Uni. Exam. Duration: 06 hrs**

Sessional Marks : 40   **(L-2, T-0, S-4, P-0, C=6)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To introduce the basics of designing for Residential interiors and to develop skills required for the same.
3. **COURSE OUTCOME**
   - To develop understanding of the scale, function and options existing when designing small-scale spaces in residences such as toilets, kitchens, living, bedrooms etc.
   - Development of ideas with regard to false ceiling, wall paneling, flooring, floor coverings, curtains, windows, doors and other elements of residential interiors.
   - To understand and create spaces of comfort and spatial quality
   - To understand and do a technical drawing of kitchen & toilet related elements and storages.
   - To be able to choose the desired finishes and materials for the design based on their technical attributes.
   - To understand and do a technical drawing of Residential related interiors & furniture.

Unit-I

KITCHENS
   - Work triangle, planning for activity – anthropometrics – types of kitchen- Modular kitchens. Materials used in counters, shelves, worktops, washing areas & their comparative study. Lighting & color scheme – Natural & Artificial light.
   - **TOILETS**
     Anthropometry – various types of sanitary ware and their use – types of layouts – concepts in modern day toilet interiors – materials & finishes – colour, texture & pattern.

Unit-II

BEDROOMS & LIVING ROOMS
   - Concepts in bedroom & living room interiors – various layouts of these spaces – the use of furniture and accessories to create a certain type of ambience – materials & finishes – lighting, colour & texture.

Unit-III

RESIDENCE
   - Holistic concepts in residential interiors – ability to integrate various individual spaces into one theme – treatment of patios, courtyards, verandahs & other semi sheltered spaces – integration of built form and open spaces.

RECOMMENDED BOOKS
   1. Designs for 20th century Interiors – Fiona Leolie, VH Publications, London, 2000.
   2. Interior Design; The New Freedom, BarbaralecDiamonstein, Rizzoli International Publications, New York, 1982.
   3. Interior Colour by Design, Jonathan Poore, Rockport Publishers, 1994.
   4. Worldwide Interiors – International Federation of Interior Architects & Designers, Rikuyo-Sha, Japan, 1987.

INSTRUCTIONS TO QUESTION PAPER SETTER
   1. One compulsory question is to be set from the entire syllabus.

2. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

NOTE: Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

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MRSPTU

MATERIALS AND CONSTRUCTION- II
(BID - 209)

Uni. Exam. Marks : 60	**Uni. Exam. Duration: 03 hrs**
Sessional Marks : 40	**(L-2, T-0, S-3, P-0, C=5)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To familiarize the students of Interior Design on material and construction methodology
3. **COURSE OUTCOME**
   - To understand the construction of basic elements of an interior space such as walls & partitions, floors & roofs.
   - To understand in detail about the types and use of partitions and false ceilings in interior construction industry.
   - Understanding the process of building construction from the very first step.
   - Knowing about the detailing types of roofs and floors.
   - Understanding various color schemes, lighting, textures, etc. in Interior design
   - Understanding the materials and techniques used in Interior design

Unit-I

BUILDING COMPONENTS

Drawings of the components of a building indicating
- Foundation – brick footing, stone footing & RCC column footing
- concrete flooring, plinth beam & floor finish
- superstructure- brickwork with sill, lintel, windows & sunshade
- Flat RCC roof with weathering course, parapet & coping.

FLOORS

Floor coverings- - softwood, hardwood- resilient flooring - linoleum, asphalt tile, vinyl, rubber, cork tiles - terrazzo, marble & granite – properties, uses & lying.
Floor tiles- ceramic glazed, mosaic and cement tiles- properties, uses and laying, details for physically handicapped.

Unit-II

FALSE CEILING

Construction of various kinds of false ceiling such as thermocol, plaster of Paris, gypsum board, metal sheets, glass and wood Construction of domes, vaults, & other special ceilings

WALL PANELING

Panelling – Using wooden planks, laminated plywood, cork sheets, fibre glass wool & fabric for sound insulation and wall panelling for thermal insulation.

Unit-III

FINISHES

Paints- enamels, distempers, plastic emulsions, cement based paints- properties, uses and applications- painting on different surfaces – defects in painting, clear coatings & strains- varnishes, lacquer, shellac, wax polish & strains- properties, uses and applications. Special purpose paints- bituminous, luminous, fire retardant and resisting paints- properties, uses and applications.

RECOMMENDED BOOKS
1. S.C Rangwala – engineering materials – Charotar publishing, Anand 1982
2. W.B Mckay, building construction, VOL 1-4, Longmans, U.K 1981
3. Laxmi publications Pvt. Ltd., New Delhi, 1993.
4. Dr. B.C Purnima, building construction, Laxmi publications Pvt. Ltd., New Delhi, 1993.

INSTRUCTIONS TO QUESTION PAPER SETTER
The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

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Manual Graphics – II
(BID - 210)

Uni. Exam. Marks : 60
Sessional Marks : 40

Uni. Exam. Duration: 03 hrs
(L-2, T-0, S-3, P-0, C=5)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVE**
   Students should acquire knowledge of the various drawings, which effectively communicate their designs.
3. **COURSE OUTCOME**

   - To understand the spatial and stylistic qualities associated with design and creativity.
   - To understand the purpose of shadows in buildings and in interiors
   - To enable a student to understand the theory of perspective in design
   - Visualize and convert his/her thoughts and ideas of design into 3-D forms.
   - Sciography in plans and elevations.
   - Construction of Interior perspectives.

Unit-I
MEASURED DRAWING
Measured Drawing of Simple objects like Cupboards etc. and building components like Columns, Cornices, Doors, Windows etc.
ISOMETRIC
Isometric View: like Tables, Chairs, Cylindrical & Spherical elements etc.
Axonometric View: like Interior views for living room, Toilet, Dining Room etc.
Unit-II
PERSPECTIVE
Perspective View: Principles and Visual Effect of three dimensional objects, Study of Picture plane, Station Point, Vanishing Point, Eye level etc. One-point perspective for interiors Two-point perspective for interiors.
Unit-III
SCIOGRAPHY
Sciography: Principles of Shade and Shadow- Shade and Shadows of Architectural Elements in Interiors. Shadows of Circular/Cylindrical/Spherical elements.
RECOMMENDED BOOKS
1. Perspective &Sciography BY Shankar Mulik, Allied Publishers
2. Perspective Principles, M.G. Shah & K.M. Kale, Asia Publications, Mumbai
3. Geometrical drawing for Art students, I.H. Morris, Orient Longman, Chennai
4. N.D. Bhatt, 'Engineering Drawing'
5. Ching Franc D.K., 'Architectural Graphics'.
6. Robert W. Gill, 'Rendering with Pen and Ink', Thames & Hudson London, **2008.**
INSTRUCTIONS TO QUESTION PAPER SETTER
The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

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THEORY OF INTERIOR DESIGN
(BID - 211)

Uni. Viva Marks : 40	Uni. External Viva voce
Sessional Marks : 60	(L-2, T-0, S-0, P-0, C=2)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   The object of this course is to make students understand the various aspects such as spatial quality, design vocabulary, design principles, and design process related to the design of interiors.
3. **COURSE OUTCOME**
   - Understanding various aspects such as form, scale, light, dimension, height, transitional elements etc. affecting interior space.
   - Understanding and applying design vocabulary such as Point, Line, shape, color, texture, area, mass, volume etc.
   - Understanding and applying design principles such as ratio, proportion, scale, balance, harmony, unity, variety, rhythm, emphasis.
   - Understanding the process involved in design including analysis, synthesis and evaluation.
   - To analyze and identify the anthropometrics and ergonomics in daily life
   - To understand and analyze the stress factors on human body in various tasks

UNIT – I
INTERIOR SPACE
Space – definition; Interior space – spatial qualities: form, scale, outlook; structuring space with interior design elements; spatial form; spatial dimension – square, rectangle, curvilinear spaces; height of space; spatial transitions – openings within wall planes, doorways, windows, stairways.

UNIT – II
DESIGN VOCABULARY
Form – point, line, volume, shape, texture & colour – in relation to light, pattern etc. and application of the same in designing interiors.
DESIGN PRINCIPLES
Ratio; proportions – golden section; relationships; scale; Balance – symmetrical, radial, occult; harmony; unity; variety; rhythm; emphasis.

UNIT – III
ANTHROPOMETRICS
Definition, theory of standard dimension based on human figures for activities, functions, circulation, furniture design, spatial requirements etc.
Study of Ergonomics
Design of Furniture for Living, Dining, Kitchen, Office etc.
DESIGN CONTROL
Design process – Analysis, synthesis, design evaluation; Design criteria – function and purpose, utility and economy, form and style; human factors - human dimensions, distance zones, activity relationships; fitting the space – plan arrangements, function, aesthetics.
RECOMMENDED BOOKS
1. Francis. D. K. Ching, Interior design Illustrated, Van Nostrand Reinhold
2. John. F. Pile, Interior Design, Harry Abrams Inc.

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3. Sam. F. Miller, Design process – a primer for Architectural and Interior Design, Van Nostrand Reinhold.

4. Gary Gordon, Interior lighting for designers, John Wiley & Sons Inc.

5. Harold Linton, Colour in Architecture, McGraw Hill

6. Jonathan Poore, Interior Colour by Design, Rock Port Publishers.

7. Sherrill Winton, Interior Design and Decoration, Prentice Hall.

8. JohannessItten, the Art of Colour, John Wiley and Son

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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DIGITAL GRAPHICS - I
(BID - 212)

Uni. Exam. Marks : 60   **Uni. Exam. Duration: No Exam**
Sessional Marks : 40   **(L-1, T-0, S-0, P-4, C=3)**

1. **COURSE PREREQUISITES**
   The students should have cleared Soft Skill Development course.
2. **COURSE OBJECTIVES**
   The students should be made aware of the role and importance of Computers in the field of Interiors.
3. **COURSE OUTCOME**
   - Student shall be able to understand the use of Computer as an aid to drafting and presentation of Interior design projects.
   - To understand the basic components of operating on menu and setup wizard
   - To work on drafting a plan with dimensioning and layers
   - To understand the various tools on Photoshop
   - Advanced commands like layers, viewports, layer-Iso and other 2D commands.
   - To understanding 3-D Modeling on Auto cad

Unit- I
2-D AUTOCADD:
1. Advanced Introduction to Auto Cad, and Introduction to Auto Cad Revit
2. Advanced commands like layers, viewports, layer-iso and other 2D commands.
3. Drafting the complex and multi storied Plans, Sections, and Elevations.
4. Text writing and dimensioning of the Plans, Elevation and Sections

Unit- II
3-D AUTOCADD:
1. Advanced rendering in the Auto Cad
2. 3-D Modeling on Auto cad of Single Storey and Multi Storey Buildings,
3. 3-D Modeling of Multiple Building in a Single Site, Camera View of the Buildings.

Unit- III
BASICS OFADOBE PHOTOSHOP
Tool box (Moving , marquee tool), Magic ward selection, Crop tool, Paint Brush, Opacity, Tent Styles, Blue tool, Sharpening Tool, Color correction, Layers, moving Tool, Masking Tool.

INSTRUCTIONS TO QUESTION PAPER SETTER
The evaluation of student shall be based on the written questions to be set from the course and the practical conducted based on a specific problem given to assess and evaluate the knowledge of students related to course defined above.
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HUMAN VALUES & PROFESSIONAL ETHICS
(BID - 213)

Uni. Exam. Marks : 60	**Uni. Exam. Duration: No Exam**
Sessional Marks : 40	**(L-3, T-0, S-0, P-0, C=0)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To develop an understanding of point, line & planar elements in defining an interior space.
3. **COURSE OUTCOME**
   - Understanding values and its importance in current scenario
   - Understanding human rights and identifying social evils
   - Spreading awareness amongst others to help curb injustice and spread human values
   - To provide guiding principles and tools for the development of the whole person, recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.
   - Understanding professional ethics for field performance
   - To Understanding social values required to accumulation set objectives as a team..

Unit- I
NEED FOR STUDY
Value Education—Introduction – Definition of values – Why values? – Need for Inculcation of values – Object of Value Education – Sources of Values – Types of Values: i) Personal values ii) Social values iii) Professional values iv) Moral and spiritual values) Behavioral (common) values

PERSONAL VALUES
Personal values – Definition of person – Self confidence – Relative and absolute confidence, being self determined swatantrata (loosely equivalent to freedom). Self discipline – Self Assessment – Self restraint – Self motivation – Determination – Ambition – Contentment Self-respect and respect to others; expression of respect

Unit – II
SOCIAL VALUES
Social values – Units of Society - Individual, family, different groups – Community – Social consciousness – Equality and Brotherhood – Dialogue – Tolerance – Sharing – Honesty Responsibility – Cooperation; Freedom – Repentance and Magnanimity. Peer Pressure – Ragging - examples - making one's own choices

PROFESSIONAL VALUES
Professional values – Definition – Competence – Confidence – Devotion to duty – Efficiency – Accountability – Respect for learning /learned – Willingness to learn-Open and balanced mind – Team spirit – Professional Ethics – Willingness for Discussion; Difference between understanding and assuming Time Management: Issues of planning, as well as concentration (and aligning with self goals) Expectations from yourself. Excellence and competition, coping with stress, Identifying one's interests as well as strengths.

Unit – III
BEHAVIOURAL VALUES
Behavioral values – Individual values and group values. Anger: Investigation of reasons, watching one's own anger; Understanding anger as: a sign of power or helplessness, distinction between response and reaction. Right utilization of physical facilities. Determining one's needs, needs of the self and of the body, cycle of nature. Relationship

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with teachers. Inside the class, and outside the class, interacting with teachers. Complimentary nature of skills and values. Distinction between information & knowledge Goals: Short term goals and long term goals; How to set goals; How to handle responsibilities which have to be fulfilled while working for goals.

RECOMMENDED BOOKS

- Values (Collection of Essays)., Published by : Sri Ramakrishna Math., Chennai — (2008)
- Prof. R.P.Dhokalia., Eternal Human Values NCRT – Campus Sri Aurobindo Marg., New Delhi
- Holy Books of all religions

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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MRSPTU

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3RD SEMESTER

MRSPTU

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INTERIOR DESIGN STUDIO – III

(BID - 315)

Uni. Exam. Marks   : 60   Uni. Exam. Duration: 06 hrs
Sessional Marks   : 40   (L-2, T-0, S-4, P-0, C=6)

1. **COURSE PREREQUISITES**
   The students should have knowledge of relationship of forms, space, function and order.
2. **COURSE OBJECTIVES**
   To make students understand the design process of small scale building projects with special emphasis on site analysis and site planning.
3. **COURSE OUTCOME**
   - Students should be able to understand and appreciate the constraints of the site in the evolution of design for small building projects.
   - Knowledge to handle the flow of masses in buildings like primary school, dispensary, convenience shopping etc.
   - Distinguish and appreciate the constraints of the site in the evolution of design for small building projects.
   - Design of spaces which are under the preview of urban regulatory controls
   - Understand the role of design development stages in the final outcome.

Unit-I

Institution for Physically Handicapped, Old age People, Destitute, Orphan, Deaf &. Dumb, Mentally Retarded
- Scope and objectives & ways to overcome through designing
- Different research institutions & their functions
- Ergonomic Factors &. Anthropometries Data, Circulation, Work Surfaces for Different Functions, Arrangement &. Clearances, Door Width, Furniture Suggested for them & their Details
  a) For Reading & Studying
  b) Dining
  c) Storing- books & other daily needs.
  d) Recreational activity
  e) Toilet facilities
  f) Ramp, slope
  g) Parking areas
  h) Circulation areas
  i) Lifts
- Space planning and design development

Unit-II

- Design of Guest house, convenience shopping, dispensary, Road side restaurant/Dhaba without urban regulatory controls with emphasis on climatic aspects.

Note: - Minimum two projects/Assignments should be handled individually by all students.
All Assignments to be prepared manually and no computer aided design/ Presentation/Documentations should be accepted.

TEACHING METHODOLOGY
For all assignments the following methodology should be followed and all stages should be attempted individually.
1. Library and Proto type Studies

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2. Site analysis and site planning

3. Space planning

4. Design development and volumetric studies (model)

5. Preliminary design and volumetric study

6. Final design with detailed volumetric study, (Detailed Model) and visual communications (3D Visualizations)

RECOMMENDED BOOKS

1. Ching, Frank (Francis D.K.), 'Architecture: Form, Space & Order', Publisher John Wiley, Hoboken, 2007.

2. V.S. Parmar, 'Design Fundamentals', Somaiya Publisher Pvt. Ltd, Mumbai, 1997.

3. Donald Watson, Michael J. Crosbie, 'Time Saver Standard', 8th Edn., NBC (National Building Code).

4. Site planning and landscape, Symonds. 5. Francis D.K. Ching, Site Planning

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is to be set from the syllabus and covering the entire content.

2. Evaluation is to be done through viva voce by external jury comprising of two examiners appointed by the University at college and answer sheets should be retained at college level.

3. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

NOTE: Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

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MATERIALS AND CONSTRUCTION- II
(BID – 316)

Uni. Exam. Marks : 60	**Uni. Exam. Duration: 03 hrs**
Sessional Marks : 40	**(L-2, T-0, S-3, P-0, C=5)**

1. **COURSE PREREQUISITES**
 Nil
2. **COURSE OBJECTIVES**
To familiarize the students of Interior Design on material and construction methodology
3. **COURSE OUTCOME**
   - To understand working drawings
   - To explain the Co-relations and cross referencing in drawings
   - To understand elevations , Sections in drawings
   - To evaluate technical projections and isometric detailing
   - To understand detailing of material and representation in drawings
   - To understand basic anthropometry and layouts of toilets and kitchen.

Unit-I
FINISHING MATERIALS (PLYWOOD, LAMINATES & VENEERS)
Plywood Laminates & veneer as a building material, Layout techniques and machining plans. Fabrication techniques - stapling, gluing. Furniture Joinery - screw joinery, nail joinery, Mortise & tenon joints, Dovetail joints, Dowel joints, Edge joints.

MODULAR KITCHEN
Modular kitchens, components basis of Construction involving, layouts, carcase, hardware selection, fixing details finishes and special types such as tall units, grain trolleys, and carousels fold outs etc. A detailed project involving design of a small and large size kitchen using modular components.

Unit-II
WORKING DRAWING
JOINERY
Working drawing of different types of doors and windows.
FURNITURE
Furniture Construction: Drawers, Cadenza, dining chairs, sofa, settee, cots detail. Preparation for finishing, Furniture Materials Specifying timber finishes etc .Detailed construction drawings & explaining construction and material finishes.

Unit-III
TOILETS
Working drawing for toilets with plumbing diagram, Working drawing of Electrical layouts , reflected ceiling plans and flooring patterns

RECOMMENDED BOOKS
1. Interior Design & Decoration, SherrilWhiton, Prentice Hall
2. Interior Design, Francis D.K. Ching, John Wiley & Sons, New York
3. Time Saver Standards for Interior Design, Joseph De Chiara, McGraw Hill, New York..

INSTRUCTIONS TO QUESTION PAPER SETTER
The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

DIGITAL GRAPHICS - II
(BID - 317)

Uni. Exam. Marks : 60   **Uni. Exam. Duration: No Exam**
Sessional Marks : 40   **(L-1, T-0, S-0, P-4 C=3)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   The students should be able to visualize, draft and render his/her small design projects into 3-D forms.
3. **COURSE OUTCOME**
   - To understand the basics of 3D drawings with sketch up software.
   - To understand the theory behind 3d modeling with wireframe structures.
   - To understand the theory behind 3d modeling with wireframe structures
   - To explore on the solid modeling techniques in the software
   - To understand the rendering and presentation techniques for a drawing

Unit- I
RENDERING & PRESENTATION TECHNIQUES
Rendering and presentation. Printing and plotting.(V ray, In design, Illustrator, Lumion)
SKETCH UP
Orientation towards 3D: 2D to 3D conversion, perspective view, walk through the layout.

Unit- II
3DMAX
Understanding 3D, theory behind 3D modelling. Preparing for construction of 3D models. Construction of 3D surface models- extrusion, wire frame, creation of a shell, elaborate surfaces
REVIT (2D + 3D IN SAME PLATFORM)
Introduction to REVIT, Learning to use basic tools such as wall, roof floor, staircases, dimensioning, plotting etc

Unit- III
SOLID MODELING (TRANSFORMING SPACES)
Solid modelling: concepts behind solid modelling, composite solids creation and modification, solids display and inquiry. (Rhino and Grasshopper)

RECOMMENDED BOOKS
1.   Auto Desk, Revit 2017 for Architecture, Sybex, 2016 .
2.   Auto Desk, 3D MAX comprehensive tutorial resources Wiley 2014.
3.   Sketch up for Interior Design . 3D visualising designing & space planning by Lidya Sloan, Wiley Publisher - 2014

INSTRUCTIONS TO QUESTION PAPER SETTER
The evaluation of student shall be based on the written questions to be set from the course and the practical conducted based on a specific problem given to assess and evaluate the knowledge of students related to course defined above.

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HISTROY OF INTERIOR DESIGN - II
(BID - 318)

Uni. Exam. Marks : 60	**Uni. Exam. Duration: 03 hrs**
Sessional Marks : 40	**(L-2, T-0, S-0, P-0, C=2)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To understand need and applications of water supply and sanitation in buildings with exposure to various fixtures and fittings, water supply and sanitary installations at work sites.
3. **COURSE OUTCOME**
   - To understand the importance of culture and tradition in interior.
   - To understand the shapes and patterns that emphasize the elements in interiors
   - To learn the different types of materials that could bring changes in the country
   - To understand about imperialism and colonialism in Indian context
   - To learn about the different contemporary styles in interiors

Unit- I
BUDDHIST, JAIN AND HINDU
Buddhist, Jain and Hindu faith - Harmony between architecture and interior in religious spaces – the play of light and shadow – art, sculpture, mouldings, wall treatments, roof treatments, floor treatments – interiors as reflection of the faith – examples and case studies across faiths

CHRISTIAN AND ISLAMIC
Christian and Islamic faith - Harmony between architecture and interior in religious spaces – the play of light and shadow – art, sculpture, mouldings, wall treatments, roof treatments, floor treatments – interiors as reflection of the faith - – examples and case studies across faiths

Unit – II
REGIONAL VERNACULAR INTERIORS
Elements of style, materials and concepts of interiors in vernacular secular architecture across North and South India -Jammu and Kashmir – Gujarat – Goa - Kerala – Tamil Nadu – examples and case studies

IMPERIALISM AND COLONIALISM IN INDIA
Elements of Style - Ornamentation and decoration – quality of space – Colonial, Regency, Indo Sarcenic - examples and case studies

Unit – III
APPLICATION OF STYLES IN INTERIORS
Range of contemporary Indian interiors – constituents of 'earthy Indian interiors' – Colors, materials, motifs and elements associated with Indian Interiors. Exercises and case studies

RECOMMENDED BOOKS
1. John F. Pile, A history of interior design, 2nd edition, Laurence King Publishing, 2005. Jeannie Ireland, History of Interior Design, air child publications, illustrated ed., 2009
2. Elaine, Michael Dywer, Christopher Mackinnon, Norman A. J. BerisfordDenby , A History of Interior Design, Rhodec International, 2000
3. GiedionSigfried, Space, Time and Architecture: The growth of a new tradition, 5th ed. Harvard University Press, Cambridge, 2008

INSTRUCTIONS TO QUESTION PAPER SETTER

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1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

INTERIOR SERVICES - I
(BID - 319)

Uni. Exam. Marks   : 60

Uni. Exam. Duration: 03 hrs

Sessional Marks   : 40

(L-2, T-0, S-0, P-0, C=2)

1. **COURSE PREREQUISITES**
   To expose the students to the basic principles of water supply and sanitation.
2. **COURSE OBJECTIVES**
   To understand need and applications of water supply and sanitation in buildings with exposure to various fixtures and fittings, water supply and sanitary installations at work sites.
3. **COURSE OUTCOME**
   - Teaching of the subject shall help students to understand the importance and role of water supply and sanitation services in Buildings.
   - Understanding the importance sanitation services in Buildings.
   - Knowledge about the various types of water distribution system
   - Understanding the importance and role of water supply.
   - Understanding the solid waste management system in buildings.
   - Understanding the water requirements depending on the building type

Unit- I
WATER SUPPLY IN BUILDINGS

Standard of portable water and methods of removal of impurities, Consumption order of water for domestic purposes, Service connection from mains, House-service design, tube well, pumping of water, types of pumps, cisterns for storage

BUILDING DRAINAGE

Layout, Principles of drainage, Trap type, materials and functions, Inspection chambers, Design of Septic tanks and soak pits, Ventilation of house drains Anti-syphonage or vent pipes, One and two pipe systems Sinks, bath tub, water closets, flushing cisterns, urinals, wash basins, bidet, shower panel etc.

Unit – II
PLUMBING

- Common hand tools used for plumbing and their description and uses, Joints for various types of pipes, Sanitary fitting standards for public conveniences
- Different types of pipes and accessories for water supply, controlling fixtures like valves, taps, etc. Fittings and Choice of materials for piping: cast iron, steel, wrought iron, galvanized lead, copper, cement concrete and asbestos pipes, PVC pipes
- Sizes of pipes and taps for house drainage, testing drainage pipes for leakage-smoke test, water test etc, CI pipes for soil disposal and rain water drainage, Wrought iron, steel and brass pipes. Rainwater disposal drainage pipes spouts, sizes of rainwater pipes.

Unit – III
SOLID WASTE DISPOSAL

- Solidwastescollectionandremovalfrombuildings.On-siteprocessinganddisposalmethods.Aerobic and anaerobic decomposition

SERVICES STUDIO

- Preparation of plumbing layout of a single storey building & working drawings of various fittings and fixtures of water supply and sanitary installations.

RECOMMENDED BOOKS

1. Charangith shah, Water supply andsanitary engineering,Galgotia Publishers

2.AKamala&DLKanthRao,EnvironmentalEngineering,TataMcGraw–HillpublishingCompany Limited

3. Technical teachers Training Institute (Madras), Environmental Engineering, Tata McGraw – Hill publishingCompany Limited

4. Marrimuthu, Murugesan, Padmini, Balasubramanian, Environmental Engineering, Pratheeba publishers

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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INTERIOR LANDSCAPE
(BID - 320)

Uni. Exam. Marks   : 60   **Uni. Exam. Duration: 03 hrs**
Sessional Marks   : 40   **(L-2, T-0, S-0, P-0, C=2)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To acquaint students with the uses and Importance of landscape design in architecture.
3. **COURSE OUTCOME**
   - To make students understand the elements of Landscape Design and its application in Architectural Design solutions.
   - To learn the basic palette of design outside the premise of the built envelope
   - Identifying plant characteristics of various types of Trees, Shrubs, Cacti Bushes and Creepers
   - Understading Historical development, Design Principles, salient features & elements of various garden styles
   - To understand the role of hardscape elements and assess their role individually
   - To get an in-depth knowledge of plant life and the science behind their life

Unit- I
LANDSCAPE AND BUILT ENVIRONMENT
Introduction and role of landscape design in the built environment. Types of natural elements – stones, rocks, pebbles, water forms, plants and vegetation. Introduction to the study of plants in relation to landscape design and interiors. Types of indoor plants, visual characteristics: i.e., color, texture, foliage.

VISUAL PERCEPTION
Flowers- its colors, texture and its visual perception in various indoor spaces and science of flower arrangement Indoor plants in Indian context. Plant biology, soil, moisture, light nutrient, atmospheric conditions, growing medium, pests & diseases. Botanical nomenclature, anatomy and physiology of plant growth. Market survey and costs.

Unit – II
DESIGN WITH PLANTS
Design with plants – Basic principles of designs. The physical attribute of plants and relation to design. Appearance, functional and visual effects of plants in landscape design and built environment. Selection and management of plant material in relation to the built environment.

HARDSCAPE
Design concepts related to use of sculpture, lightings, garden furniture, architectural feature and grouping them into meaningful composition s for visual and functional effects.

Unit – III
LANDSCAPE DESIGN PARAMETERS
Landscaping design parameters for various types of built forms- indoor and outdoor linkage to spaces. Landscaping of courtyards- residential and commercial forms. Indoor plants and their visual characteristics- . Science of maintaining and growing greenery. Automatic irrigation costing and installation of micro irrigation systems.

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RECOMMENDED BOOKS

- Joseph DeChiara, Julius Panero, and Martin Zelnik Time-Saver Standards for Interior Design and Space Planning, 2nd edition, Mc-Graw Hill Professional,2001.
- Andreas Uebele, Signage Systems and Information Graphics , Thames and Hudson, 2007
- Craig Berger, Wayfinding: Designing and Implementing Graphic Navigational Systems, Rotovision, 2009.
- Chris Calori, Signage and Wayfinding Design: A Complete Guide to Creating Environmental Graphic Design Systems, Wiley and sons, 2007.
- David Gibson, The Wayfinding Handbook: Information Design for Public Places, Princeton Architectural Press; 1st edition, 2009.
- Rayan Abdullah and Roger Hubner, Pictograms, Icons and Signs, Thames and Hudson, illustrated edition, 2006.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

4TH SEMESTER

MRSPTU

INTERIOR DESIGN STUDIO – IV
(BID - 421)

Uni. Exam. Marks : 60	Uni. Exam. Duration: 06 hrs
Sessional Marks : 40	(L-2, T-0, S-3, P-2, C=6)

1. **COURSE PREREQUISITES**
   The student should have the knowledge of Design fundamentals and spatial organization
2. **COURSE OBJECTIVES**
   - To understand the constraints of designing multi use buildings in an urban setting with respect to building norms, climate and client's expectations.
   - To understand design limitations due to building bye laws and site conditions.
   - To understand the limitations of designing for Hilly Areas.
   - To integrate services and structure system in the design project.
   - To understand the importance and role of design elements in evolving architectural character.
3. **COURSE OUTCOME**
   1. To understand large scale interior projects and services
   2. To generate coordination drawings with consultants and architects

Unit-I

Design problems of larger scale and complexity to be introduced to make the students understand the role of services in functioning of interior space in relation to buildings. Students should be able to generate working drawings to scale and co-ordinate the services such as electrical, plumbing and air conditioning to provide a complete solution to the user.
Public spaces such as Shopping Malls , Auditorium , Theatre , Multi storeyed office spaces , Hotel interiors , Airport lounges can be considered for design.
Note: - Minimum two projects/Assignments should be handled individually by all students.
All Assignments to be prepared manually and no computer aided design/ Presentation/Documentations should be accepted.

TEACHING METHODOLOGY
For all assignments the following methodology should be followed and all stages should be attempted individually.
1. Library and Proto type Studies
2. Site analysis and site planning
3. Space planning
4. Design development and volumetric studies (model)
5. Preliminary design and volumetric study
6. Designs &details Electrical and Lighting layout Plumbing Drawing HVAC co-ordination
7. Final design with detailed volumetric study, (Detailed Model) and visual communications (3D Visualizations)

RECOMMENDED TEXT AND REFERNCE BOOKS
1. Joseph De Chiara, Michael J. Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, 'Human Dimension and Interior Space', Whitney Library of Design, 1975.
3. Joseph De Chiara, Julius Panero, Martin Zelnik, 'Time Saver Standards for Interior Design and Space Planning', McGraw Hill, 2001.
4. Ernst Neuferts, 'Architects Data', Blackwell, 2002.
5. Ramsey et. al, 'Architectural Graphic Standards', Wiley, 2000.

6. Sam F. Miller, 'Design Process: A Primer for Architectural and Interior Design', Van Nostrand Reinhold, 1995.

7. NBC (National Building Code).

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is to be set from the syllabus and covering the entire content.

2. Evaluation is to be done through viva voce by external jury comprising of two examiners appointed by the University at college and answer sheets should be retained at college level.

3. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

NOTE: Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

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FURNITURE DESIGN
(BID - 422)

Uni. Exam. Marks : 60

Sessional Marks : 40

Uni. Exam. Duration: 03 hrs

(L-1, T-0, S-0, P-2, C=3)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
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3. **COURSE OUTCOME**
   - To understand and use basic theories if design to develop furniture in different styles.
   - To apply principles of universal design to create comfortable furniture
   - To refer from history and other case studies to get inspired and apply learning's to their designs
   - To express concepts with appropriate terms and reflect the design by developing furniture of different categories.
   - To understand seating typologies and impact of culture on them.

Unit- I
FUNCTIONAL AND FORMAL ISSUES IN DESIGN

Study and evaluation of popular dictums such as "Form follows function", Form and function are one", "God is in Details", "Less is more" or "Less is bore" etc. Evaluation of visual design: study of Gestalt theory of design – law of closure, law of proximity, law of continuity etc. Typology offurniture with respect to the different states in India

ERGONOMICS AND HUMAN FACTORS

Human factors, engineering and ergonomic considerations: Principles of Universal Design and their application in furniture design.

Unit – II
EVOLUTIONOF FURNITURES

Evolution of furniture from Ancient to present: Various stylistic transformations. Furniture designers and movements for various types of furniture.

ROLE OF FURNITURE

Furniture categories – role of furniture in interior design, exploration of the idea of furniture as elements of living units, education institutes, health facilities, street elements office, educational institutes, banks, stores, street furniture, etc

Unit – III
SEATING

Seating Design: Different types of seating with Functionality, Aesthetics, Style, Human factors and ergonomics

Design with wood, metal and combination of materials. Drawings, details. Market survey of available products and economics of products. Design of furniture for upper middle, middle and lower middle income groups - elements of living units, educational institutes, health facilities, street elements etc. Exploration of wood, metal, glass, plastics, FRP, etc as materials for furniture design – traditional and modular. Cost criteria of furniture design.

RECOMMENDED BOOKS

1 Maureen Mitton, Interior Design Visual Presentation: A Guide to graphics, models and presentation techniques, 3rd edition, wiley publishers, 2007

2 MogaliDelgadeYanes and Ernest Redondo Dominquez, Freehand drawing for Architects and Interior Designers, www.Norton& co., 2005

INSTRUCTIONS TO QUESTION PAPER SETTER

1.   One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2.   The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

ENGLISH COMPOSITION AND COMMUNICATION
(BID - 423)

Uni. Exam. Marks : 60	Uni. Exam. Duration: 03 hrs
Sessional Marks : 40	(L-1, T-0, S-0, P-2, C=2)

1. **COURSE PREREQUISITES**
   Basic knowledge of English as a language up to 12th standard

2. **COURSE OBJECTIVES**
   The objective is to help the students to become independent users of English language. Students should be able to understand spoken and written English language of varied complexity on most including some abstract topics; particularly for preparing reports. They must show awareness in the field and must be able to explain their views in a rational manner.

3. **COURSE OUTCOME**
   - The students shall be able to converse fluently, without strain with international speakers of English in an accent and lexis that is widely understood across the globe. They will be able to prepare reports and texts on their own and shall be able to communicate in a professional manner.
   - **Reading:** Reading texts of varied complexity; speed reading for global and detailed meaning; processing factual and implied meanings.
   - **Vocabulary:** Building up and expansion of vocabulary; active use of vocabulary
   - **Grammar:** Revising and practicing a prescribed set of grammar items; using grammar actively while processing or producing language
   - **Writing:** The qualities of good writing; Learning the prescribed written expressions of conventional use; writing business letters, emails; Architectural reports, summaries and various forms of descriptive and argumentative essays related to buildings; poetry and prose.

Unit- I (Reading)

The students will go through the reading texts themselves with the help of a dictionary or word power as given at the end of books. As they progress from one reading to another they should learn to read fast with greater degree of understanding of both concrete and abstract topics. While taking up the textbook lessons in the classroom, the teacher shall ensure that students can do the following:
- Identify the significant points and conclusions as given in the text.
- Handle large texts (even outside the prescribed book) with overall comprehension of the links between arguments and the finer distinction between stated and implied meanings.
- Generally, read the stance or the point of view of the writer and present it in the form of a summary.
- Use the vocabulary learnt in the lessons (especially given in "word power") productively in various writing tasks as suggested at the end of each lesson.
- Profitably use the grammatical items as discussed at the end of each lesson while producing language for communication.
- Besides the textbook, the teacher must insist that students extend their reading by taking up additional texts of their own choice

Unit – II (Writing)

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The students must learn the language that expresses various cognitive functions that are frequently used in writing. With the help of the teacher who will give them adequate practice, the students should be able to:

- Convey information on concrete or abstract topics with clarity and precision.
- Write about objects or events with appropriate detail in both descriptive and narrative form.
- Explain ideas and build up arguments with adequate support in a convincing manner.
- Use language with some degree of flexibility in consideration to the reader.
- Produce effectively such forms of professional writing as business letter, emails, notes, memos, reports summaries etc.
- While teaching, the teacher must inculcate in students the habit of revising their writing. The teacher can also use and recommend the relevant sections of the following books for developing writing skills in students.

Unit – III (Reporting)

The students must visit places of importance, buildings, gardens, monuments etc. and prepare visit reports. The parameters to be considered for report writing shall be location, history, concept and key elements of design

- Basic understanding and vocabulary of Interior terms and features.
- Presentation of various site reports, case studies and methods of holding meetings.
- Preparation of press note of Interior reports and events.

RECOMMENDED BOOKS

1. Vandana R. Singh, 'The Written Word', Oxford University Press, New Delhi.
2. K.K. Ramchandran, et al, 'Business Communication', Macmillan, New Delhi.
3. Swati Samantaray, 'Business Communication and Communicative English', Sultan Chand, New Delhi.
4. S.P. Dhanavel, 'English and Communication Skills for Students of Science & Engineering (with audio CD)'.

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

INTERIOR SERVICES - II
(BID - 424)

Uni. Exam. Marks : 60   Uni. Exam. Duration: 03 hrs

Sessional Marks : 40   (L-2, T-0, S-0, P-0, C=2)

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   To develop an understanding of the advanced building services such as Fire Safety, HVAC, lifts, escalators, Building automation systems, and their application in the design proposals of multi-storied buildings.
3. **COURSE OUTCOME**
   - To understand the heating, ventilation and air conditioning systems
   - To learn on the various fire fighting systems and provision of fire systems in NBC
   - To learn about the vertical transportation systems in multi-storied buildings
   - To understand on the various safety and security systems.
   - To have a brief understanding on the various building management systems

Unit- I

HVAC

Heating Ventilation & Air Conditioning (HVAC) systems: Air conditioning, Mechanical ventilation – mechanical inlet and extraction systems. Functions of air conditioning, Principles of AC, capacity of AC, Types of AC systems – window AC, split, ductable, central AC and their details. Air distribution systems – ducts, air inlets.

FIRE SAFETY

Fire – causes and spread of fire. Design considerations for fire safety, Devices for firefighting – portable, built in wet riser system, sprinkler system, fire hydrant. Class of fire and occupancy, study of fire regulations as per NBC

Unit – II

VERTICAL TRANSPORT

Services for multi storied buildings - Vertical transportation systems – Introduction – lifts, escalatorsvertical& horizontal, definition, location, arrangement, structure, drives, traffic analysis, supervisory control, remote monitoring.

SAFETY AND SECURITY

Security and safety systems – introduction, designing a security system – burglar alarm, CCTV, central alarm systems, intrusion sensors and space sensors. Other services – cable TV, PABX, computer labs – access flooring, server rooms.

Unit – III

BUILDING AUTOMATION AND ENERGYMANAGEMENT

Building automation and energy management – Introduction, History of development of BAS, typical BAS, criteria for choosing the right BAS, open system architecture. Information technology, communications & artificial intelligence in intelligent buildings. Design in computer age, engineering intelligence through nature.

RECOMMENDED BOOKS

1. Rangwala, S.C. water supply and Sanitary Engineering: Environmental Engineering, 19th ed, Charotar pub house, Anand, 2004.
2. Electrical wiring and contracting (vol. 1 to vol.4), London. The New era Publishing Company
3. Dr Frith Abnwos and others, Electrical Engineering hand book.

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4. William . J. Guinness, Mechanical and Electrical Systems for Buildings, New York :McGraw Hill.
5. Derek Clements-Croome, Derek J. Croome, Intelligent buildings: Design, Management and Operation, Thomas Telford Books, London, 2004.
6. Albert Ting-pat So, WaiLok Chan, Intelligent Building Systems, Kluwer Academic Publishers, 2009.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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MRSPTU

INTERIOR AESTHETICS - I
(BID - 425)

Uni. Exam. Marks   : 60   **Uni. Exam. Duration: 03 hrs**
Sessional Marks   : 40   **(L-2, T-0, S-0, P-0, C=2)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   Students should acquire knowledge of the various types of lightings to effectively communicate their designs and understand the effect of various lights on colors and textures.
3. **COURSE OUTCOME**
   - To understanding importance of daylighting and artificial lighting.
   - To learn terminology used for artificial lighting in interiors.
   - To learn effect of colour lighting in Interiors
   - To understanding problems take place during site visits.
   - To enhances the knowledge of material and fixtures for lighting available in market.

Unit- I
INTRODUCTION TO DAYLIGHTING
Nature flight –Wavelength, Photometric quantities–intensity, Flux, illumination and luminance, visual efficiency, sources of light, day light factor concept, design sky concept, day lighting requirements.

ARTIFICIAL LIGHTING
Electric lamps – incandescent, fluorescent, sodium vapour, mercury, halogen and neon. Different types of lights in interior and exterior – task lighting, special purpose lighting. Calculation of artificial lighting, guidelines for lighting design, Glare in artificial lighting.

Unit – II
EFFECT OFCOLOR IN LIGHTING
Colors, color schemes - Monochromatic, analogous, complementary color schemes, triadic and tetradic schemes, effects of color in different areas, color temperature, psycological effects of color in interiors, factors affecting color, Prang theory – Color wheel,Munsell system and Oswald system.

LUMINARES& FIXTURES
Definition, different luminaries for lighting, lighting control system- benefits & application, Impact of lighting, fixture types - free standing or portable, fixed, light fixture control. Lighting accessories - switches, sockets, fused connection units, lamp holders, ceiling roses etc.

Unit – III
CASESTUDY
Study of projects based on different lighting concepts used in interiors and exteriors
RECOMMENDED BOOKS
1. The Art of living- Randallwhitehead,
2. Lighting design, sourcebook- Randall whitehead,
3. Light right- M.K.Halpeth,T.Senthil kumar, G.Harikumar
4. Conceptsof lighting, Lighting design in Architecture- Torquil Barker
INSTRUCTIONS TO QUESTION PAPER SETTER
1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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INTERIOR MODEL MAKING
(BID - 426)

Uni. Exam. Marks : 60
Sessional Marks   : 40

Uni. Exam. Duration: No Exam
(L-3, T-0, S-0, P-3, C=2)

1. **COURSE PREREQUISITES**
    Nil
2. **COURSE OBJECTIVES**
    The teaching of this subject shall help the students to learn different materials and technique used to present work of interiors on higher level.
3. **COURSE OUTCOME**
    - To understand the workability of materials for finish quality
    - To be able to understand the model scales in 3D
    - To be able to capture good photographs of the models made
    - To document and present the models using various representation skills
    - To understand the workability of materials for finish quality

Unit- I
MEDIUM OF REPRESENTATION
Working with different materials like wood paper metal textile to understand material parameters in design in terms of finishes color surface quality etc

Unit- II
SCALES
Making of elements of various scales in the built form such as interior space making elements, furniture forms and their evolution.

PHOTOGRAPHY
Model Photography

Unit- III
REPRESENTATION
Documentation and representation of final product

RECOMMENDED BOOKS

1 Carol Stangler, The crafts and art of Bamboo, Rev. updated edition, Lark books, 2009.

2 Liz Gibson, Weaving Made Easy: 17 Projects Using a Simple Loom (Paperback), Interweave press, 2008

3 Deoborah Chandler, Learning to weave, Revised edition, Interweave press, 2009.

4 Fabrics: A guide for architects and Interior Designers, Marypaul Yates, Norton publishers, 2007.

5 Materials for Interior Environments, Corky Bingelli, John wiley and sons, 2007

6 Collingwinslow: The Handbook of Model-making for Set Designers

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

EDUCATIONAL TOUR -I
(BID - 427)

Uni. Exam. Marks : 60   **Uni. Exam. Duration: No Exam**
Sessional Marks : 40   **(L-0, T-0, S-0, P-0, C=1)**

1. **COURSE PREREQUISITES**
   Nil
2. **COURSE OBJECTIVES**
   The main aim is to explore study, analyze and understand the contemporary/traditional/historical architectural characteristics and details of areas, places relevant to the syllabi. The duration of tour shall be up to 06 days.
3. **COURSE OUTCOME**
   - Understand the traditional construction techniques used in forts, palaces, religious structures in North India
   - Understand the planning concepts of traditional Indian cities
   - Awareness of various design principles as employed in historical monuments
   - Socially responsible
   - Learn team work.
   - Learn cultural values of the visited area.

GENERAL GUIDELINES FOR TEACHER
Study of building materials and details through sketches and photographs to be made as an individual student activity and is to be submitted in a report form. Study of concepts/ construction techniques and Interior characters for different sites/ buildings visited to be submitted in groups of students. Viva voce of individual student for both the submissions will be conducted by the teacher in-charge, who accompanied the tour, as part of the internal assessment.
NOTE: The Evaluation shall be done on the work done by the students in the form of handmade Sketches and Report of the Tour.

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M.PLANNING
(URBAN PLANNING)

STUDY SCHEME

S. No	Code	Subject	Hrs. per Week		End Semester Exam/ External Jury (Marks)	Internal Assessment (Marks)	Credits (T)	Credits (S)	Total Credit
FIRST SEMESTER									
1	MUP1-101	**Planning History and Theory**	3	--	50	50	3	--	3
2	MUP1-102	**Socio-economic basis for Planning**	3	--	50	50	3	--	3
3	MUP1-103	**Planning Techniques & Statistical Analysis**	3	--	50	50	3	--	3
4	MUP1-104	**Infrastructure Planning**	3	--	50	50	3	--	3
5	MUP1-105	**Housing Environments and Planning**	3	--	50	50	3	--	3
6	MUP1-106	**Planning Studio -I**	2	4	150	250	2	4	6
		Sub-Total	**17**	**4**	**400**	**600**	**17**	**4**	**21**
SECOND SEMESTER									
1	MUP1-201	**City and Metropolitan Planning**	3	--	50	50	3	--	3
2	MUP1-202	**Transport Planning**	3	--	50	50	3	--	3
3	MUP1-203	**Urban Management and Governance**	3	--	50	50	3	--	3
4	MUP1-204	**Advanced Planning Techniques**	3	--	50	50	3	--	3
5	MUP1-205	**Planning Studio - II**	2	4	150	250	2	4	6
6	MUP1-206 (Elective)	**Urban Heritage Conservation**	3	--	50	50	3	--	3
	MUP1-207 (Elective)	**Planning for Tourism**							
7	**Mandatory Training of Six Weeks after Second Semester during Summer Vacation**								
	Sub-Total		**17**	**4**	**450**	**550**	**17**	**4**	**21**

S. No.	Code	Subject	Hrs. per Week		End Semester Exam/ External Jury (Marks)	Internal Assessment (Marks)	Credits (T)	Credits (S)	Total Credit
THIRD SEMESTER									
1	MUP1-301	**Project Planning and Management**	3	--	50	50	3	--	3
2	MUP1-302	**Politics and Planning**	3	--	50	50	3	--	3
3	MUP1-303	**Planning Studio - III**	3	6	150	250	3	6	9
4	MUP1-304 (Elective)	**Environment, Development and Disaster Management**	3	--	50	50	3	--	3
	MUP1-305 (Elective)	**Energy, Climate Change and Urban Development**							
5	MUP1-306	**Review of Six Weeks Mandatory Training during Summer Vacation after Second Semester.**							
		Sub-Total	**12**	**6**	**450**	**550**	**12**	**6**	**18**
FOURTH SEMESTER									
1	MUP1-401	**Development Finance**	3	-	50	50	3	--	3
2	MUP1-402	**Legal Issues and Professional Practice**	3	-	50	50	3	--	3
3	MUP1-403	**Thesis**	--	12	300	500	--	12	12
		Sub-Total	**6**	**12**	**400**	**600**	**6**	**12**	**18**
		Grand Total	**52**	**26**	**1700**	**2300**	**52**	**26**	**78**

Note: (1)   Credits for Theory: One Credit for one hour of teaching per week.

           (2)   Credits for Studio: One Credit for one hour of studio per week.

           (3)   Six Weeks Training after Second Semester during the summer vacation is **mandatory** for which the Review will be held in Third Semester.

SYLLABUS

1ST SEMESTER

MRSPTU

Name of the Subject: **PLANNING HISTORY AND THEORY**		
Subject Code: **MUP1-101**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study History and Theory of Urban and Regional Planning.**

Objectives:
1. **To study Evolution of Cities and History of Planning.**
2. **To study Theories of City Development.**

Expected outcomes: -

 1: Understanding the planning process, theory and practice and its role in planning of cities.
 2: Appreciate the role of historical developments in planning and its evolution and trace these influences to the current situation.
 3: Developing capacity to understand multiple often conflicting factors to be balanced in planning for an urban area.
 4: Identifying the key paradigms that define urban planning theory

Contents		Hrs
Unit - 1	**Evolution of City Building** Relevance of the study of evolution of settlements; Hunter, gatherer, farmer and formation of organized society; Cosmological and other influences, origins and growth of cities, effects of cultural influence on physical form; Human settlements as an expression of civilizations; Basic elements of the city; Concepts of space, time, scale of cities.	9
Unit - 2	**Planning History** Town planning in ancient India; classification of settlements and plans of ancient Indian villages and towns; Medieval, renaissance, industrial and post-industrial cities; City as a living spatial entity; Concepts of landmark, axis, orientation; City form as a living space; City as a political statement: New Delhi, Chandigarh, Washington D.C. Brasilia etc.; Contribution of individuals to city planning: Lewis Mumford, Patrick Geddes, Peter Hall, Camillo Sitte, Clarence Perry, C.A. Doxiadus, F.L. Wright, Le Corbusier etc; Dynamics of the growing city, impact of industrialization and urbanization, metropolis and megalopolis.	15
Unit - 3	**Definitions and Objectives of Planning** Definitions of town and country planning; Orthodoxies of planning; Goal formulation, objective, scope, limitations; Sustainability and rationality in planning; Components of sustainable urban and regional development.	9
Unit - 4	**Theories of City Development and Planning Theories** Theories of city development including Concentric Zone Theory, Sector Theory, Multiple Nuclei Theory and other latest theories; Land use and land value theory of William Alonso; Ebenezer Howard's Garden City Concept; and Green Belt Concept; City as an organism: a physical, social, economic and political entity; Emerging Concepts: global city, inclusive city, safe city, etc.; City of the future and future of the city; Shadow cities, divided cities; Models of planning: Advocacy and Pluralism in Planning; Systems approach to planning: rationalistic and incremental approaches, mixed scanning and middle range planning; Equity planning; Political Economy Model; Types of development plans, plan making process.	15

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Hall, P.	Cities of tomorrow: an intellectual history of urban planning and design in the twentieth century,	2001	Blackwell, London.
2	Birch, E.L. and Silver, C.	One Hundred Years of City Planning's Enduring and Evolving Connections, Journal of the American Planning Association, Vol.75, Issue 2, pp.113-122.	2009	
3	Sandercock, L.	Making the Invisible Visible: A Multicultural Planning History	1998	University of California Press London.
4	Brooks, M.P.	Four critical junctures in the history of the urban planning profession: An exercise in hindsight, Journal of the American Planning Association, Vol. 54, Issue 2, 241-248.	1988	
5	McLoughlin, J. B.	Urban and Regional Planning. A systems approach,	1969	Faber and Faber, London.
6	Faludi, A.	A Reader in Planning Theory,	1973	Pergamon Press, London.
7	Healey, P.	Collaborative Planning: Shaping Places in Fragmented Societies	1997	Macmillan, London.
8	Peter, G.H. and Tewdwr-Jones, M.	Urban and Regional Planning,	2011	Routledge, London. Edition.

List of Exercises / Practicals:

1	Visit to Planning Organization / Department and submit Report on adoption of Concepts and Theories by them.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (at least one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **SOCIO - ECONOMIC BASIS FOR PLANNING**		
Subject Code: **MUP1-102**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To develop understanding with relevance to Socio-economic Issues in Urban and Regional Planning.**
Objectives: 1. **To study Socio-cultural Profile of Indian Society in the context of Urban and Rural Settlements.** 2. **To study the Economic Growth and Development of Urban and Rural Settlements.**
Expected outcomes:- **1: Understanding the relationship between sociology and urban planning** **2: Developing an insight in to social, geographical, biological and economic factors that shapes the urban environment** **3: Developing the relevance to Socio-economic Issues in Urban and Regional Planning** **4: Studying and analyzing the approaches to valuation and public finance**

Contents		Hrs
Unit - 1	**Nature and Scope of Sociology** Sociological concepts and methods, man and environment relationships; Socio- cultural profile of Indian society and urban transformation; Tradition and modernity in the context of urban and rural settlements; Issues related to caste, age, sex, gender, health safety, and marginalized groups; Displacement, resettlement and rehabilitation due to compulsory land acquisition.	9
Unit - 2	**Community and Settlements** Social problems of slums and squatters communities, urban and rural social transformation and their impact on social life, safety, security; Crimes in urban areas and their spatial planning implications, social structure and spatial planning; Role of socio-cultural aspects on growth patterns of city and neighborhood communities; Social planning and policy, and community participation; Marginalization and concepts of inclusive planning, and gender concerns in planning. Settlement Policy: National Commission on Urbanization, Rural Habitat Policy and experiences from developing countries. Regarding settlement structure, growth and spatial distribution.	15
Unit - 3	**Elements of Micro and Macro Economics** Concepts of demand, supply, elasticity and consumer markets; concept of revenue costs; Economies of scale, economic and social costs, production and factor market; Different market structures and price determination; market failures, cost-benefit analysis, public sector pricing; Determinants of national income, consumption, investment, inflation, unemployment, capital budgeting, Risk and uncertainty, and long-term investment planning.	12
Unit - 4	**Development Economics and Lessons from Indian Experiences** Economic growth and development, quality of life; Human development index, poverty and income distribution, employment and livelihood; Economic principles in land use planning; Policies and strategies in economic planning, balanced versus unbalanced growth, public sector dominance; changing economic policies, implications on land.	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	N. Jayapalan	Urban Sociology	2002	Atlantic Publishers & Distributors, New Delhi
2.	William G. Flanagan	Urban Sociology-images and Structures	2010	Rowman & Littlefield Publishers Inc
3.	Mani Monto, L.S. Ganesh & K. Verghese	Sustainability and Human Settlements: Fundamental Issues, Modeling and Simulation	2005	SAGE Publications Pvt. Ltd, New Delhi
4.	Dr. D N Dwivedi	Principles of Economics	2006	Vikas Publishing House
5	Karl E. Case	Principles of Economics	2009	Pearson Education
6.	Jhingan, M	The Economics of Development and Planning	1998	Vrinda Publications, Delhi,

List of Exercises / Practicals:

1.	Visits to a Village / Small town to ascertain Socio-economic Impact of Development and submit Report.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 3.
2	Assignment on Unit 2 or Unit 4

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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Name of the Subject: **PLANNING TECHNIQUES & STATISTICAL ANALYSIS**		
Subject Code: **MUP1-103**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	
Aim: **To study Mapping and Survey Techniques and Spatial Standards.**		
Objectives: **1. To study the Database for Physical Surveys and Techniques of preparation of Base Maps.** **2. To study the Methods of Population Forecast and Projections.**		
Expected outcomes: - **1: Understanding the techniques to prepare base maps , classify and delineate region** **2: Understanding the necessary information on town planning theories, principles, techniques and methodologies.** **3: Knowing the Spatial standards, URDPFI guidelines, zoning regulations and development control rules and regulations.** **4: Understanding the various dimensions of urban planning in past.**		

Contents		**Hrs**
Unit - 1	**Survey Techniques and Mapping** Data base for physical surveys including land use, building use, density, building age, etc., and socio-economic surveys; Survey techniques; Land use classification or coding and expected outputs; Techniques of preparing base maps including understanding the concepts of scales, components and detailing for various levels of plans like regional plan, city plan, zoning plan, and local area plan.	12
Unit - 2	**Analytical Methods** Classification of regions, delineation techniques of various types of regions, analysis of structure of nodes, hierarchy, nesting and rank size; Scalogram, sociogram, etc.; Planning balance sheet; Threshold analysis; Input output analysis, SWOT analysis; Introduction to Techniques of system simulation, Garin and Lowry Model; Threshold Analysis, Preparation of Urban and Regional Development plans - various approaches.	15
Unit - 3	**Demographic Methods** Methods of population forecasts and projections; Lorenz Curve, Ginni Ratio, Theil's index, rations: urban – rural, urban concentration, metropolitan concentration; Location dimensions of population groups – social area and strategic choice approach – inter connected decision area analysis. Regionalization and delineation techniques for various types of regions, regional planning vis-vis National Five Year Plans.	12
Unit - 4	**Planning Standards** Spatial standards, performance standards and benchmarks, and variable standards; URDPFI guidelines, zoning regulations and development control rules and regulations. Town typology and their characteristics, Urbanization and Urban Growth, Identification of problems and priorities, Preparation of plans; Perspective Plan, Master Plan, Development Plan, Zonal Plans, Project Plans/Schemes;	9

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Margaret Robert	An introduction to town planning techniques	1974	Hutchinson Educational, University of California

2.	Ian Braken	Urban Planning Methods	2007	Routledge,
3.	Kruekeberg D. A. and Silvers A. A.	Urban Planning Analysis	1988	John Willey and Sons Inc.
List of Exercises / Practicals:				
1	Visit to a Local Body / Development Authority and submit report with relevance to adoption of Planning Techniques by them.			
List of Assignments/Tests:				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 4.			

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **INFRASTRUCTURE PLANNING**		
Subject Code: **MUP1-104**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	
Aim: **To study the Elements of Infrastructure and its Role in Urban and Regional Planning.**		
Objectives: **1. To study the Elements of Physical Infrastructure and its Management.** **2. To study the Quantitative and qualitative assessment of infrastructure provisions and selected methodologies for suitable provisions and implementation.**		
Expected outcomes: - **1: The student shall be able to understand the specific techniques of analysis and evaluation for urban infrastructure planning** **2: The student shall be able to understand the possible means of achieving project and societal objectives.** **3: The student shall be able to understand the concepts of infrastructure management at various levels** **4: Students will learn about the different hierarchies of the finance of infrastructure facilities.**		

Contents		Hrs
Unit - 1	**Role of Infrastructure in Development** Elements of Infrastructure (physical, social, utilities and services); Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, provision of infrastructure, and land requirements; Principles of resource distribution in space; Types, hierarchical distribution of facilities. Access to facilities, provision and location criteria, Norms and standards, etc.	9
Unit - 2	**Planning and Management of Water, Sanitation and Storm Water** Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues; Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Storm water – rainfall data interpretation, points of water stagnation, system of natural drains, surface topography and soil characteristics, ground water replenishment, storm water collection and disposal, norms and standards, institutional arrangements, planning provisions and management issues;	15
Unit - 3	**Planning and Management of Municipal Wastes, Power and Fire** Municipal and other wastes – generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues. Fire – History of fire hazards, vulnerable locations, methods of firefighting, norms and standards, planning provisions and management issues.	15
Unit – 4	**Economics of Urban Services** Cost recovery, economics of urban service system and networks, Infrastructure finance concepts and principles of emerging urban infrastructure finance and management issues such as BOO, BOT, BOOT etc.	9

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Bijlani, H.U.; Rao, P.S.N.	Water supply and sanitation in India	1990	Pub. by Oxford and IBH Publishing, New Delhi
2	Bandela, N.N; Tare, D.G.	Municipal solid waste management	2009	Pub. by B.R. Publishing
3	Mukerjee S. and Chakraborty D. (Eds)	Environmental scenario in India	2012	Routledge, London
4	Sameer Kochhar, Deepak B. Phatak, H. Krishnamurthy, Gursharan Dhanjal, (eds)	Infrastructure and Governance	2008	Academic Foundation, New Delhi

List of Exercises / Practicals :

1	Visit to a Local Body / Development Authority and submit report relevant with Infrastructure Planning.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus. Any four questions (selecting at least one from each unit).

2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt.

Name of the Subject: **HOUSING ENVIRONMENTS AND PLANNING**		
Subject Code: **MUP1-105**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To provide an Exposure to the Basic Housing and Planning Concepts and Issues.**

Objectives:
1. **To introduce the Basic Definitions, Concepts and Socio-economic Dimensions related to Housing.**
2. **To provide a basic understanding of Housing at the Neighborhood and City level and to Appreciate the Housing Sector as an Integral Sector of Overall Town Planning System.**

Expected outcomes: **-**
1: Appreciating the housing sector as an integral part of overall town planning system
2: Understanding of housing at the neighborhood and City Level
3: Appreciating typologies of housing in relation to culture and environment factors
4: Focusing on the role of housing development and its policy context in shaping the social and physical fabric of the contemporary city

Contents		Hrs
Unit - 1	**Concepts and Definitions** Shelter as a basic requirement, determinants of housing form, Census of India definitions, Introduction to policies, housing need, demand and supply, dilapidation, structural conditions, materials of constructions, housing age, occupancy rate, crowding, housing shortage, income and affordability, poverty and slums, houseless population. Various housing typologies viz. traditional houses, plotted development, group housing, multi-storied housing, villas, chawls, etc.	12
Unit - 2	**Social and Economic Dimensions** Housing as social security, role of housing in development of family and community well-being, status and prestige related to housing, safety, crime and insecurity, deprivation and social vulnerability, ghettoism, gender issues, housing for the elderly. Contribution of housing to micro and macro economy, contribution to national wealth and GDP, housing taxation, national budgets, fiscal concessions, forward and backward linkages.	12
Unit - 3	**Housing and the City** Understanding housing as an important land use component of city plan / master plan, considerations for carrying out city level housing studies, projections, land use provisions; Suitability of land for housing, housing stress identification, projecting housing requirements, calculating housing shortages, housing allocation.	12
Unit - 4	**Housing Environments** Slums and squatters, night shelters, public health issues related to housing, various theories of housing, concept of green housing, green rating of housing projects; basic services for housing neighborhoods. Approaches to neighborhood living in traditional and contemporary societies, elements of neighborhood structure, Planning and design criteria for modern neighborhoods, norms and criteria for area distribution, housing and area planning standards, net residential density and gross residential density, development controls and building byelaws, URDPFI guidelines, NBC 2005 provisions and Case studies of neighborhood planning.	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Dwyer, D.J.	People and Housing in Third World Cities	1981	Orient Longman
2.	Beyer Glen H,	Housing : a factual analysis	1958	The Macmillan Co. NY
3.	Abrams, Charles	Man's Struggle for Shelter in an Urbanizing World	1964	MIT, Harvard
4.	Payne, Geofrey	Urban Housing in the Third World	1977	Routledge and Keegan Paul,USA
5.	Al Nichols, Jason Laros	Inside the Civano Project (Green Source Books): A Case Study of Large-Scale Sustainable Neighborhood Development (Mcgraw-Hill's Green source Series)	2009	McGraw-Hill Professional
6.	Douglas Farr	Sustainable Urbanism: Urban Design With Nature	2007	John Wiley & Sons
7.	Aromar Revi	Shelter in India - Sustainable Development Series	1990	StosiusInc / Advent Books Division
8.	International Institute for Energy Conservation	Eco housing Assessment criteria Version II	2009	USAID

List of Exercises / Practicals:

1	Visit to Regional Office of HUDCO or State Housing Board and submit report.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **APPLICATION OF GEO-INFORMATICS & REMOTE SENSING**		
Subject Code: **MUP1-106**	Semester: **First**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: **(3 + 0) = 3**
Teaching Scheme	**Examination Scheme**	
Lecture :- **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio :- **hrs / week**	Internal Assessment: **Marks 50**	
Aim: **To study sources of demographic data and applications for GIS and remote sensing for Urban and Regional Planning.**		
Objectives: **1. To study GIS Applications and principles of remote sensing.** **2. To study sources of demographic data and statistical applications.**		
Expected outcomes: - **1: Understanding fundamentals of remote sensing and GIS and its application in the field of urban and regional planning** **2: A comprehensive understanding of the concepts, techniques, methods used by an urban planner to treat spatially cities. by preparing urban land use models using GIS** **3: Knowing to prepare urban land use models using GIS** **4: Knowing the usage of various modern tools/ softwares of urban planning in preparation of development plans.**		

Contents		Hrs
Unit - 1	**GIS Applications** Coordinate system and geo-coding, vector data structure and algorithms, raster data structure and algorithms, data bases for GIS – concepts, error modeling and data uncertainty, decision making through GIS, constructing spatial data infrastructure and spatial information system; National Urban Information system.	12
Unit - 2	**Remote Sensing** Why remote sensing, aerial and satellite remote sensing, principles of aerial remote sensing, Aerial photo-interpretation, photogrammetry, stereovision, measurement of heights / depths by relief displacement and parallax displacement. Principles of satellite remote sensing, spatial, spectral, temporal resolutions. Applications in planning, population estimation, identification of squatter / unauthorized areas, sources of pollution, etc.,spatial resolution related to level of Planning	12
Unit - 3	**Demography** Sources of demographic data in India, Settlement type, growth pattern and structure: urban settlement analysis, Concentration: spatial, vertical and size, peri- urban sprawl, economic base; Rural Settlements – Size, occurrence and character, transformation, Policies towards various size class settlements. Population structure and composition – Age, sex, gender, marital status, caste, religion, literacy level, etc.; Age - sex ratio, structure, pyramid; dependency ratio; occupational structure; Fertility; mortality, migration analysis, natural growth of population, migration and its implications in spatial planning;	12
Unit - 4	**Statistical Applications** General concepts - statistical interference, population and samples variables, Sampling, simple statistical models, Measures of central Tendency, Measures of Dispersion, Measures of shape of distribution, Correlation and Regression.	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Longley Paul, A., et. al	Geographic Information Systems and Science	2001	John Wiley & Sons Ltd., New York.
2.	Bhatia, S.C.	Fundamentals of Remote Sensing	2008	Actantic Publishers, Delhi
3.	Sinha, V.C. and Acharia, E.	Elements of Demography	1984	Allied Pub., Delhi
4.	Dixon, W.J. and Massey, F.J.	Introduction to Statistical Analysis	1951	McGraw Hill, New York.

List of Exercises / Practicals:

1.	Visit to NSO and Institute of Remote Sensing or Organizations using GIS and submit report.

List of Assignments/Tests:

1.	Test on Unit 1 or Unit 2.
2.	Assignment on Unit 3 or Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **PLANNING STUDIO-I**		
Subject Code: **MUP1-106**	Semester: **First**	
Duration: **192 Hours**	Maximum Marks: **400**	Credits: (2+4) = **6**
Teaching Scheme	**Examination Scheme**	
Lecture : **- 2 hrs/week**	End Semester Exam: **Marks 150 (Viva-Voce only)**	
Studio :- **4 hrs / week**	Internal Assessment: **Marks 250**	

Aim: **To provide Appreciation of Site Planning, Area Planning, and City Development Plan.**

Objective:
1. **To understand Development Issues.**
2. **To appreciate Contextual location of Area in relation to City.**

Expected outcomes: -
1:Critically analyzing relevant literature and field conditions
2:Applying planning techniques and prepare of plans at layout/zone/part of settlement level
3:Developing capacity to understand complex and interrelated factors to be considered in spatial planning
4:Developing planning insight and make acquaintance with various planning related exercises, such as, Layout Planning, Neighborhood Planning, Urban Renewal / Redevelopment, etc.

Contents

Unit 1 – Introduction to Geo-Informatics

Basic concepts of GIS and to represent geographical features in GIS. Concept of digital maps and its advantages, raster and vector maps, spatial and attributes data, various types of spatial and non-spatial analysis in urban planning using GIS.
Various data input methods in the ArcView of ArcGIS software, which includes geo-referencing, digitization, query building, spatial and non-spatial analysis, and final production of maps using GIS. For the purpose of digitization and data, existing data source may be used.
Exercises undertaken by the students will be submitted in the form of soft copy of problems, hard copy of
Some problems, and reports / assignments.
In addition, a final practical examination will be conducted.

Unit 2 – Site Development

Study and Design of lay out for an Industrial, Commercial, Institutional areas etc. on an existing site of about 10 hectares land .The items to be submitted may include.
(I) Site analysis clearly indicating all physical features, infrastructural facilities and landscape features, potentials and problems on standard scale.
(II) Design of Typed units-All plans and at least, two elevations and one section on suitable scale.
(III) Layout of buildings and roads.
(IV) Layout showing network services trunk sewer, main waterlines and refuse collection points, etc.
(V) Layout showing landscaping proposal along with buildings and roads all on suitable scale
(VI) Report containing introduction site analysis, area calculation s etc. followed in design process.

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Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Lynch, Kevin	Site Planning		
2.	Smith, Carl, et. al.,	Residential Landscape Sustainability – A Checklist Tool	2008	Blackwell Pub., Oxford
3.	Ministry of Urban Development	Revised Tool Kit for Preparation of CDP	2009	Government of India, New Delhi

List of Exercises / Practicals:

1	Visit to Local Planning Agency and Field Visit for Data Collection and submit Report.

List of Assignments/Tests:

1	Marked Reviews on all Units.
2	Internal and External Jury.

MRSPTU

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Name of the Subject: **CITY AND METROPOLITAN PLANNING**		
Subject Code: **MUP1-201**	Semester: **Second**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: To study the Growth of Metro and Mega Cities and their relationship with their respective Regions; and spatial planning approaches for their Planned Development.

Objectives:
1. To study City – Region Linkages and problems of Metro and Mega Cities.
2. To study Urban Development Policies and Problems.

Expected outcomes: -
1: Gaining understanding of the city-region linkages and inter-dependency between city and region.
2: Getting familiar with acts and legal tools relevant to city planning.
3: Understanding the complex nature of environmental issues and development processes specifically at metro and mega cities scale.
4: Becoming capable of working for societal development addressing fulfillment of needs of all, improving the quality of life of residents.

Contents		Hrs
Unit – 1	**Urban Growth and System of Cities** Definition of Urbanization and Metropolitanization process; metropolis and related concepts-Urban agglomeration, Conurbation, necropolis, Primate City, metropolitan region and area of influence, megalopolis, world cities, global city, Classic and neo classic definitions.Growth of cities scale, complexity and its impact on national development, cities as engines of growth, cities as ecosystems, resources in cities. City as a three dimensional entity; Study of volumes and open space at all spatial levels, Inclusive Planning definitions and components	9
Unit – 2	**City – Region Linkages** City, fringe and the periphery - physical and functional linkages, peri-urban development. Image of city and its elements: nodes, districts, paths, edges and landmarks. Centralization and decentralization processes and their impact on Form and concept for metropolitan planning and developments: Sheet, Galaxy, Core, Star, Ring and multinucleated. Stakeholders Profile and Needs, Access to Shelter, Services and Livelihoods, Urban Poor, Informal Sector, Gender, Children, Elderly, Disabled, Displaced people, etc.; Slums - dimensions, causative factors, determinants, location characteristics of settlements; Informal sector - growth, characteristics, functions, economic contributions, linkages with formal sector, impact on Urban Development	9
Unit – 3	**Metro and Mega Cities: Problems and Issues** Growth trends and processes, characteristics, problems, concepts and concerns of urban sustainability, issues related to diversity and unintended growth, economic, social and environmental sustainability, quality of life, inclusivity and equity, climate change, transit oriented development, participatory planning. Inner city – issues and problems, approach to development. Inclusive zoning, development and building regulations, Slum Improvement. **Participatory Planning Process and Policies, Programmes and Legislation** Methods, role of stakeholders (including civil society organizations), etc.; Related Acts, Five year plans, policies and programmes at various levels.	15

Unit – 4	**Human Settlement Planning, Urban Development Policies and Programmes**			15
	Concepts, approaches, strategies and tools; Policies and programmes at various levels, impact on metro and mega city development. 74th Amendment Act, 1992, role of MPC. Case studies on metropolitan planning and development – mega cities and metropolitan cities			
	Planning interventions			
	Inclusive zoning, development and building regulations, Slum Improvement.			

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	ITPI	City and Metropolitan Planning and Design	--	ITPI, New Delhi
2.	Ramachandran, R	Urbanization and Urban Systems in India	1998	Oxford University Press, New Delhi
3.	Bawa, V. K.	Indian Metropolis: Urbanization, Planning and Management	1987	Inter-India Publications, New Delhi
4.	MMRDA	Madras 2011: A New Perspective for Metropolitan Management	1991	MMRDA, Chennai
5.	NCRPB	Regional Plan 2021	2005	NCRPB, New Delhi
6.	DDA	Master Plan for Delhi 2021	2010	DDA, New Delhi
7.	Misra, R.P. & Misra, K.	Million Cities of India Vol. 1&2	1998	Sustainable Development Foundation, New Delhi

List of Exercises / Practicals:	
1	Visit to a City / Metropolitan Planning and Development Agency and submit report.

List of Assignments/Tests:	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit)

Name of the Subject: **TRANSPORT PLANNING**		
Subject Code: **MUP1-202**	Semester: **Second**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study the Significance of Transport Infrastructure in Urban and Regional Planning and Development.**

Objectives:
1. **The Role and Significance of Transport Infrastructure in Habitat Planning and in inducing Peoples' Participation in the Planning Process.**
2. **To understand the importance of different Sectors and their Mutual Interdependence.**

Expected outcomes: -
 1: Students will learn to address urban infrastructure challenges.
 2: Students will be able to do short and long range planning for alternative infrastructure systems while designing for present and future cities and regions
 3: Students will have an understanding of the infrastructure network like water supply, roads, sewer, solid waste and street lighting to enable them to evolve spatial strategy for cities and towns
 4: Students will learn to identify the gaps and requirements of the infrastructure in a particular city/town and will come out with a way outs to give proper infrastructure in each and very society.

Contents		Hrs
Unit – 1	Transport systems and their types, design and operating characteristics, urban road hierarchy, planning, and management criteria for road and junction improvements, arterial improvement techniques. Transport survey and studies: study area definitions, survey and their types, sampling methods, survey techniques, programming and processing of travel data, analysis and interpretation of traffic studies. Transportation Planning Process and analytical techniques, Urban travel characteristics, urban transport interrelationship, transport planning process and modeling,	12
Unit – 2	**Traffic management, mass transit system**: Problems and prospects, tramways, trolley buses, LRS and RTS operation characteristics, planning transit systems. Management of transport systems: existing organizational and legal framework, traffic and environmental management techniques. Review of existing traffic management schemes in Indian cities.	12
Unit – 3	**Transport and environment:** Traffic noise, factor affecting noise statement measures, standards, air pollution standards, traffic safety, accident reporting and recording systems, factors affecting road safety , transport planning for target groups, children, adults , handicapped and women . Norms and guide lines for highway landscape, street lighting types, standards and design considerations.	12
Unit - 4	**Economics evaluation:** pricing and funding of transport services and systems, economic appraisal of highway and transport projects. Techniques for estimating direct and indirect road user costs and benefit value of time.	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Meyer, M. D.; Miller, E. J.	Urban Transportation Planning: A Decision-Oriented Approach	2001	Pub. by McGraw-Hill

2	Black, A.	Urban Mass Transportation Planning	1995	Pub. by McGraw-Hill
3	Weiner, E.	Urban transportation planning in the United States: An historical overview	1986	Technical Report
4		Indian Roads Congress Codes		
List of Exercises / Practicals:				
1	Visit to a Infrastructure Development Agency and submit report.			
List of Assignments/Tests:				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 4.			

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **URBAN MANAGEMENT AND GOVERNANCE**		
Subject Code: **MUP1-203**	Semester: **Third**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study the Processes and Management of Urban Planning and Development.**

Objectives:
1. **To comprehend the various Facets of Urban Development and Management.**
2. **To study issues in urban policies, practices, governance and their inter- relationship.**

Expected outcomes: -

1: **Understanding the practical aspects of planning processes, and the political, institutional and legal systems that direct and/or inform planning including demand, development and management.**

2: **Creating awareness about the critical laws used in India and their salient features relating to development of land.**

3: **Making the students aware of the governance mechanisms involved in development planning, administration and management.**

4: **Understanding the structure of local bodies and gaining knowledge of the finances involved and fiscal management of development.**

Contents		Hrs
Unit - 1	**Introduction to Development Management** Concept, approaches, components, interfaces with national goals and political economic system. Development Management: Basic principles and process of management, Role of management in a developing economy, Strategies, Tools and Techniques; organizations involved.	12
Unit - 2	**Land and Real Estate Development** Economic concepts of land, Land Pricing / valuation; Economic principles of land use; demand forecasting for land use: factors affecting land supply and demand; Land development methods, Supply Management, Demand side Management; Real estate markets, type of property development and its impact on supply and demand, method of development, environmental considerations, land acquisition act, land pooling, TDR	12
Unit - 3	**Information System and Urban Reforms** Spatial and Non - spatial information systems; Urban reforms and acts and policies. Urban & regional development management policies and programmes of Government of India, AMRUT, HRIDAY Priorities	12
Unit - 4	**Overview of Urban Governance** Definition, concepts, components, government and governance, hierarchy and structure, forms of governance, process of inclusion and exclusion, Provisions in the National Development Five Year Plans. Differences between institutions and organizations; approaches to understanding organizations; types, structure and functions, their interface and conflicts, reach, and their effectiveness; Methods, process and evaluation; Present organizations and involved in urban governance. **Urban Local Governance and Participatory Processes** System, structure, functions, powers, process and resource, performance, interface with NGO's, other agencies.	12

Text / Reference Books:

S.No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Rakodi, C.and Llyod-Jones, T.	Urban Livelihoods: A People- Centered Approach to Reducing Poverty.	2002	Earthscan, London
2	Datta, A.	The Illegal City: Space, Law and Gender in a Delhi Squatter Settlement	2012	Ashgate, Burlington
3	Roy, A. and Ong, A. (eds.)	Worlding Cities: Asian Experiments and the Art of Being Global	2011	Wiley Blackwell, London
4	Rhodes, R.A.W.	Understanding Governance: policy networks, governance, reflexivity and accountability.	1997	Open University Press, Maidenhead,GB, Philadelphia
5	Jayal,N.G., Prakash, A. and Sharma, P.K.	Local Governance in India: decentralization and beyond.	2006	Oxford University Press, New Delhi
6	Baud, I.S.A. and Wit, J. de	New Forms of Urban Governance in India: shifts, models, networks and contestations	2008	Sage New Delhi.

List of Exercises / Practicals:

1	Visit to development project undertaken by Local body and submit a report.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **ADVANCED PLANNING TECHNIQUES**		
Subject Code: **MUP1-204**	Semester: **Second**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study Advanced Planning Techniques.**

Objectives:
 1. To study Surveying Techniques and GIS Mapping.
 2. To study Analytical Planning Techniques, Report Writing and Presentation.

Expected outcomes: **-**
 1: Knowing the in depth knowledge about the planning techniques and assessment methods
 2: Developing the ability to form research questions worthy of informing public policy.
 3: Generating more equitable outcomes through policies and planning interventions.
 4: Ability to conduct various investigations through the use of research techniques.

Contents		Hrs
Unit - 1	**Survey Techniques** Data Base for Physical surveys (including land use / building use / density / building age, etc.) and Socio-economic surveys; Questionnaire formulation, Sampling and survey techniques, etc. Land use classification / coding.	9
Unit - 2	**Introduction to Research** Definition and needs of Research, Scientific research and methods, System approach of research, Levels of research: micro and macro; Major steps in the conduct scientific research, induction, deduction and verification; Selection and formulation of research problems, reviewing of literature, Designing a research, Pre-test and pilot study.	9
Unit - 3	**Research Design and implementation** Approaches in research, developing a method for research; Questionnaire Design, Types of data, sampling methods; developing aims, objectives, scope, limitations; and literature research – using library, accessing the Internet, Hypothesis; meaning, importance and different concept, formulation and testing of hypothesis, Correlation and Regression Analysis - meaning, types, importance.	15
Unit - 4	**Analytical Techniques, Presentation and Report Writing** Data tabulation; Interpretation of information; Graphical presentation of data; Spatial representation of data; Types of reports with specific focus on technical report writing; Organizing the report, structure chapter organization, Writing the report (analytical findings); Referencing in text, use of software in referencing	15

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Groves R.M. Fowler F.J., Couper M.P., Lepkowski J.M., Singer E., Tourangeau R.,	Survey Methodology	2009	John Wiley and Sons
2.	Easa S., Chan Y., (ed)	Urban Planning GIS	2000	American Society of Civil Engineers,

3.	John W. Creswel	Research Design	2003	Sage Publication, California
4.	Glatthorn A. A, and Joyner R. L.	Writing the winning thesis	2005	Corwin Press, California

List of Exercises / Practicals:

1.	Visit to a Division / Department of Local Bodies / Development Authority dealing with Surveying Techniques and submit report.

List of Assignments/Tests:

1.	Test on Unit 1 or Unit 2.
2.	Assignment on Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit

Name of the Subject: **PLANNING STUDIO - II**		
Subject Code: **MUP1-205**	Semester: **Second**	
Duration: **96 Hours**	Maximum Marks: **400**	Credits (2+4) = **6**
Teaching Scheme	**Examination Scheme**	
Lecture : **2 hrs / week**	End Semester Exam: **Marks 150**	
Studio : **4 hrs / week**	Internal Assessment: **Marks 250**	

Aim: **To carry out City Based Study focusing Planning and Design.**

Objectives:
1. **To Assess, Collect and Analyze the Information Requirements for the Study.**
2. **To understand the Characteristics of the City for Preparation of Sustainable Development Plan.**

Expected outcomes: -

1: Analyzing components such as physical characteristics, natural resources, demographic characteristics, economic base, employment, shelter, transportation, social and infrastructure facilities, finance, institutional set-up, regional interdependencies etc

2: Carrying out surveys and frame proposals

3: Understanding local problems through planning surveys

4: Understanding of spatial and non-spatial data collection, presentation and interpretation in context for physical planning.

Contents	Hrs
First Assignment (Minor Problem) Study of an existing Town for its Urban Development and Planning. The proposal may include (I) An existing land uses map indicating all its subcategories and extent and nature of use/ activity. (II) A map showing the future proposal as given in the development plan along with all facts and figures. (III) Analysis of standards adopted in the Development Plan regarding the various land uses, with suggestion of improvements and various techniques etc. (IV) A comprehensive report containing introduction, reasons for selection of the Town and the planning alternatives with analysis, calculations, observations and recommendation etc.	36
Second Assignment (Major Problem) The students are required to prepare a plan on the basis of identification of problems, potentials of the town studied under first assignment of Study of Town". The scope of Comprehensive Development plan preparation will include working out the detailed requirements; formulation goals, objectives and policies; planning considerations; conceptual framework; planning proposals including zoning and phasing; and implementation strategy covering organizational and financial aspects. The Master plan shall be submitted in form of a detailed report illustrated with necessary maps, charts, drawngs, sketches.	60

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Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Dellinger, A.	Validity and the Review of Literature, Review in the Schools	2005	
2.	Hart, C.	Doing a Literature Review, Releasing the Social Science Research Imagination	198	London: Sage and Open University
3.	Taylor, G.	A Student's Writing Guide: How to Plan and Write Successful Essays	2009	Cambridge University Press
4.	Neville, C.	The Complete Guide to Referencing and Avoiding Plagiarism	2007	McGraw-Hill International
5.	Punch, Keith	An Introduction to Social Research: Quantitative and Qualitative Approaches	2005	Sage
6.	Neuman, William	Basics of Social Research: Qualitative and Quantitative Approaches	2007	Pearson, Allen and Bacon
7.	Bryman, Alan	Social Research Methods	2008	Oxford University Press
8.	Finlay, B.	Statistical Methods for the Social Sciences	2009	Pearson Publisher University of Florida, US

List of Exercises / Practicals:

1	Visit to the case study town and submit report.

List of Assignments/Tests:

1	Marked Reviews of Unit 1
2	Internal and External Jury.

Name of the Subject: **URBAN HERITAGE CONSERVATION (ELECTIVE)**		
Subject Code: **MUP1-206**	Semester: **Second**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To develop Understanding with relevance to Sustainable Urban Heritage Conservation.**
Objectives: 1. **To study Natural and Cultural Heritage Conservation.** 2. **To study Policies, Programs and Legislation for Heritage Conservation.**
Expected outcomes: - **1: Students will be able to develop a understanding of mapping and recording of physical and social layering in the city.** **2: Student will gain an insight into theoretical concepts of cultural variation and diversity in urban context** **3: Students will be able to develop the understanding to identify the key attributes of cultural significance in the built environment.** **4: Student will come up with the knowledge of the past history of a city and will learn the importance of the heritage and will try out the methods for conservation.**

Contents		Hrs
Unit - 1	**Introduction to Urban Heritage** Typology / classification, inventories, mapping; Human habitation in historical context; Heritage as a motivating force in sustainable urban conservation and development,	9
Unit - 2	**Heritage Conservation** Natural heritage conservation - typologies, policies for conservation, regulatory measures, community participation; Concept of Historic Urban Landscapes; Built heritage conservation - determinants of built form on heritage; Historic urban infrastructure and traditional water harvesting systems. Integration of historic monuments / areas / cores / urban systems in the developmental process and land use, regulatory measures and community involvement; Basic concepts of redevelopment & renewal. Intangible cultural heritage and development: issues, conservation strategies. Preparation of conservation and heritage management plans.	15
Unit - 3	**Heritage and Tourism, Policies and Programmes, Legislation** Cultural and heritage based tourism - nature, potential and prospects, marketing aspects; Acts and laws recognizing conservation / regeneration; Heritage toolkit; Implications of 74th Constitution Amendment Act. National Organizations their role & functions Archeological Survey of India, IHCN, Indian National Trust for Art and Cultural Heritage (INTACH).	9
Unit - 4	**Design in Human Habitation** Social / cultural / ecological / energy determinants of design; Imagibility of the city; Structure of urban spaces – location criteria of activities and urban uses; Urban Regeneration, renewal, rehabilitation, revitalization, reconstruction and redevelopment - concepts, interventions, processes, approaches and methods, tools.	15

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Luigi Fusco Girard and Peter Nijkamp (editors)	Cultural Tourism and Sustainable Local Development	2009	Ashgate, Burlington
2.	Nirmala Rao Khadpekar	Urban revitalization : perspectives and initiatives /	2008	ICFAI University Press
3.	Richard Longstreth (editor)	Cultural Landscapes: Balancing Nature and Heritage in Preservation Practice	2008	University of Minnesot a Press
4.	Cohen, Naoum	Urban Planning Conservation and Preservation	2001	McGraw-Hill
5.	Ismailb Serageldin, Ephim Shluger, Joan Martin-Brown (editors)	**Historic Cities and Sacred Sites:** Cultural Roots for Urban Futures	2001	The World Bank
List of Exercises / Practicals:				
1	Visit to a Heritage Conservation Site and submit report.			
List of Assignments/Tests:				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 4.			

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (at least one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit)

Name of the Subject: **PLANNING FOR TOURISM (ELECTIVE)**		
Subject Code: **MUP1-207**	Semester: **Second**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study the Role of Tourism in Urban and Regional Planning.**

Objectives:
1. **To study Tourism and its Relevance in Urban Development**
2. **To study Policies and Programmes of Tourism so as to ascertain parameters for Planning for Tourism Sector.**

Expected outcomes:-
 1. Students will be able to understand the strategies to develop an infrastructure development plan for tourist.
 2. Students will be able to mark the tourist spots which are less identified and can increase the flow tourist flow
 3. Students will be able to develop more tourist infrastructure related strategies.
 4. Students will identify the abundant heritage sites and will revive the site and will always try to develop the tourist inflow over the site.

Contents		Hrs
Unit - 1	**Introduction to Tourism** Definitions, scope, nature, classification and dimension, tourism as an industry, tourism in developed and developing world.	9
Unit - 2	**Tourism Sector – impacts** Relationship between Tourism and Urban Development, Tourism multiplier and forecasting methods: capacity building and carrying capacity planning for tourism projects, tourism and cultural and social change: Socio-cultural problems, environmental degradation.	15
Unit - 3	**Planning for Tourism** Nature and scope of a tourism plan- key issues and stages, data requirements, surveys, role of key players / stake holders in tourism policy and planning, sustainable tourism development planning; community planning and tourism; implementation and management, role of travel and tourism promoting agencies, monitoring the tourism development; Tourism marketing - concept, techniques and strategies.	15
Unit - 4	**Policies and Programmes** Tourism policies at various levels.	9

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Charles R. Goeldner , J.R. Brent Ritchie	Tourism: Principles, Practices, Philosophies	2009	John Wiley & Sons
2.	A.Satish Babu	Tourism Development in India	2008	APH Publishing Corporation , New Delhi

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3.	Christopher M Law	Urban Tourism: The Visitor Economy and the Growth of Large Cities	2009	Continuum
4.	K.K. Sharma	Planning for Tourism	2003	Sarup & Sons, New Delhi
5.	Planning Commission	Working Group Report on Tourism (2012-2017)	2012	Planning Commission, GoI
6.	Ministry of Tourism	Strategic Action Plan for Tourism in India	2011	Ministry of Tourism, Government of India

List of Exercises / Practicals:			
1	Visit to Ministry / Department of Tourism /ITDC/ State Tourism Development Corporation /Tourism based City and Submit Report.		

List of Assignments/Tests:	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (at least one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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3rd SEMESTER

Name of the Subject: **PROJECT PLANNING AND MANAGEMENT**		
Subject Code: **MUP1-301**	Semester: **Third**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	
Aim: **To study Project Planning, Management and Implementation Techniques.**		
Objectives: 1. **To study relationship between Projects and Planning at various Levels.** 2. **To study Management, Implementation and Evaluation of Projects.**		
Expected outcomes: **-** **1: Understanding the working involved in formulating, appraising and managing the planning project.** **2: Ability to understand the process of evaluating the project, checking its feasibility in context of all inputs used.** **3: Developing the capability of grasping of the main issues arising in the planning process and creative strategies for implementation.** **4: Understanding the relationship between Projects and governing fiscal planning at various Levels.**		

Contents		Hrs
Unit - 1	**Project planning** Introduction to Projects; Nature of planning projects; Project Life Cycle; Identification of projects	9
Unit - 2	**Project Formulation and Appraisal** Relationship between projects and planning issues including sectoral policy at: Local, State and National levels Project appraisal: Market analysis – Macro environment survey, survey methods, market characterization, demand forecasting; Technical Analysis – Magnitude, processes, materials, equipment, factors of production availability, implementation schedule; suitability of the plans, layout and design, location of the project; location analysis; supporting infrastructure requirements-	15
Unit - 3	**Project Management and Implementation, and Project Evaluation and Monitoring** Project characteristics - pitfalls in management of a project; Techniques of management; Planning milestones - responsibility charts and principle responsibility, principles of activity planning; Project Implementation– methods, hurdles, facilitative factors; Project culture: line management, steering committee, role of project manager; Project Control: cost and time, quality - ISI standards and its application to Indian context; Introduction to Project Management Software (Ms Projects) and its usage. Types of evaluation - concurrent, ex-ante and ex-post. Methods of evaluation, techniques of evaluation, end results, Presentation of evaluation findings, Techniques of Monitoring of Development Works.	12
Unit - 4	**Regulatory Frameworks Governing Projects** National Rehabilitation and Resettlement Policy (2007) - Social Impact mitigation; National Environmental Policy (2006) – Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP)	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Prasanna Chandra	Projects	2009	McGraw Hill, New Delhi.
2.	Barker,Stephen and Cole, Rob.	Brilliant Project Management	2007	Pearson Education Limited, UK

List of Exercises / Practicals:

1	Visit to a Local Body / Development Authority and submit report on the large scale project being undertaken by them.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit

Name of the Subject: **POLITICS AND PLANNING**		
Subject Code: **MUP1-302**	Semester: **Third**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To understand the Two Way Relationship Between Politics and Planning.**

Objectives:
1. **To develop a Comprehension of the Interplay of Politics in the Planning Process.**
2. **To understand the Social, Economic and Cultural Contexts of Politics and Planning and how it influence Development / Provision / Financial / Management of Resources and other Basic Infrastructure.**

Expected outcomes: **-**
 1: Understanding the relation between politics and planning
 2: Developing the capacity for resource optimization
 3: Developing a comprehension of the interplay of politics in the planning process
 4: Understanding the social, economic, and cultural contexts of Politics and Planning and its influence on development/ provision/ financial/ management of resources and other basic infrastructure

Contents		Hrs
Unit - 1	**Interface between Politics and Planning** Social and economic context; State in India – political culture of the Indian State – Centre – State – Local political economy: 74th Constitution Amendment Act, State Finance Commissions; Emergence of the State in the federal set up.	12
Unit - 2	**City and the State** State as a manager of resources – property rights, norms and standards – Government market and market by Government – Regulatory State, Reforming State, and Rent Seeking State – their spatial implications; Development planning and the Indian state – Centralization, powerlessness and decentralization; spatial politics and competition; Politics of the State and bureaucracy; New State spaces, invited and contested spaces – changing role of the state.	12
Unit - 3	**Politics related to Planning and Development** Politics related to land, shelter, urban infrastructure, resources; Regeneration and redevelopment politics; politics of provision, financing and pricing; decision-making and decision taking.	12
Unit - 4	**Politics and Civil Society** Politics and emergence of civil society – NGO, CBO and their role in planning, development and management, collective bargaining and collective action.	12

Text / Reference Books:				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Sarma, KSRN	Financing Urban Development in India	1979	IIPA, New Delhi
2.	Maarten, A.H.	City Politics	1989	Aldershot, Avebury
3.	Sharan, P.	Government and Politics of India	1984	New Delhi, Metropolitan Book
4.	Vettivel, Surendra, K.	Participation of Sustainable Development:Theory and Practice in Government and NGOs	1993	New Delhi, Vetri Publishers
List of Exercises / Practicals:				
1	Visit to a NGO or CBO and submit report on their Role in Planning and Development.			
List of Assignments/Tests:				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 4.			

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit)

Name of the Subject: **PLANNING STUDIO - III**		
Subject Code: **MUP1-303**	Semester: **Third**	
Duration: **144 Hours**	Maximum Marks: **400**	Credits: (3 + 6) = **9**
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 150**	
Studio : **6 hrs / week**	Internal Assessment: **Marks 250**	
Aim: **To undertake City based study focusing on Management and Governance.**		

Objectives:

1. **To assess the status of the Case Study City, to prepare Management Plans, to identify and formulate Projects,**
2. **To prepare DPR covering Physical, Environmental aspects, sequence of tasks, Cost Estimates, Project Benefits, and Institutional Framework for Project Implementation.**

Expected outcomes: -

1: **Understanding the phasing, funding and implementation mechanism.**
2: **Preparing DPR covering Physical, Environmental aspects, sequence of tasks, Cost Estimates, Project Benefits etc.**
3: **Developing capacity to analyze issues and evolve solutions at urban level**
4: **Understanding the implication of law relating to planning and land development and local government, with an emphasis on statutory authority, finance, and land use control.**

Contents		Hrs
Unit 1	**First Assignment - Re-planning of an area** Our cities and parts thereof require re-planning in the light of changing requirements of their residents. These changes can be of varying nature such as re-densification, change of land use, significant alteration in development controls, provision of parking, or other requirements as desired by the inhabitant of the area. This requires to consider such changes keeping in view the problems, constraints and potentials of such pockets and impact of such alterations on the surroundings of these pockets. The students, individually or in groups, shall be required to meet the desired outcome with essential required alterations without changing the basic character of the area as per the changed scenario. The students can take a proposed project or identify an area and its potential and replan the site. The final submission shall be in the form of various layouts and report.	54

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Unit 2	**Second Assignment - Detail Project Report of Urban Project** The focus of the studio is on management and governance aspects (in line with the other core and elective courses offered in the semester). The exercise pertains to metropolitan cities and mega cities and ranges from preparing management plans and projects related to various sectors pertaining to infrastructure, disaster risk, riverfront development etc. Students are also required to identify and formulate projects, work out the appraisals and do the feasibility, viability and implementation mechanisms of the projects. Students work on a case study town/city and have to visit the field for collection of data and interaction with city officials and stakeholders. Although planning continues to be an important aspect of the exercise, students are also exposed to project identification, formulation, and appraisal, financing mechanisms and institutional framework. Students draw from the theoretical knowledge provided in the core and elective subjects related to management, finance and governance offered in the semester and translate them in their studio exercise. The culmination of the exercise is in the form of group presentations and studio report.	90

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Goodman,L.T.; Love; Ralph N.	Project Planning and Management: an Integrated Approach	1980	Pergamon Press, NY
2.	Little, IMD, Mirrlees, J.A.	Project Appraisal and Planning for Development Countries	1974	London, Heinemann Educational Books
3.	Rougvie, Alexander	Project Evaluation and Development	1987	London, Mitchell Publishing
4.	Choudhury, S.	Project Management	1988	New Delhi, Tata McGraw- Hill

List of Exercises / Practicals:

1	Visit to a Municipal Corporation and submit report on their approach for preparing of DPR.

List of Assignments/Tests:

1	Marked Reviews of Unit 1.
2	External and Internal Jury.

Name of the Subject: **ENVIRONMENT, DEVELOPMENT AND DISASTER MANAGEMENT (ELECTIVE)**		
Subject Code: **MUP1-304**	Semester: **Third**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio: **--**	Internal Assessment: **Marks 50**	

Aim: To study Disaster Management Practices and Mitigation Measures and their Impact on Environment and Development

Objectives:

1. To understand the Interface between Environment and Development with a focus on Disaster Management.
2. To study the Disaster Mitigation Measures and Related Legislation of Environment and Disaster Management / Mitigation.

Expected outcomes –

1: Understanding the various factors of development and its effect on the environment

2: Understanding the different facets of environmental planning, development control, impact assessment methods, eco cities development, environmental improvement etc

3: Developing the capacity to understand the environmental consideration in spatial planning backed by theoretical understanding

4: Identifying the inter-linkages between environmental management and disaster management

Contents		Hrs
Unit - 1	**Environment, Development and Disaster Management – Interface** Resource use, exploitation and conservation; Impact of human activities on environment; Environment and economy interaction, introduction to environmental accounting. Types of Environment: Natural, Built and Social, Concept of Resources, Types of Resources Economic, Natural, Potential vs. Actual, Non-renewable, Renewable and Perpetual Resources, Sustainable use of resources, Resources needed for a Settlement, Environmental issues in Settlements, Environmental Considerations in Urban Planning,	12
Unit - 2	**Environmental Management** Environmental Impact Assessment, thresholds, indicators, audits, environmental certification, lifecycle analysis, environment and poverty links, environmental policy, Acts and regulations; Environmental education, participatory approaches, emerging concepts. Disaster classification, concepts, hazards, vulnerability, risks, human response to disaster, impacts	12
Unit - 3	**Disaster Mitigation and Management** Relevance of disaster management in development and environment, disaster preparedness, prevention, displacement and development, Role and responsibilities of government and non–government organizations, Disaster Education – awareness of individuals, communities and participation at various levels; Integrating disaster mitigation in the spatial planning process, provision of infrastructure for disaster mitigation.	15
Unit - 4	**Policies and Legislation Pertaining to Environment and Disaster Management** Policies and Legislation at various levels. Environment Protection Act 1986. Environment and sanitation issues during disasters, Stakeholders coordination in disaster response, roles and responsibilities of international organizations, disaster management legislation and policy framework (United Nation International Strategy for Disaster Risk Reduction (UNISDR), International Search and Rescue Advisory Group, (INSARAG), Global Facility for Disaster Risk Reduction (GFDRR), Asean Region Forum (ARF), Asian Disaster	9

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Reduction Centre (ADRC), SAARC Disasters Management Centre (SDMC), others. Hygo Framework of Action, Best practices/case studies in natural and manmade disaster management.

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Rajib Shaw	Community, Environment and Disaster Risk Management	2010	Emerald Group Publishing Limited
2.	Rajib Shaw Hari Srinivas, Anshu Sharma	Urban Risk Reduction An Asian Perspective	2009	Emerald Group Publishing Limited
3.	P C Sinha	Introduction to Disaster Management	2007	Anmol Publications, New Delhi
4.	Pardeep Sahni, Alka Dhameja, Uma Medury	Disaster Mitigation: Experiences and Reflections	2008	PHI Learning Pvt. Limited, New Delhi
5.	Jegadish Gandhi P	Disaster Mitigation & Management Post Tsunami Perspectives	2007	Deep & Deep Publications Pvt Ltd, New Delhi
6.	NDMA	Disaster Management Guidelines	2007-11	NDMA
7.	Ministry of Home Affairs	Model Amendment in Town and Country Planning Legislations, Regulation for Land Use Zoning and Building Byelaws for Structural Safety	2004	MHA
8.	Ministry of Home Affairs	National Policy on Disaster Management(NPDM)	2006	MHA

List of Exercises / Practicals:

1	Visit NDMA / NIDM and submit the report.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.

2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit

Name of the Subject: **ENERGY, CLIMATE CHANGE AND URBAN DEVELOPMENT (ELECTIVE)**			
Subject Code: **MUP1-305**	Semester: **Third**		
Duration: **48 Hours**	Maximum Marks: **100**		Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**		
Lecture : 3 hrs/week	End Semester Exam: **Marks 50**		
Studio: **--**	Internal Assessment: **Marks 50**		

Aim: **To study Interface between Energy, Climate Change and Urban Development.**

Objectives:
1. **To study the Determinants of Energy Supply and Demand.**
2. **To study relationship of Plans, Policies and Strategies with reference to Energy Planning.**

Expected outcomes: -
1. **Implementing sustainability in planning process at different spatial scales**
2. **Familiarizing students with basic concept of economics of energy, environment and their interaction with reference to climate change.**
3. **Understanding the impact and adaptation of climate change.**
4. **Understanding mitigation strategy of climate change.**

Contents		Hrs
Unit - 1	**Introduction** Energy, Climate change and Urban Development – Interface.	9
Unit - 2	**Energy Generation and Consumption** Energy Supply and Demand, Energy Consumption in cities, determinants of energy demand, phenomenon of climate change, factors influencing climate change, impacts of climate change	12
Unit - 3	**Energy Planning and Management, and Mitigation and Adaptation to Climate Change** Energy efficient development, Compact city form, Transit oriented development. Mechanisms and measures for mitigating and adapting to climate change at various levels	15
Unit - 4	**Plans, Policies and Strategies** Related to energy planning, conservation, climate change mitigation and adaptation.	12

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	S.K Dash	Climate change: an Indian perspective, New Delhi	2007	Cambridge University Press
2.	Jenks, Mike; Burgess, Rod	Compact cities: Sustainable urban forms for developing countries	2000	Spon Press, London
3.	Bicknell, Jane	Adapting cities to climate change: understanding and addressing the development Change	2009	Earthscan, London
4.	Andres Duany, Jeff Speck and Mike Lydon	The Smart Growth Manual	2009	McGraw-Hill
5.	David Owen	Green Metropolis: Why Living Smaller, Living Closer, and Driving Less are the Keys to Sustainability	2009	

List of Exercises / Practicals:	
1	Visit to a Development Authority and submit report, with focus on energy planning.
List of Assignments/Tests:	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

4th SEMESTER

Name of the Subject: **DEVELOPMENT FINANCE**		
Subject Code: **MUP1-401**	Semester: **Fourth**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture **: 3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To provide an Overview of Development Finance.**

Objectives:
1. **To study Development Finance covering State Finance and Municipal Finance.**
2. **To analyze Municipal Finance and Investment Planning in relation to Development Activities.**

Expected outcomes: **-**
 1: Gaining ability to explore efforts to regulate the finances involved in delivery of services in planned units
 2: Understanding the governance structure and financial background of the various planning bodies and tools to strengthen them.
 3: Gaining understanding of Municipal Finances and Investment Planning.
 4: Knowledge to understand the flow of finances from Central to State Governments for any planning project.

Contents		Hrs
Unit - 1	**Overview of Development Finance** Approaches, concepts, components, process, credit rating.	9
Unit - 2	**State Finance** Inter-governmental fiscal relationship between Central, State and Urban Local Government.	9
Unit – 3	**Municipal Finance** Urban fiscal reforms, municipal finance and urban inclusion, Sources of revenues and application of money; Equities; Loans; Debt financing; Municipal Bonds, land and non-land based sources; Structure of finances, fiscal problems and issues of financial management, implications of 74th Constitution Amendment Act for municipal finance, expenditure pattern, Bilateral and multi lateral lending institutions mobilizing resources for a project - financial resources, land resources, project resources, and other resources.	15
Unit – 4	**Investment Planning and Financing Mechanism** Link with spatial plans, process, components, investment needs and budgeting for infrastructure and services. Financing of urban development, infrastructure and services – mechanisms and instruments, subsidy reduction, cost recovery, public private partnerships; Financial appraisal, investment appraisal; Financial Risk – Sources, Measures and perspectives on risk, Sensitivity analysis and pricing and cost recovery mechanism.	15

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Mathur, O.P. and Peterson, George	State Finance Commissions and Urban Fiscal Decentralization in India	2006	NIPFP
2.	Ministry of Finance	Report of 13th Finance Commission	2011	Government of India, New Delhi

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3.	Government of India	73rd and 74th Constitution Amendment, Acts	1992	Government of India, New Delhi
4.	Pandey, K.K.	Stimulating Revenue Base of ULBs in India	2010	IIPA

List of Exercises / Practicals:	
1	Visit to Finance / Budget Section of Local Bodies and submit report.

List of Assignments/Tests:	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: **LEGAL ISSUES AND PROFESSIONAL PRACTICE**		
Subject Code: **MUP1-402**	Semester: **Fourth**	
Duration: **48 Hours**	Maximum Marks: **100**	Credits: (3 + 0) = 3
Teaching Scheme	**Examination Scheme**	
Lecture : **3 hrs/week**	End Semester Exam: **Marks 50**	
Studio : **--**	Internal Assessment: **Marks 50**	

Aim: **To study Legislations related to Urban Planning and Development and to make students understand their role and responsibilities as professional planner, and equip them with the knowledge, procedures, and legal tools required for Professional Practice in Urban Planning.**

Objectives:
1. **To understand the Interface between Legislation and Urban Planning and to study Basic Concept of Law and Indian Constitution and the requirement of various Acts, Laws, Rules and Regulations related to Urban Planning.**
2. **To understand the Scope, Nature and Procedure of Professional Practice; prepare consultancy Proposals and Quote Fees and Charges for Professional Work.**

Expected outcomes: **-**
 1: **Developing ability to demonstrate knowledge of how planning intentions are implemented through policies, instruments and controls.**
 2: **Applying awareness of the importance of evidence and argument in preparing planning proposals for sustainable development.**
 3: **Ability to propose planning solutions within the domain of various acts controls and legislations.**
 4: **Capability to work for development addressing fulfillment of needs of all, improving the quality of life of residents.**

Contents		Hrs
Unit - 1	**Introduction** Iintroduction and importance of professional practice in Planning , Interface between policy and legislation pertaining to urban development.	9
Unit - 2	**Understanding of Law** Concepts, sources, terminologies, significance of law and its relationship to Urban Planning benefits of statutory backing for schemes - eminent domain and police powers; Indian Constitution: concept and contents; provision regarding property rights.	9
Unit - 3	**Planning Legislation and Policy Formulation and Appraisal** Evolution; An over view of legal tools connected with Urban Planning and Development, Town and Country Planning Act, Improvement Trust Act, Urban Planning and Development Authorities Act – objectives, contents, procedures for preparation and implementation of Regional Plans, Master Plans and Town Planning Schemes. Various Acts related to urban governance, planning and development organizations, land resources, environment protection, and public participation in statutory planning process; Approaches of formulation of policies, appraisal of policies.	15
Unit - 4	**Professional Practice** Aims and objectives of professional Institutes, sister bodies, professional role and responsibility of planning consultants, professional ethics, code of conduct and scale of professional charges; Formulation of project proposal and outlines, consultancy agreements and contracts, managerial aspects; Role in inter disciplinary groups: Appreciation of the decision-making processes and the process in relation to varied consultancy assignments of planning.	15

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	ITPI	Planning Legislation and professional Practice		ITPI, New Delhi
2.	Bijlani, H.U. & Balachandran	Law and Urban Land	1978	IIPA, New Delhi
3.	GoI	UDPFI Guidelines Vol. 2A	1996	ITPI, New Delhi
4.	GoI	Indian Contract Act 1872; Indian Contract Act 1872; The Arbitration and Conciliation Act 1996. Constitution of India; Constitution (73rd & 74th Amendment) Acts 1992; Model Rent control Legislation; Slum (Improvement and Clearance) Act 1956; Land Acquisition Act 1894 and amendments thereof; NCR Planning Board Act, Environment (Protection) Act 1986;Model Town Planning and Regional Planning Development Law; and other acts		
5.	Government of Maharashtra	Maharashtra Regional and Town Planning Act 1966		
6.	Government of various States	State Acts related town planning, Slum clearance, municipalities, development authorities, etc.		
7.	Kulshrestha, S. K.	Urban and Regional Planning in India: Handbook for Professional Practice	2012	Sage Publications, New Delhi
8.	ITPI	Conditions of Engagement of Professional Services and Scale of Professional Fee and Charges	2011	ITPI, New Delhi
9.	CPWD	CPWD Manual 2012	2012	CPWD, New Delhi

List of Exercises / Practicals:

1	Visit to the office of a Senior Planning Professional and submit report, on professional practice.

List of Assignments/Tests:

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (at least one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit)

Name of the Subject: **THESIS**			
Subject Code: **MUP1-403**	Semester: **Fourth**		
Duration: **216 Hours**	Maximum Marks: **800**		Credits: (0 + 12) = **12**
Teaching Scheme	**Examination Scheme**		
Lecture : **-- hrs/week**	End Semester Exam: **Marks 300**		
Studio : **12 hrs / week**	Internal Assessment: **Marks 500**		

Aim: **To undertake independent study in the field of Urban Planning.**

Objectives:

1. To develop a basic understanding of the area chosen for study (by carrying out a detailed literature review).
2. To undertake detailed exploration of the topic (by way of surveys and studies).
3. To identify issues and concerns those emerge out of the study and suggest recommendations.

Expected outcomes: **-**

 1: Conceptualizing problems from complex, real-world situations so the problems are meaningful to the intended audience and research-worthy
 2: Identifying and summarize appropriate peer-reviewed literature relevant to a proposed area of research
 3: Preparing constructive, tactful feedback to help colleagues improve their writing
 4: Using various techniques for effective data identification and collection through current practices.

Contents	Hrs
The students are required to carry out independent research and prepare a thesis on a topic on urban planning selected by them and approved the faculty under the supervision of a research guide allocated by the department.	216

Text / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Brubaker, D.L. and Thomas, R.M.	Thesis and Dissertations: A Guide to Planning, Research and Writing.	-	-
2.	Rowena Murray	How to Write a Thesis (3rd Edition)	-	Open University Press
3.	F. Abdul Rahim	Thesis Writing	2005	New Age International (P) Limited Publishers, N.D
4.	Kastens, K.Pfirman, S., Stute, M., Abbott,D. and Scholz, C.	How to Write Your Thesis	-	Colombian University
S5.	Bracken, I.	Urban Planning Methods, Research and Policy Analysis	2008	Routldge
6.	Wang, X., Von Hofpe, R.	Research Methods in Urban and Regional Planning	2007	Springer

List of Exercises / Practicals:

1	Field visit to Collect Data on selected Topic of Research.

List of Assignments/Tests:

1	Marked Reviews at different Stages of completion of Research work.
2	Internal and External Jury.

*One research paper is to be written on the Thesis work carried out and presented to his/her supervisor and the Department Research Committee (DRC). The paper, if approved, shall be communicated for publication in the journal recommended by DRC

SEMESTER 1st		Contact Hrs.			Marks			
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	Credits
GPBHS1-101	Element of Public Health	3	1	0	40	60	100	4
GPBHS1-102	Basic Anaesthesia Technology	3	1	0	40	60	100	4
GPBHS1-103	Research Methodology for Public Health	3	1	0	40	60	100	4
GPBHS1-104	Epidemiology	3	1	0	40	60	100	4
GPBHS1-105	Public Health Internship	0	0	6	100	00	100	3
GPBHS1-106	Project/Field work	0	0	6	40	60	100	3
	Total	**12**	**4**	**12**	**300**	**300**	**600**	**22**

SEMESTER 2nd		Contact Hrs.			Marks			
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	Credits
GPBHS1-201	Social Work, Behavioural Sciences and Mental Health	3	1	0	40	60	100	4
GPBHS1-202	Environmental and Occupational Health	3	1	0	40	60	100	4
GPBHS1-203	Health System Management	3	1	0	40	60	100	4
GPBHS1-204	Indigenous Medicine and Health Communication	3	1	0	40	60	100	4
GPBHS1-205	Public Health Internship	0	0	6	100	00	100	3
GPBHS1-206	Project/Field work	0	0	6	40	60	100	3
	Total	**12**	**04**	**12**	**300**	**300**	**600**	**22**

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Overall Marks / Credits

Semester	Marks	Credits
1st	600	22
2nd	600	22
Total	1200	44

<div style="background-color:orange; text-align:center;">**ELEMENT OF PUBLIC HEALTH**</div>

Subject Code: **GPBHS1-101**   **L T P C**   **60 Hours**
                                          3 1 0 4

COURSE OBJECTIVES:
1. Concepts of public health, and community health.
2. Theoretical foundations of helping profession of public health.
3. To develop constructive understanding of various determinants of health and development in emerging economies.
4. To learn the historical development of public health practice.

COURSE OUTCOME:
1. Knowledge about public health, and community health.
2. To learn the theoretical foundations of helping profession of public health.
3. To develop constructive understanding of various determinants of health and development in emerging economies.
4. Knowledge about the historical development of public health practice.

COURSE SYLLABUS
<div style="text-align:center;">**Unit-I**   **15 Hours**</div>

Introduction to Public Health and Health Policy
1. Public and Community health: Concept, definition and history.
2. Theoretical foundations and approaches of public health.
3. Understanding of the concepts of health, illness wellbeing, healthcare and Medical Care.
4. Components of Public Health
<div style="text-align:center;">**Unit-II**   **15 Hours**</div>

Essentials and Determinants of Public Health
1. Determinants of health– Biological, Behavioural, Socio-economic, Cultural, Environmental, Geographical etc.
2. Essentials of public health services and public Health delivery system in India (including Govt, NGO and PPP).
3. Community Diagnosis, Needs Assessment and Community based healthcare system
<div style="text-align:center;">**Unit-III**   **15 Hours**</div>

Public Health Policies and Ethics
1. Health policy: concept, process, stakeholders and their role in health policy formulation and implementation.
2. Right to health and National Health Policy: 1983 & 2002,2015(Draft), National Population Policy – 2005

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3. National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM)

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Unit-IV   **15 Hours**

</div>

 National Public Health Programs in India for: TB, Malaria, HIV/AIDS Cardio Vascular Diseases, Diabetes, Cancer

Public health: surveillance, Challenges, preparedness and impact assessment

References:

1. Wilkinson, Richard G., and Michael Gideon Marmot, eds. *Social determinants of health: the solid facts*. World Health Organization, 2003.

2. Park,K.(2015) Preventive and Social Medicine. Bhanot: New Delhi.

3. Website of Ministry of Health and Family Welfare. https://mohfw.gov.in

4. Jeffery, Roger. *The politics of health in India*. University of California Press, 1988.

5. Smith, Elizabeth, Ruairi Brugha, and Anthony Zwi. *Working with private sector providers for better health care: an introductory guide*. London School of Tropical Medicine, 2001

Additional Readings

6. Solar, Orielle, and Alec Irwin. "A conceptual framework for action on the social determinants of health." (2007).

7. Turnock, Bernard. *Public health*. Jones & Bartlett Publishers, 2011.

8. Tulchinsky, Theodore H., and Elena A. Varavikova. *The new public health: an introduction for the 21st century*. Academic Press, 2008.

9. Antosia, Robert E. "Public Health Preparedness." In *Handbook of Bioterrorism and Disaster Medicine*, pp. 23-24. Springer US, 2006.

10. Noji, Eric K., ed. *The public health consequences of disasters*. Oxford University Press, 1996.

11. Detels, Roger, Robert Beaglehole, Mary Ann Lansang, and Martin Gulliford.*Oxford textbook of public health*. Oxford University Press, 2011.

12. Frenk, Julio. "Health Professionals for a New Century." *Transforming Education to* (2011).

13. Rosen, George. *A history of public health*. JHU Press, 1993.

BASIC ANAESTHESIA TECHNOLOGY

Subject Code:GPBHS1-102   **L T P C**   **60 Hours**
                              3 1 0 4

COURSE OBJECTIVES:
   1. To focus on issues in nutrition and public health.
   2. Nutritional Status of Individual and Community.

COURSE OUTCOME:
   1. To understand about issues in nutrition and public health.
   2. Knowledge about the Nutritional Status of Individual and Community.

COURSE SYLLABUS:

	Unit-I	**15 Hours**

Public Health Nutrition

1. Foundations of public health nutrition: aim, scope and content.

2. Principles of human nutrition – relationship between nutrition, health & disease

3. Principles of human nutrition-food hygiene, nutritive values and Balanced Diet.

4. Role of Public Health Nutritionist in National development

	Unit II:	**15 Hours**

Assessment of Nutritional Status of Individual and Community

1. Recommended dietary allowances

2. Assessment of Nutritional Status: Direct methods and indirect methods

3. Nutritional surveillance & growth monitoring

	Unit-III	**15 Hours**

Public Health Aspects of Under nutrition

1. Aetiology, public health implications, preventive strategies for:

PEM/CED, Vitamin A deficiency, Nutritional Anaemia, Iodine Deficiency

Disorders, Vitamin D deficiency and Osteoporosis, Zinc deficiency

2. Public health implications and preventive strategies for: Obesity, Hypertension,

Coronary heart disease, Diabetes, Cancer, Dental Caries

	Unit-IV	**15 Hours**

1. Public health aspects of H.I.V/ AIDS

2. Food toxicants, food addition, food fortification, food adulteration

3. National Nutrition Policy & Programmes

Recommended books:

1. Swaminathan (1995): "Food & Nutrition", The Bangalore Printing & publishing co

ltd., Vol I, Second Edition, Bangalore.

2. Srilakshmi (1997): "Food Science", New Age International (P) Ltd, Publishers,

Pune.

3. Gopalan,C., Ramashatry, B.V., Subramanium,S.C. and Swaminathan,M.C(2011)
Nutritive value of India, National Institute of Nutrition: Hyderabad

4. http://www.icmr.nic.in/pricepubl/content/1.htmPark and Park

5. Das,S (2015)Textbook of Community Nutrition. Academic Publisher

6. Park.K. (2009) Park's Textbook of Preventive and Social Medicine, 20th ed. M/s
Banarsida Bhanot, Jabalpur

Additional Readings

1. Gibney M.J., Margetts, B.M., Kearney, J.M. Arab, I. eds (2004) Public Health
Nutrition, NS Blackwell Publishing. .

2. Jelliffe, D. B and Jelliffe, E.F.P. (1989) Community Nutritional Assessment,
Oxford University Press.

3. Owen, A.Y. and Frankle, R.T. (1986) Nutrition in the Community. The Art
ofDelivering Services, 2nd ed. Times Mirror/Mosby.

4. Wadhwa, A. and Sharma, S. (2003) Nutrition in the Community. A text book.
SCN News, UN ACC/SCN Subcommittee on Nutrition

5. Whitney, Eleanor, and Sharon Rady Rolfes. *Understanding nutrition*. Cengage
Learning, 2007.

6. Obert, Jessie Craig. *Community nutrition*. John Wiley & Sons, Inc., 1978.

7. King, Felicity Savage, and Ann Burgess. *Nutrition for developing countries*. New
York: Oxford University Press, 1993.

8. World Health Organization, and UNICEF. *Global strategy for infant and young
child feeding*. World Health Organization, 2003.

RESEARCH METHODOLOGY TECHNOLOGY FOR PUBLIC HEALTH

Subject Code:GPBHS1-103   **L T P C**   **60 Hours**
                                     3 1 0 4

COURSE OBJECTIVES:
1. To learn the relevance of interdisciplinary perspectives in public health research.
2. To learn the relevant advanced cross-cutting research approaches essential for public health practice.
3. To learn the fundamentals of mixed methods of research and how they may be used.
4. To learn how to frame research problem (formulation or conceptualization of research problems), design.
5. To understand about essential skills in research- home visits, interviews, data collection, observations,
use of documents etc.
6. Learn to develop project specific objectives and assessment of community health needs.

COURSE OUTCOME:
1. To gain a knowledge about the relevance of interdisciplinary perspectives in public health research.
2. To gain a knowledge about relevant advanced cross-cutting research approaches essential for public health practice.
3. To gain a knowledge about the fundamentals of mixed methods of research and how they may be used.
4. To know how to frame research problem (formulation or conceptualization of research problems), design.
5. To learn essential skills in research- home visits, interviews, data collection, observations, use of documents etc.
6. Understand about project specific objectives and assessment of community health needs.

COURSE SYLLABUS:

<center>Unit-I   15 Hours</center>

Introduction to Public Health Research
1. Research in Public Health - concept, definition, and importance.
2. Types of Research and Research designs.
3. Steps in Research and writing a research proposal.
4. Ethics in Public Health research.

<center>Unit-II   15 Hours</center>

Research Process and Quantitative analysis
1. Sampling: Qualitative and Quantitative
2. Tools and techniques of data collection: Qualitative and Quantitative.

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3. Data Management: collation, editing, analysis, meta analysis and data interpretation.

4. Report writing: concept, process, dos and don'ts

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Unit-III   **15 Hours**

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Computer application in Public Health Research

1. Use of Excel in data management

2. SPSS: Creating and saving a data file, Assigning names and values to variables, Creating syntax file for execution and running and obtaining simple analysis.

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Unit-IV.   **15 Hours**

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1. Interpreting Quantitative data and Use of Computers in Qualitative data

2. Creating Charts from Frequencies and Statistical Applications

References:

1. Minkler, Meredith, and Nina Wallerstein, eds. *Community-based participatory research for health: From process to outcomes*. John Wiley & Sons, 2010.

2. Brandeau, Margaret L., François Sainfort, and William P. Pierskalla, eds.*Operations research and health care: a handbook of methods and applications*. Vol. 70. Springer, 2004.

3. Creswell, John W., and Vicki L. Plano Clark. *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage publications, 2007.

4. Pope, Catherine, and Nicholas Mays, eds. *Qualitative research in health care*. John Wiley & Sons, 2008.

5. Fixsen, Dean L., Sandra F. Naoom, Karen A. Blase, and Robert M. Friedman. "Implementation research: A synthesis of the literature." (2005).

6. De Vos, Anna Susanna, C. S. L. Delport, Christa B. Fouché, and H. Strydom.*Research at grass roots: A primer for the social science and human professions*. Van Schaik Publishers, 2011.

7. Whyte, William Foote Ed. *Participatory action research*. Sage Publications, Inc, 1991.

8. Kumar, Sameer, and Promma Phrommathed. *Research methodology*. Springer US, 2005.

9. Bowling, Ann. *Research methods in health*. Maidenhead: Open University Press, 2009.

10. Day, Robert, and Barbara Gastel. *How to write and publish a scientific paper*. Cambridge University Press, 2012.

11. Berg, Bruce Lawrence, and Howard Lune. *Qualitative research methods for the social sciences*. Vol. 5. Boston: Pearson, 2004.

12. Creswell, John W., and Vicki L. Plano Clark. *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage publications, 2007.

13. Moser, Claus Adolf, and Graham Kalton. "Survey methods in social investigation." *Survey methods in social investigation.* 2nd Edition (1971).

14. Cooper, Harris, Larry V. Hedges, and Jeffrey C. Valentine, eds. *The handbook of research synthesis and meta-analysis*. Russell Sage Foundation, 2009.

15. Daniel, Wayne W. "Biostatistics: a foundation for analysis in the health sciences." *New York, USA* (1995).

<div style="background-color:orange; text-align:center">**EPIDEMIOLOGY**</div>

Subject Code:GPBHS1-104   **L T P C**   **60 Hours**
                                                          3 1 0 4

COURSE OBJECTIVES:
1. Health problems including their causes, methods and strategies for prevention.
2. Significance of interdisciplinary and systems approach to public health.
3. Concepts and practice of alternative medical care service delivery system.
4. Role of media in healthcare and components of health communication.

COURSE OUTCOME:
1. To understand about the health related problems including their causes, methods and strategies for prevention.
2. To learn the significance of interdisciplinary and systems approach to public health.
3. To learn the concepts and practice of alternative medical care service delivery system.
4. To understand the role of media in healthcare and components of health communication.

COURSE SYLLABUS:

<div style="text-align:center">**Unit-I**   **15 Hours**</div>

Introduction to Epidemiology
1. Epidemiology: concept, definition, components.
2. Measures of casual associations, disease frequency.
3. Epidemiological study designs-ecological, cross sectional, case control, cohort and clinical trials.
4. Uses of Epidemiology

<div style="text-align:center">**Unit- II**   **15 Hours**</div>

Epidemiology of communicable and Vector Borne diseases
1. Epidemiology & control of communicable diseases: Focusing on patterns of transmissions, risk factors, preventions and control of HIV /AIDS, STD, Leprosy
2. Epidemiology and control of Vector borne diseases: Malaria, Filarial, Plague, Yellow fever, Chikungunya, Japanese Encephalitis

<div style="text-align:center">**Unit -III**   **15 Hours**</div>

Epidemiology & control of Non Communicable Diseases:
1. Epidemiology, Prevention and Control of -Asthma , Cancer
2. Epidemiology, Prevention and Control of Cardiovascular diseases, rheumatic diseases, Diabetes , Hypertension
3. Substance Abuse

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Unit-IV   **15 Hours**

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1. Epidemiology and control of vaccine preventable diseases I: Diphtheria, Whooping cough, Tetanus, Poliomyelitis Worm Infestation ,cholera and typhoid.
2. Epidemiology and control of Common Infections: Tuberculosis, leprosy, pneumonia, measles, mumps , rubella
3. Health aspects of Disaster management-Definition, types and management

References

1. Park,K.(2017) Park's Textbook of Preventive and Social Medicine. Bhanot Publishers: Bhopal
2. Wallace,R.B, et al (1998) Maxcy-Rosenau-Last Public Health and Preventive Medicine. McGraw Hill: Michigan
3. Bonita, R., Beaglehole, R. & Kjellstrom,T. (2007). Basic epidemiology (2nd ed.). Geneva: World Health Organization.
4. Friis,R.S. and Sellers,T.A.(2014) Epidimiology for Public Health Practice. Jones and Barlett Publishers: Burlington
https://books.google.co.in/books?id=CaFhNI7CcbUC&printsec=frontcover&dq=4.%
09+Epidemiology+by+Leon+Gordis&hl=en&sa=X&ved=0ahUKEwjPofXk4oPYAh
VKRiYKHbUPADgQ6AEIQzAF#v=onepage&q&f=false
5. Practical Epidemiology by D.J.P Barker e book
https://books.google.co.in/books?id=ugVMAQAAIAAJ
6. MacMahon, B., and Trichopoulos, D. (1996) Epidemiology: principles and methods. Boston, MA: Little, Brown and Company.
7. PV Sathe and AP Sathe(1991) Epidemilogy and management for health-care for all., Popular: Bombay
8. Clark DW, MacMahon B (eds).(2012) Preventive and Community Medicine, 2nd edit. Little Brown, Boston

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PUBLIC HEALTH INTERNSHIP

Subject Code:GPBHS1-105   L T P C   90 Hours
                                     0 0 6 3

COURSE OBJECTIVES:

Field work outline:

Placement: Field work placement in healthcare setting of public/private/non-governmental organisations.

Fieldwork days:

Concurrent Field Work in a block of one month in Agency of placement. Observe full agency timings and Holidays.

Individual conferences with the faculty supervisor:

Once in a week (minimum)

COURSE OUTECOME

Learning objectives and tasks:

1. Familiarization with the organization, its structure, management dimensions.
2. Establishing rapport with personnel.
3. Familiarization with overall functioning of health service delivery systems.
4. Understanding of health policies and programmes relating to the relevant field area.
5. To learn various determinants of health.
6. To understand essential components of community health services.
7. Active participation in organisational activities to learn public health practice skills.
8. To learn to work as part of an interdisciplinary team and
9. To develop analytical skill in report writing.

Field work report content:

The weekly report must include- a brief description of activities planned, activities carried out, observations, self-learning and future.

PROJECT / FIELD WORK

Subject Code:GPBHS1-106   **90 Hours**
                                     L T   P C
                                     0 0   6 3

Course Objectives/Outcome: This subject will lead to practical understanding of the procedures. Project report making lead to a introduction on research investigations.

Course details:

Students have to carry out a research project under the supervision of a faculty/hospital administration. The project report has to be prepared on the basis of the research work carried out. The assessment is done on the basis of the work done and the presentation and viva.

2nd

Semester

SOCIAL WORK, BEHAVIOURAL SCIENCES AND MENTAL HEALTH

Subject Code:GPBHS1-201	L	T	P	C	60 Hours
	3	1	0	4	

COURSE OBJECTIVES:
1. Relevance of Social Work interventions and behavioural sciences approaches to public health.
2. To identify the causes and nature of key social and behavioural factors that affect health of individuals and the community.
3. To learn social and behavioural dimensions of health and various and relevant Social Work interventions including the therapeutic measures.
4. To learn the relevance of helping profession in the mental health setting.

COURSE OUTCOME:
1. To gain the knowledge about the relevance of Social Work interventions and behavioural sciences approaches to public health.
2. To understand about the causes and nature of key social and behavioural factors that affect health of individuals and the community.
3. To understand about social and behavioural dimensions of health and various and relevant Social Work interventions including the therapeutic measures.
4. To understand the relevance of helping profession in the mental health setting.

COURSE SYLLABUS:

	Unit-I	**15 Hours**

Behavioural Sciences and Public Health
1. Behavioural sciences in public health: concepts, purpose and approaches.
2. Health Psychology- Concepts, Understanding & health seeking behaviours
3. Health services for special groups-I children, adolescents and elderly.
4. Health services for special groups- II HIV AIDS afflicted, Migratory populations and Sexual Minorities.

	Unit-II	**15 Hours**

Social Work and Public Health Practice
1. Social Work: concept, definition, process, methods, principles, and ethics.
2. Working with individuals-concepts, process, principles, components, skills required.
3. Working with Groups-concepts, process, principles, components, skills required.
4. Working with Communities-concepts, process, principles, components, skills required.

	Unit-III	**15 Hours**

Mental Health
1. Mental Health: Classification, diagnosis, intervention and support services
2. Core competencies of public health professionals in the field of mental health.

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<div align="center">**Unit-IV**   **15 Hours**</div>

1. Concept of Mental Health Burden of Mental Diseases: Depression, Schizophrenia, Alzheimer's, Parkinson's, Senile dementia, Suicides and Substance Abuse
2. National Mental Health Programme and Role of Voluntary organizations and self-help groups

References:

1. APA Ed. (2013) Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Published by American Psychiatric Association Publishing
2. Golightley,M(2004) Social Work and Mental Health (Transforming Social Work Practice Series) . Sage:London
3. Herrman, Helen, Shekhar Saxena, and Rob Moodie. *Promoting mental health: concepts, emerging evidence, practice: a report of the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation and the University of Melbourne*. World Health Organization, 2005.
4. Cohen, Mikal R., Marianne D. Farkas, and Cheryl Gagne. *Psychiatric rehabilitation*. Boston, MA: Center for Psychiatric Rehabilitation, Sargent College of Health and Rehabilitation Sciences, Boston University, 2002.
5. Bloom, Bernard L. *Community mental health: A general introduction*. Brooks/Cole, 1977.
6. Goldberg, David P., and Peter Huxley. *Common mental disorders: A bio-social model*. Tavistock/Routledge, 1992.
7. World Health Organization. Dept. of Mental Health, and Substance Abuse.*Mental health atlas 2005*. World Health Organization, 2005.
8. Warr, Peter. *Work, unemployment, and mental health*. Oxford University Press, 1987.
9. Desjarlais, Robert, Leon Eisenberg, Byron Good, and Arthur Kleinman. *World mental health: Problems and priorities in low-income countries*. Oxford University Press, 1995.
10. Caplan, Gerald. *Support systems and community mental health: Lectures on concept development*. Behavioral Publications, 1974.
11. Üstün, T. Bedirhan, and Norman Sartorius, eds. *Mental illness in general health care: an international study*. John Wiley & Sons, 1995.
12. Trevithick, Pamela. *Social work skills: A practice handbook*. McGraw-Hill International, 2005.
13. Rooney, Ronald H., and Glenda Dewberry Rooney. *Direct Social Work Practice: Theory and Skills: Theory and Skills*. Cengage Learning, 2010.
14. Adams, Robert. *Empowerment, participation and social work*. Basingstoke: Palgrave Macmillan, 2008.

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ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Subject Code:GPBHS1-202   **L   T   P   C**   **60 Hours**
                                             3   1   0   4

COURSE OBJECTIVES:
1. Significance of political economy of health.
2. Role of environmental health system.

COURSE OUTCOME:
1. To understand the significance of political economy of health.
2. To learn the role of environmental health system.

COURSE SYLLABUS:

| **Unit-I**   **15 Hours** |

Occupational Health
1. Occupational Health : Concept, Principles, relevance and legal aspects
2. Occupational health: disorders and diseases
3. Occupational Safety and Health: Chemical and physical exposures, control of occupational exposures, injury control
4. Occupational health of working population of organized and unorganized sectors- Farmers, Industrial Workers, health workers, CSW, etc

| **Unit-II**   **15 Hours** |

Environmental Health
1. Environment: concept, types, components and Environmental Pollution- Sources, Impacts and treatments of Air (Indoor/Outdoor), Water, Soil, Nuclear, Solid waste, Biomedical waste, e- waste etc.
2. Environment & Health Impact Assessment-Concept, Steps and application

| **Unit-III**   **15 Hours** |

Healthcare Legislation
1. Public health, relevant laws, need and scope.
2. Important health Acts in India-I: Drug, birth and death, Factories Act 1948, prevention of adulteration Act, ESI, Consumer protection Act.
3. Important health Acts in India-II: Medical termination of pregnancy Act, the pre-natal diagnostic techniques Act, Bio-medical waste rules, the transplantation of human organs Act.
4. The role of Community participation in effective enforcement of these laws

| **Unit-IV**   **15 Hours** |

1. Environmental Ethics, Global Warming, Climate Change, Ozone Depletion, Acid Rain etc. And Eco-friendly environmental practices-Waste management, Energy practices, Agriculture Practices
2. Environmental Disaster- Definition, types and management.

418

References:

1. Occupational Health: Management and Practice for Health Practitioners By S. P. Hattingh, 3rd edition.

2. Urban Health: Global Perspectives edited by David Vlahov, Jo Ivey Boufford, Clarence E. Pearson, Laurie Norris, published by Jossey bass

3. Industrial HealthJack E. Peterson American Conference of Governmental Industrial Hygienists, 1991

4. Frumkin, Howard, ed. *Environmental health: from global to local*. Vol. 11. John Wiley & Sons, 2005.

5. Pozgar, George. *Legal aspects of health care administration*. Jones & Bartlett Publishers, 2011.

6. Rom, William N., and Steven B. Markowitz, eds. *Environmental and occupational medicine*. Lippincott Williams & Wilkins, 2007.

7. Costanza, Robert, Bryan G. Norton, and Benjamin D. Haskell, eds. *Ecosystem health: new goals for environmental management*. Island Press, 1992.

8. Nieuwenhuijsen, Mark J. *Exposure assessment in occupational & environmental epidemiology*. Oxford University Press, 2003.

9. Warr, Peter. *Work, unemployment, and mental health*. Oxford University Press, 1987.

10. Robson, Mark G., and William A. Toscano, eds. *Risk assessment for environmental health*. Vol. 2. John Wiley & Sons, 2007.

11.Noji, Eric K., ed. *The public health consequences of disasters*. Oxford University Press, 1996.

419

HEALTH SYSTEM MANAGEMENT

Subject Code:GPBHS1-203   **L T P C**   **60 Hours**
                                     3 1 0 4

COURSE OBJECTIVES:

1. To learn relevant management skills used in public health practice.

2. Management practice areas in healthcare.

3. To learn analytical, communicative, policy development, programme management skills used in health system management.

COURSE OUTCOME:

1. To learn relevant management skills used in public health practice.

2. To understand the relevance of management practice areas in healthcare.

3. To gain the knowledge about analytical, communicative, policy development, programme management skills used in health system management

COURSE SYLLABUS:

                                     Unit-I   **15 Hours**

Relevance of Management in Healthcare

1. Management: concept, definitions, principles, functions.

2. Management theories: classical, behavioural, human relations, systems and contingency.

3. Functional areas of management-human resource, organisational behaviour, social marketing and finance.

4. Quality management, standardisation, regulation and quality control.

                                     Unit-II   **15 Hours**

Healthcare Management

1. Health services organisations-types and relevance.

2. Health services : Models, definitions, types and components.

3. Health Information Management Systems.

                                     Unit-III   **15 Hours**

Core Management Skills for Public Health Practitioners

1. Leadership skills in public health, concept, theories, relevance.

2. Motivation and interpersonal skills in public health, theories, relevance.

3. Programme management skills, networking and advocacy skills.

                                     Unit-IV   **15 Hours**

1. Healthcare service delivery organisations at different levels (Primary, Secondary & Tertiary Health care providers including (Government, Private, Voluntary/NGO)

2. Integrated health care delivery-Preventive, promotive, curative & rehabilitative

420

References:

1.Pearce, II, et al, (1989), Management, McGraw-Hill Book Company, London

2.Armstrong, Michael, (2003), A Handbook of Human Resource Management Practice, Kogan Page, London.

3.Decenzo, David A., P. Stephen Robbins, (2005), Fundamentals of Human Resource Management, John Wiley & Sons, USA.

3.Health Care Administration: Planning, Implementing, and Managing Organized Delivery Systems, Third Edition, by Lawrence Wolper, Jones and Bartlet Publishers International, UK.

4.Essentials of Public Health Management by L. Fleming Fallon Jr., Eric Zgodzinski, Jones & Bartlett Publishers,2011

5.Health Management by Preeti Oberoi, Sarup & Sons publication

6.Kongstvedt, Peter Reid. *Essentials of managed health care*. Jones & Bartlett Publishers, 2012.

7.Novick, Lloyd F., and Glen P. Mays, eds. *Public health administration: principles for population-based management*. Jones & Bartlett Learning, 2005.

8.Rowitz, Louis. *Public health leadership*. Jones & Bartlett Publishers, 2012.

9.Hughes, Richard L., Robert C. Ginnett, and Gordon J. Curphy. *Leadership*. Irwin, 1996.

10.Swayne, Linda E., W. Jack Duncan, and Peter M. Ginter. *Strategic management of health care organizations*. John Wiley & Sons, 2012.

11.Al-Assaf, A. F., and June Schmele, eds. *The textbook of total quality in healthcare*. CRC Press, 1993.

12.Grostick, Sara, Mary Alice Hanken, and E. Jacobs. *Health information*. Edited by Mervat Abdelhak. Saunders, 2001.

13Rowitz, Louis. *Public health leadership*. Jones & Bartlett Publishers, 2012.

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INDIGENOUS MEDICINE AND HEALTH COMMUNICATION

Subject Code:GPBHS1-204 **L T P C** **60 Hours**
3 1 0 4

COURSE OBJECTIVES:
1. Significance of interdisciplinary and systems approach to public health.
2. Concepts and practice of alternative medical care service delivery system.
3. Components of health communication and role of media in healthcare.

COURSE OUTCOME:
1. To learn the significance of interdisciplinary and systems approach to public health.
2. To learn the concepts and practice of alternative medical care service delivery system.
3. To learn components of health communication and role of media in healthcare.

COURSE SYLLABUS:

Unit-I   15 Hours

Indigenous Medicine and Public Health
1. Indigenous medicine: concept, importance.
2. Typology of indigenous systems of medicine.
3. Evidence based indigenous medicine.
4. Contemporary and emerging issues in practice of alternative medicine.

Unit-II   15 Hours

Health Communication and Media
1. Communication – Concept, Process, Types and Models
2. Communication: Principles, Barriers and Gateways
3. Theories of interpersonal communication (Johari Window, Transactional Analysis, etc).

Unit-III   15 Hours

Health Communication and Media
1. Health education/communication- Principles & Practice and Approaches.
2. Health education/communication :Models and Content.
3. Health Communication-concept, types, need and significance.

Unit-IV   15 Hours

1. Mass media: definition, types, functions and significance to public health practice.
2. Relevance of Information, Education and Communication (IEC) in public health

References:
1. Arnold, David. *Science, technology and medicine in colonial India*. Vol. 3.
Cambridge University Press, 2000.
2. Thompson, Teresa L., Alicia Dorsey, Roxanne Parrott, and Katherine Miller,
eds. *Handbook of health communication*. Routledge, 2003
3. Backer, Thomas E., Everett M. Rogers, and Pradeep Sopory. *Designing health*

communication campaigns: What works?. Sage Publications, Inc, 1992.

4. Bala, Poonam. *Imperialism and medicine in Bengal continued*. Sage Publications, 1991.

5. Bhatia, Jagdish C., Dharam Vir, A. Timmappaya, and C. S. Chuttani. "Traditional healers and modern medicine." *Social Science & Medicine (1967)* 9, no. 1 (1975): 15-21.

6. Dubey, N. K., Rajesh Kumar, and Pramila Tripathi. "Global promotion of herbal medicine: India's opportunity." *CURRENT SCIENCE-BANGALORE-* 86, no. 1 (2004): 37-41.

7. Glanz, Karen, Barbara K. Rimer, and Kasisomayajula Viswanath, eds. *Health behavior and health education: theory, research, and practice*. John Wiley & Sons, 2008.

8. Gracey, Michael, and Malcolm King. "Indigenous health part 1: determinants and disease patterns." *The Lancet* 374, no. 9683 (2009): 65-75.

9. Grilli, R., C. Ramsay, and S. Minozzi. "Mass media interventions: effects on health services utilisation." *Cochrane Database Syst Rev* 1, no. 1 (2002).

10. Gupta, Brahmananda. "Indigenous medicine in nineteenth and twentieth century Bengal." *Asian medical systems: A comparative study* (1976): 368-77.

11. Heeks, Richard. "Health information systems: Failure, success and improvisation." *International journal of medical informatics* 75, no. 2 (2006): 125-137.

12. Hornik, Robert, ed. *Public health communication: Evidence for behavior change*. Routledge, 2002.

13. Leslie, Charles M., and Allan Young, eds. *Paths to Asian medical knowledge*. No. 32. Univ of California Press, 1992.

14. Leslie, Charles M., ed. *Asian medical systems: A comparative study*. Vol. 3. Motilal Banarsidass Publishe, 1998.

15. Pal, Dulal Chandra, and Sudhanshu Kumar Jain. *Tribal medicine*. Naya Prokash, 1998.

16. Pieroni, Andrea, and Lisa Leimar Price. *Eating and healing: traditional food as medicine*. Food Products Press, 2006.

17. Rice, Ronald E., and Charles K. Atkin, eds. *Public communication campaigns*. Sage, 2012.

18. Wakefield, Melanie A., Barbara Loken, and Robert C. Hornik. "Use of mass media campaigns to change health behaviour." *The Lancet* 376, no. 9748 (2010): 1261-1271.

<table>
<tr><td style="background:#F5A800">**PUBLIC HEALTH INTERNSHIP**</td></tr>
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Subject Code: GPBHS1-205   **L   T   P   C**   **90 Hours**
                                             0   0   6   3

Field work outline:

Placement: Field work placement in healthcare setting of public/private/non-governmental organizations.

Fieldwork days:

Concurrent Field Work in a block of one month in Agency of placement. Observe full agency timings and Holidays.

Individual conferences with the faculty supervisor:

Once in a week (minimum)

Group conference:

The group conference which will be held in the second week of March (exact dates/months will be decided by the field work committee).

Learning objectives and tasks:

1. Familiarization with programme management skills.

2. Active participation in organisational activities to learn public health practice skills

3. To understand the significance of helping profession interventions in public health practice.

4. To learn to work as part of an interdisciplinary team.

5. To learn intersectoral health policy approach and advocacy strategies for healthcare policies and programmes.

6. To develop analytical skill in report writing.

7. To learn to use the relevance of various tools including research, documentation, advocacy, training etc.

8. To gain practical and experimental skills.

9. To attain effective communication skills (written and oral).

Field work report content:

The weekly report must include- a brief description of activities planned, activities carried out, observations, self learning and future plan.

PROJECT / FIELD WORK

Subject Code:**GPBHS1-206**   **90 Hours**

L T P C
0 0 6 3

Course Objectives/Outcome: This subject will lead to practical understanding of the procedures. Project report making lead to a introduction on research investigations.

Course details:
Students have to carry out a research project under the supervision of a faculty/hospital administration. The project report has to be prepared on the basis of the research work carried out. The assessment is done on the basis of the work done and the presentation and viva.

425

Total Credits = 25

SEMESTER 1st		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
GMRTS1-101	Healthcare Delivery System in India	3	1	0	40	60	100	4
GMRTS1-102	Health Information Management -I	3	1	0	40	60	100	4
GMRTS1-103	Human Anatomy and Physiology	3	1	0	40	60	100	4
GMRTS1-104	Medical Record Science	2	0	0	40	60	100	2
GMRTS1-105	Medical Terminology	2	0	0	40	60	100	2
GMRTS1-106	Communication Skills	2	0	0	40	60	100	2
GMRTS1-107	Health Information Management–I Laboratory	0	0	4	40	60	100	2
GMRTS1-108	Communication Skills-Laboratory	0	0	2	40	60	100	1
GMRTS1-109	Clinical/Hospital Visits	0	0	8	100	0	100	4
Total		**15**	**3**	**14**	**420**	**480**	**900**	**25**

Total Credits = 25

SEMESTER 2nd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
GMRTS1-201	Diseases and Surgical Procedures	3	1	0	40	60	100	4
GMRTS1-202	Health Information Management - II	3	1	0	40	60	100	4
GMRTS1-203	Biochemistry & Microbiology	3	1	0	40	60	100	4
GMRTS1-204	Legal Aspects of Health Care	2	0	0	40	60	100	2
GMRTS1-205	Basic Computers and Information Science	2	0	0	40	60	100	2
GMRTS1-206	Diseases and Surgical Procedures Laboratory	0	0	4	40	60	100	2
GMRTS1-207	Health Information Management – II Laboratory	0	0	4	40	60	100	2
GMRTS1-208	Basic Computers and Information Science Laboratory	0	0	2	40	60	100	1
GMRTS1-209	Project/Field work	0	0	8	40	60	100	4
Total		**13**	**3**	**18**	**360**	**540**	**900**	**25**

Overall Marks / Credits

Semester	Marks	Credits
1st	900	25
2nd	900	25
Total	1800	50

HEALTHCARE DELIVERY SYSTEM IN INDIA

Subject Code:GMRTS1-101   **L T P C**   **60 Hours**
                                           3 1 0 4

COURSE OBJECTIVES:

1. Concept and methods about the History of disease.

2. Significance about demography & Vital Statistics, Demography

3. Significance about immunizations

COURSE OUTCOME:

1. To know about the concept and methods about the History of disease.

2. To understand the significance about demography & Vital Statistics, Demography

3. Knowledge about immunizations

COURSE SYLLABUS

UNIT- I   **15 Hours**

Introduction to National Healthcare System

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Introduction to healthcare delivery system, National Health Programme.

UNIT- II   **15 Hours**

Demography & Vital Statistics, Demography – its concept , Vital events of life & its impact on demography, Significance and recording of vital statistics, Census & its impact on health policy.

UNIT- III   **15 Hours**

Epidemiology-Principles of Epidemiology, Natural History of disease, Methods of Epidemiological studies, Epidemiology of communicable & non-communicable diseases.

UNIT- IV   **15 Hours**

Immunization- Disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Reference books

1. Kelkar S. India's Private Health Care Delivery: Critique and Remedies.

2. Einstein, A., B. Podolsky, and N. Rosen, 1935, "Can quantum-mechanical description of physical reality be considered complete?", Phys. Rev. 47, 777-780.

3. Medical Records Organization and Management Paperback – 27 February 2017 by Mogli Gd (Author).

4. Essentials of health information management: Principles and Practices Book by Mary Jo Bowie and Michelle A. Green.

5. Medical Record Auditor Book by Deborah J. Girder, 2008 published.

HEALTH INFORMATION MANAGEMENT-I

Subject Code:	GMRTS1-102	**L**	**T**	**P**	**C**	**60 Hours**
		3	**1**	**0**	**4**	

COURSE OBJECTIVES:
1. Health Information Management serves the healthcare industry and the public by managing, analyzing, and utilizing the data vital for patient care and making the data accessible to healthcare providers.
2. Enhancing individual patient care through timely and relevant information is one of the primary goals for the Health Information Management Technology

COURSE OUTCOME:
1. To learn the about the Health Information Management serves in public by managing, analyzing, and utilizing the data vital for patient care and making the data accessible to healthcare providers.
2. To understand how to enhancing individual patient care through timely and relevant information is one of the primary goals for the Health Information Management Technology

COURSE SYLLABUS:

UNIT-I. 15 Hours

Characteristics of quality Health Information Management:

a. Definition, Characteristics of Medical Record

b. Values of Medical Record to various users

c. Required Characteristics of entries in medical Records

d. Source-oriented, Problem-oriented, and Integrated medical records

e. Medical Record Forms and their Content

f. Standard Order of Arrangement of Medical Record forms

g. Analysis of Medical Record-Quantitative & Qualitative

h. Incomplete Record Control

UNIT-II 15 Hours

Organizational Aspects of the Centralized Admitting Services

a. Principles of Identification of a Patient

b. Methods of Collection of Identification Data

c. Types of Central Admitting Services

d. Admitting Policies

e. Procedure Outlines for Admissions

f. Flow of Records following Admissions

g. Advantages of good Admitting Policies and Procedures

UNIT-II I5 Hours

Medical Record Department Management

a. Planning, Organizing, Directing and Controlling

b. Personnel Management

c. Principal Responsibilities and Duties of the Medical Record Administrator

d. Tools of Management in the Hands of the Medical Record Administrator

VI. Intradepartmental and Interdepartmental Relationships

a. Developing Intradepartmental Relationship

b. Developing Interdepartmental Relationships with various Departments of the Hospital

UNIT-IV   15 Hours

Medico-Legal Aspects of Health Information Management

a. Medical Ethics, Hippocratic Oath, and Code of Ethics for the HIM Professionals

b. Ownership of the Medical Record

c. Privileged Communication and confidentiality of Medical Records

d. Release of Information: To the Patient, To Authorized Persons /Agencies Legal Implications of release of Information to unauthorized, Persons/Agencies.

e. Consents: Different types and their validity, invalidity blanket, and improper consents.

f. Corrections in identification data medical documentations

g. Rights and responsibilities of patients

h. Medical Record in a Court of Law

i. Legal requirements in Retention of Medical Records

Reference books

1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.

2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.

3. Introduction to Health Information Management, Text Book by Donna Olson and Sue Bierdermann

4. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis

5. Legal aspects of health information management Textbook by Dana McWay

HEALTH INFORMATION MANAGEMENT-I LABORATORY

Subject Code:GMRTS1-107   **L T P C**   **60 Hours**
                                   0 0 4 2

COURSE OBJECTIVES:
1. Verify the documentation of medical records.
2. Organizational Aspects of the Centralized Admitting Services, Personnel Management
3. Principal Responsibilities and Duties of the Medical Record Administrator

COURSE OUTCOME:
1. Knowledge about verifying the documentation of medical records.
2. To understand about the Organizational Aspects of the Centralized Admitting Services, Personnel Management
3. To understand about principal Responsibilities and Duties of the Medical Record Administrator

COURSE SYLLABUS:

Practical:

Actual handling of medical records

1. Medical Records for different patient encounters with health care facility

2. Filing Methods, Storage, and Retention

3. Organizational Aspects of the Centralized Admitting Services

a. Principles of Identification of a Patient

b. Methods of Collection of Identification Data

4. Medical Record Department Management

a. Planning, Organizing, Directing and Controlling

b. Personnel Management

c. Principal Responsibilities and Duties of the Medical Record Administrator

d. Tools of Management in the Hands of the Medical Record Administrator

Reference books
1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.
2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.
3. Introduction to Health Information Management, Text Book by Donna Olson and Sue Bierdermann
4. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis
5. Legal aspects of health information management Textbook by Dana McWay

HUMAN ANATOMY AND PHYSIOLOGY

Subject Code:GMRTS1-103   **L T P C**   **60 Hours**
                                     3   1   0   4

COURSE OBJECTIVES:

1. Describe the various homeostatic mechanisms and their imbalances.
2. Identify the various organs and system of different systems of human body.
3. Perform the various experiments related to special senses and nervous system.
4. Appreciate coordinated working pattern of different organs of each system.

COURSE OUTCOME

1. Understand the technical functions of various organs and systems of the body
2. Acquire knowledge about various body fluids, hormones and enzymes

COURSE SYLLABUS:

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UNIT-I   **15 Hours**

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Integumentary system: Structure and functions of skin

Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

<div align="center">

UNIT-II   **15 Hours**

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Skeletal system

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

Joints

Structural and functional classification, types of joints movements and its Articulation

<div align="center">

UNIT-III   **15 Hours**

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Respiratory system: Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

Cardiovascular system:

Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heartbeat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

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UNIT-IV   **15 Hours**

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Blood and lymphatic system:

Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.

Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system,

Digestive system:

Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver,

movements of GIT, digestion and absorption of nutrients and disorders of GIT.

Reference Books:

- Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson Churchill Livingstone, New York
- Text book of Medical Physiology by Arthur C, Guytonand John.E Hall. Miamisburg, OH, U.S.A
- Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam, Jaypee brother's medical publishers, New Delhi
- Principles of Anatomy and Physiology by Tortora Grabowsk, Palmetto, GA, U.S.A

MEDICAL RECORD SCIENCE				

Subject Code:GMRTS1-104	L T P C	30 Hours
	2 0 0 2	

COURSE OBJECTIVES:

1. To provide information regarding preparation and maintain medical records.
2. To learn about reviewing medical records while keeping patient privacy

COURSE OUTCOME:

1. Knowledge about the information regarding preparation and maintain medical records.
2. To understand about reviewing medical records while keeping patient privacy.

COURSE SYLLABUS:

UNIT-1.   7 Hours

History of Development of Medical Records During different periods

1. Early Ancient Times to Renaissance Period (16th &17th Centuries)
2. 18th -20th Centuries and Till Date
3. In U.S.A.
4. At International Level
5. In India

UNIT-II.   8 Hours

Characteristics of quality Medical Records:

1. Definition, Characteristics of 'Good' Medical Record
2. Values of 'Good' Medical Record to various users
3. Required Characteristics of entries in medical Records
4. Responsibility for Medical Record Quality
5. Source-oriented, Problem-oriented, and Integrated medical records
6. Medical Record Forms and their Content
7. Standard Order of Arrangement of Medical Record forms
8. Analysis of Medical Record-Quantitative & Qualitative
9. Incomplete Record Control

UNIT-III.   8 Hours

Medical Records for different patient encounters with health care facility

1. Ambulatory Care Records {Emergency & Outpatient Records]
2. Clinical Records in Long Term Care and Rehabilitation Facilities
3. Mental Health Records

Medico-Legal Aspects of the Medical Records

1. Medical Ethics , Hippocratic Oath, and Code of Ethics for the Medical Record Professionals
2. Ownership of the Medical Record Privileged Communication

UNIT- IV.   7 Hours

Medical Record Department Management

1. Planning, Organizing, Directing and Controlling
2. Personnel
3. .Principal Responsibilities and Duties of the Medical Record Administrator/ Director
4. Tools of Management in the Hands of the Medical Record Administrator/ Director

Reference books

1. Berg M, Bowker G. The multiple bodies of the medical record: Toward a sociology of an artifact. Sociological Quarterly. 1997 Jun;38(3):513-37.
2. Kohane IS. Getting the data in: three year experience with a pediatric electronic medical record system. InProceedings of the Annual Symposium on Computer Application in Medical Care 1994 (p. 457). American Medical Informatics Association.
3. Documentation for Medical Records Book by Barbara Odom-Wesley, Chris L. Meyers, and Diann Brown.
4. HCISPP Study Guide Book by Justin Rainey and Timothy Virtue.
5. Fundamentals of Medical Science for Medical Record Personnel Book by Florence C. Amato

MEDICAL TERMINOLOGY

Subject Code:GMRTS1-105   L T P C   **30 Hours**

                 2 0 0 2

COURSE OBJECTIVES:

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes.

Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.

COURSE OUTCOME:

On the completion of this course, the students will be able:

1. To know the elements of medical words.
2. To develop sense of correctness of medical terms.
3. To gain an understanding of standard medical abbreviations.
4. To understand the relationship between medical terms and their synonyms in common usage.
5. To spell correctly the medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology
6. To appreciate the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study.

COURSE SYLLABUS:

<div align="center">

UNIT-I   **8 Hours**
</div>

Introduction to Medical Terminology:
Definition and Origin of Medical Terms, Define word roots, prefixes, and suffixes, Basic medical terms, Components of Medical Terms, Prefixes
And Suffixes, Roots and Combining forms, External Anatomy and Internal Anatomy

<div align="center">

UNIT-II   **7 Hours**
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Additional Lists and their combining forms grouped as:
Verbs, Adjectives, Body Fluids, Body Substances, Chemicals, Colours and Phobias

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UNIT-III   **8 Hours**
</div>

Terms Relating to the Body as a Whole

a. Study of the Body

b. Basic Structures

c. Cells

d. Tissues

e. Organs

f. Systems

g. Directions

h. Anatomic Planes and Position

<div align="center">

UNIT- IV   **7 Hours**
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Basic medical abbreviations/symbols
Diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.

Reference Books

1. Cohen BJ, DePetris A. Medical terminology: An illustrated guide. Lippincott Williams & Wilkins; 2013 Feb 8.
2. Stanfield PS, Hui YH, Cross N. Essential Medical Terminology: Textbook and Online Course with Embedded EBook. Jones & Bartlett Publishers; 2013 Sep 16.
3. Medical Terminology Book by Davi-Ellen Chabner.
4. Medical Terminology for Health Professionals Textbook by Ann B. Ehrlich and Carol L. Schroeder.
5. Medical Terminology Systems: A Body Systems Approach Book by Barbara Gylys and Mary Ellen Wedding.

COMMUNICATION SKILLS

Subject Code:GMRTS1-106   **L T P C**   **30 Hours**

         2 0 0 2

COURSE OBJECTIVE:
1. The students will be able to appreciate communication skills.
2. The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient)

COURSE OUTCOME:
1. The students will understand appreciation of communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
2. Also learn about the topic which include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

COURSE SYLLABUS

UNIT-1   7 Hours
- Basic Language Skills: Grammar and Usage. Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

UNIT-II   7 Hours
- Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization. Basic concepts & principles of good communication

UNIT-III   8 Hours
- Special characteristics of health communication. Types & process of communication. Barriers of communication & how to overcome.

UNIT-IV   8 Hours

- Soft Skills - with important sub-elements: Communication Styles, Team work, Leadership Skills Effective & Excellent Customer Service, Decision Making & Problem Solving, Managing Time and Pressures, Self-Management & Attitude.

Recommended Text Books / Reference Books:
- Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
- Communication N Soft Skills Paperback – 2013 by Niraj Kumar, Chetan Srivastava

COMMUNICATION SKILLS LABORATORY

Subject Code: GMRTS1-108   **L   T   P   C**   **2 Hours /Week**

                       0   0   2   1

COURSE OBJECTIVE:
1. The students will be able to appreciate communication skills.
2. The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient)

COURSE OUTECOME:
1. The students will understand appreciation of communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
2. Also learn about the topic which include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

COURSE SYLLABUS:
1. Précis writing and simple passage from a prescribed text books. Atleast100 words should be chosen and few questions from the passage may be said to answer.
2. Speaking skill testing: Giving as small topic and to speak for at least two minutes on it.
3. Group discussion on profession related topics
4. To practice all forms communication i.e. drafting report, agenda notes, précis writing, E. mail drafting, circular, representations, press release, telephonic communication, practice of writing resume and Writing application of employment.
5. Organizing a mock interview.
6. Locate a specified book in the library Find out some words in the dictionary Pronunciation, stress and intonation Give abbreviations of particular words and vice-versa Give meaning of some words Spell some words Practice of handling some communication system like telephone and noting down and conveying message.

CLINICAL/ HOSPITAL VISIT

Subject Code: GMRTS1-109   **L   T   P   C**   **120 Hours**

                       0   0   8   4

- Visit will include visit to the entire chain of healthcare delivery system –sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.
- Governance at village level including interaction and group discussion with village panchayat and frontline health workers.
- Clinical visit to their respective professional department within the hospital.

2nd Semester

DISEASES AND SURGICAL PROCEDURES

Subject Code:GMRTS1-201	L	T	P	C	60 Hours
	3	1	0	4	

COURSE OBJECTIVES:
1. To know the elements of medical words.
2. To develop sense of correctness of medical terms.
3. To gain an understanding of standard medical abbreviations.
4. To understand the relationship between medical terms and their synonyms in common usage.
5. To spell correctly the medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology
6. To appreciate the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study.

COURSE OUTCOME:
1. To understand about the elements of medical words, medical abbreviations and develop the sense of correctness of medical terms.
2. To learn about the relationship between medical terms and their synonyms in common usage.
3. To understand the correctly about medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology
4. To understand the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study

COURSE SYLLABUS:

UNIT-1	15 Hours

Introduction and usage of International Classification of Disease
Coding of final diagnosis and secondary diagnosis.

UNIT-II	15 Hours

International Classification of Diseases
 Volume 1 – Tabular list
 Volume 2 – Instruction manual
 Volume 3 – Alphabetical Index
Morbidity and Mortality Reporting

UNIT- III	15 Hours

CPT – Current Procedural Terminology (Introduction)
HCPCS – Healthcare Common Procedure Coding System (Introduction)

ICD- Oncology (ICD - O)

ICP (Procedure) coding system

<div align="center">

UNIT- IV   **15 Hours**
</div>

Disease and operation nomenclatures, International Classification of Disease 10, International Classification of Disease – 9CM, indexing of patient care data.

ICD-10 CM- Alpha-numeric coding Guidelines

Reference Books

1. Sabiston DC, Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston textbook of surgery: the biological basis of modern surgical practice. Philadelphia: Wb Saunders; 2001.

2. Gershwin ME, Incaudo G, editors. Diseases of the sinuses: a comprehensive textbook of diagnosis and treatment. Springer Science & Business Media; 2012 Dec 6.

3. Textbook of Surgery, 4th Edition,Julian A. Smith (Editor), Andrew H. Kaye (Editor), Christopher Christophi (Editor), Wendy A. Brown (Editor).

4. Browse's Introduction to the Symptoms & Signs of Surgical Disease, Edited By James A. Gossage, Matthew F. Bultitude, Steven A. Corbett.

5. Surgical & Medical Procedures For Nurses & Para Medical Staff, 1st Edition By Nathan

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DISEASES AND SURGICAL PROCEDURES LABORATORY
</div>

Subject Code:GMRTS1-206	**L T P C**	**60 Hours**
	0 0 4 2	

COURSE OBJECTIVES:

1. To know the elements of medical words.
2. To develop sense of correctness of medical terms.
3. To gain an understanding of standard medical abbreviations.
4. To understand the relationship between medical terms and their synonyms in common usage.
5. To spell correctly the medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology
6. To appreciate the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study.

COURSE OUTCOME:

1. To understand about the elements of medical words, medical abbreviations and develop the sense of correctness of medical terms.
2. To learn about the relationship between medical terms and their synonyms in common usage.

3. To understand the correctly about medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology

4. To understand the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study

COURSE SYLLABUS:

ICP (Procedure) coding system - Practical

International Classification of Diseases –

Practical SNOMED-CT

Reference Books

1. Sabiston DC, Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston textbook of surgery: the biological basis of modern surgical practice. Philadelphia: Wb Saunders; 2001.

2. Gershwin ME, Incaudo G, editors. Diseases of the sinuses: a comprehensive textbook of diagnosis and treatment. Springer Science & Business Media; 2012 Dec 6.

3. Textbook of Surgery, 4th Edition,Julian A. Smith (Editor), Andrew H. Kaye (Editor), Christopher Christophi (Editor), Wendy A. Brown (Editor).

4. Browse's Introduction to the Symptoms & Signs of Surgical Disease, Edited By James A. Gossage, Matthew F. Bultitude, Steven A. Corbett.

5. Surgical & Medical Procedures For Nurses & Para Medical Staff, 1st Edition By Nathan

HEALTH INFORMATION MANAGEMENT - II

Subject Code: GMRTS1-202   **L   T   P   C**   **60 Hours**

                                       3   1   0   4

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate, Collect and maintain health record data, Apply mortality and morbidity codes as per the guidelines, Identification of the legal use of health records and relevant documents, Identification of discrepancies between documentation and disease coding.

COURSE OUTCOME:

1. Students learn to maintain the complete accurate record of health timely.
2. Knowledge about the mortality and morbidity codes as per the guidelines.
3. Knowledge about the legal use of health records and relevant documents.
4. Students learn to identify the discrepancies between documentation and disease coding

COURSE SYLLABUS:

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UNIT-I.   **16 Hours**

</div>

A. Organizational Aspects of Medical Record Department/Services

a. Policy development, Functions, Location, Space and Layout, Equipments, Forms Designing and Control.

b. Medical Records Flow and processing

B. Heath Care Statistics, Quality control of Data Collection & Presentation

a. Heath Care Statistics, Inpatient census and rates computed from it. Processing and reporting of Vital Health Statistics

d. Reporting of Notifiable Diseases to Public Health Authorities

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UNIT-II   **14 Hours**

</div>

A. Quality Management: Quality Assurance and Quality Improvement, Utilization management & Utilization review processing. Accreditation requirements, licensing regulations, and certification requirements relevant to department/organization.

b. International Standards Organization [ISO], Quality Council of India, Joint Commission International [JCI] & National Accreditation Board of Hospitals [NABH]

<div align="center">

UNIT-III   **15 Hours**

</div>

A. Fundamentals of Health Informatics

Hospital Information System (HIS) with Electronic Medical Records (EMR) or Electronic Health Information Management System, EHR – definitions – contents and examples of EHR practices. Preliminary steps in implementation of HER. Issues and challenges in implementation of HER and Planning for the introduction of HER and Factors to be considered when developing EHR & implementation plan.

B. Telemedicine:

443

Objectives of Telemedicine, Technology of Telemedicine, Rules of Telemedicine and Future Telemedicine plans

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UNIT-IV.   **15 Hours**

</div>

A. Health Insurance and Billing Design:

a. Definition and history of Health Insurance, Concepts in Health Insurance, Types of health insurance, Social health insurance, Private health insurance, Community health insurance (CHI)

b. Government-initiated health insurance schemes (GHI), Denial of claims Role of MRD in and Health Insurance and Billing

B. Medical Transcription:

a. Basics of Medical Transcription, Objectives of Medical Transcription, Rules of Medical Transcription and Advantages of Medical Transcription

Reference books

1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.

2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.

3. Introduction to Health Information Management, Text Book by Donna Olson and Sue Bierdermann

4. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis

5. Legal aspects of health information management Textbook by Dana McWay

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HEALTH INFORMATION MANAGEMENT – II LABORATORY

</div>

Subject Code: **GMRTS1-207**   **L   T   P   C**   **60 Hours**

                                           0   0   4   2

COURSE OBJECTIVES:
1. Verify the documentation in the health record of Hospital Information System
2. To know about Heath Care Statistics

COURSE OUTCOME
1. To understand about the Verification regarding the documentation in the health record of Hospital Information System
2. To understand about the Heath Care Statistics.
3. Analyse and determine the factors affecting enzyme activity.

COURSE SYLLABUS:
SOP

1. Hospital Information System (HIS) with Electronic Medical Records (EMR) or Electronic Health Information Management System
2. Heath Care Statistics, Quality control of Data Collection & Presentation
3. Heath Care Statistics, Quality control of Data Collection & Presentation

Reference books

1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.

2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.

3. Introduction to Health Information Management, Text Book by Donna Olson and Sue Bierdermann

4. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis

5. Legal aspects of health information management Textbook by Dana McWay

BIOCHEMISITY AND MICROBIOLOGY

Subject Code:GMRTS1-203	L	T	P	C	60 Hours
	3	1	0	4	

COURSE OBJECTIVES:

1. Identify normal and abnormal biochemical constituents of urine and estimate biochemical parameters in blood and urine. Collect and maintain health record data.
2. Identification tests as per Indian Pharmacopoeia, handle various instruments used in biochemical investigations
3. Analyse and report the physiological and pathological constituents of urine.
4. Analyse and determine the factors affecting enzyme activity.

COURSE OUTCOME:

1. To understand how to identify the normal and abnormal biochemical constituents of urine and estimate biochemical parameters in blood and urine. Collect and maintain health record data.
2. To perform identification tests as per Indian Pharmacopoeia. Handle various instruments used in biochemical investigations
3. To understand about analyzing and report the physiological and pathological constituents of urine and determine the factors affecting enzyme activity.

COURSE SYLLABUS:

UNIT-I:	15 Hours

Biochemistry

a) Chemistry of the human body fluids in health and diseases

b) Cerebrospinal fluid

c) Clotting mechanism of the blood,

d) Enzymes produced in the G.I.Tract,

UNIT-II	15 Hours

Biochemistry

a) Nitrogenous substances, lipids, carbohydrates,

b) Electrolytes

c) Metabolism, acid-base balance,

d) Normal values and ranges of biochemistry investigations

UNIT-III	15 Hours

Microbiology

a) Introduction to Microbiology,

b) Classification and characteristics of organisms,

c) Cultivation and identification of organisms, Viral, fungal, bacterial etc

UNIT- IV	15 Hours

Microbiology

a) Disinfection, antiseptics, sanitation,

b) Immunity,

c) Allergy

d) Pathogenic organisms, non-pathogenic organisms, virus and fungus.

Reference books

1. Kango N. Textbook of microbiology. IK International Pvt Ltd; 2010 May 13.

2. Bhatia SC. Textbook of biotechnology. Atlantic Publishers & Dist; 2005.

3. A Laboratory Text Book of Biochemistry, Molecular Biology and Microbiology
Book by Sharad Vats.

4. Basic Techniques in Biochemistry, Microbiology and Molecular biology Book by Aakanchha
Jain, Richa Jain, and Sourabh Jain.

5. Laboratory Manual of Microbiology, Biochemistry and Molecular Biology Book by Indu
Ravi, Jyoti Saxena, and Mamta Baunthiyal.

LEGAL ASPECTS OF HEALTH CARE

Subject Code:GMRTS1-204   **L T P C**   **30 Hours**
                                      2 0 0 2

COURSE OBJECTIVES:
1. Verify the documentation Legal Aspects of Health Care
2. Know about method of Medical Termination of Pregnancy Act
3. Know about The Consumer Protection

COURSE OUTCOME:
1. To understand about the Legal Aspects of Health Care
2. To understand and learn about the method of Medical Termination of Pregnancy Act
3. To understand about The Consumer Protection

COURSE SYLLABUS:

UNIT-I   10 Hours
Legal Aspects of Health Care:
Introduction To Healthcare, Hospital organization.
The Consumer Protection Act: Introduction, objectives and amendments.

UNIT-II   5 Hours
The Transplantation of Human Organs Act: Introduction, objectives and amendments.

UNIT-III   5 Hours
The Medical Termination of Pregnancy Act:
Introduction, objectives and amendments.
Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act:

UNIT-IV   10 Hours
Introduction, objectives and amendments.
The Consumer Protection Act: Introduction, objectives and amendments.
Health Insurance (Medi-Claim Policy). Bio-Medical Waste (Management and Handling) Rules.
Ethics committees for animals and humans.

Reference books
1. Hall MA, Orentlicher D, Bobinski MA, Bagley N, Cohen IG. Health care law and ethics. Wolters Kluwer; 2018 Feb 26.
2. Pozgar GD. Legal and ethical essentials of health care administration. Jones & Bartlett Learning; 2020 Mar 11.
3.Legal Aspects of Health Care Administration Hardcover – Import, 24 March 2011
by George D. Pozgar (Author)
4. Legal Aspects Of Health Care Administration Hardcover – Import, 27 March 2015
by George D. Pozgar (Author), Nina Santucci (Author)
5. Legal Aspects Of Health And Safety By Dimmond B.

BASIC COMPUTERS AND INFORMATION SCIENCE			

Subject Code:GMRTS1-205	**L T P C**	**30 Hours**
	2 0 0 2	

COURSE OBJECTIVES:

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE OUTCOME:

1. The students will be able to appreciate the role of computer technology.

2. Students should gain the knowledge about various computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE SYLLABUS:

<div align="center">

UNIT-I   **10 Hours**
</div>

- **Computer networks:**
- **Introduction**- Types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
- **Internet and its Applications**: definition, brief history, basic services (E-Mail, File Transfer
- **Protocol**, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

<div align="center">

Unit-II   **10 Hours**
</div>

- **Introduction to MS-Word:** introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
- **Introduction to Excel: I**ntroduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
- **Introduction to power-point:** introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
- **Introduction of Operating System:** Introduction, operating system concepts, types of Operating system.

<div align="center">

Unit III   **10 Hours**
</div>

- **Computers as data analysis in Preclinical development**. Chromatographic dada analysis (CDS), PRACTICAL Information management System (LIMS) and Text Information Management System(TIMS).

Reference books

1. Kango N. Textbook of microbiology. IK International Pvt Ltd; 2010 May 13.

2. Bhatia SC. Textbook of biotechnology. Atlantic Publishers & Dist; 2005.

3. Computer Science: An Overview | Twelfth Edition | By Pearson Paperback – 30 June 2017

by Glenn Brookshear (Author), Dennis Brylow (Author)

4. Fundamentals Of Computers And Information System by Niranjan Shrivastava, WILEY INDIA

Books from same Author: Niranjan Shrivastava

5. Computer Fundamentals : Concepts, Systems & Applications- 8th Edition Paperback – 30 November 2004

by Priti Sinha, Pradeep K., Sinha (Author)

BASIC COMPUTERS AND INFORMATION SCIENCE LABORATORY				
Subject Code:GMRTS1-208	**L** **T** **P** **C**			**30 Hours**
	0 **0** **2** **1**			

COURSE OBJECTIVES:
The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE OUTCOME:
1. The students will be able to appreciate the role of computer technology.

2. Students should gain the knowledge about various computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE SYLLABUS:
1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.

2. Basic Data Processing

3. Database and Spreadsheet Operations

4. Basic Computer Concepts and Applications

5. Miscellaneous: Scanning of documents (of various sizes) and in different conditions (for e.g., mutilated), file naming, saving, uploading, etc. Copying of original medical document, back up of old data/ records.

Reference books

1. Kango N. Textbook of microbiology. IK International Pvt Ltd; 2010 May 13.

2. Bhatia SC. Textbook of biotechnology. Atlantic Publishers & Dist; 2005.

3. Computer Science: An Overview | Twelfth Edition | By Pearson Paperback – 30 June 2017

by Glenn Brookshear (Author), Dennis Brylow (Author)

4. Fundamentals Of Computers And Information System by Niranjan Shrivastava, WILEY INDIA

Books from same Author: Niranjan Shrivastava

5. Computer Fundamentals : Concepts, Systems & Applications- 8th Edition Paperback – 30 November 2004

by Priti Sinha, Pradeep K., Sinha (Author)

PROJECT / FIELD WORK

Subject Code:GMRTS1-209   **120 Hours**

$$\begin{array}{cccc} \text{L} & \text{T} & \text{P} & \text{C} \\ 0 & 0 & 8 & 4 \end{array}$$

Course Objectives: This subject will lead to practical understanding of the procedures. Project report making lead to a introduction on research investigations.

Course details:
Students have to carry out a research project under the supervision of a faculty/hospital administration. The project report has to be prepared on the basis of the research work carried out. The assessment is done on the basis of the work done and the presentation and viva.

Total Credits = 24

SEMESTER 1st		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
GHPMS1-101	Hospital Planning & Administration	3	1	0	40	60	100	4
GHPMS1-102	Health care and management service	3	1	0	40	60	100	4
GHPMS1-103	Human Resource Management & Organizational Behavior	3	1	0	40	60	100	4
GHPMS1-104	Computer Fundamentals & Software Related to Hospital	3	1	0	40	60	100	4
GHPMS1-105	Hospital Planning & Administration Practical	0	0	4	40	60	100	2
GHPMS1-106	Computer Fundamentals & Software Related to Hospital Practical	0	0	4	40	60	100	2
GHPMS1-107	Clinical/Hospital Visits	0	0	8	100	0	100	4
	Total	**12**	**4**	**16**	**340**	**360**	**700**	**24**

Total Credits = 26

SEMESTER 2nd		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
GHPMS1-201	Material Management & Financial Control	3	1	0	40	60	100	4
GHPMS1-202	Health Information Management	3	1	0	40	60	100	4
GHPMS1-203	Medical Terminology and Procedures	3	1	0	40	60	100	4
GHPMS1-204	Material Management & Financial Control Practical	0	0	4	40	60	100	2
GHPMS1-205	Health Information Management Practical	0	0	4	40	60	100	2
GHPMS1-206	Medical Terminology & Procedures Practical	0	0	4	40	60	100	2
GHPMS1-207	Project/Field work	0	0	16	40	60	100	8
	Total	**9**	**3**	**28**	**280**	**420**	**700**	**26**

Overall Marks / Credits

Semester	Marks	Credits
1st	700	24
2nd	700	26
Total	**1400**	**50**

HOSPITAL PLANNING & ADMINISTRATION

Subject Code:GHPMS1-101　　　　**L　T　P　C**　　　　　　　　　**60 Hours**
　　　　　　　　　　　　　　　　3　1　0　4

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate, Collect and maintain health record data, Apply mortality and morbidity codes as per the guidelines, Identification of the legal use of health records and relevant documents, Identification of discrepancies between documentation and disease coding.

COURSE OUTCOME:

1. Students learn to maintain the complete accurate record of health timely.
2. Knowledge about the mortality and morbidity codes as per the guidelines.
3. Knowledge about the legal use of health records and relevant documents.
4. Students learn to identify the discrepancies between documentation and disease coding

COURSE SYLLABUS

Unit I (15 Hours)

Types of Hospital Organization & Statutory Requirements for Planning. Steps in Hospital Planning: Need Assessment Appointment of Planning Teams/Consultants Appointment of Architect Size of the Hospital Design of the Hospital. Selection of the Contractor Preparation of Architect's Brief. Selection of the Size, Preparation of the Master plan. Preparation of Schedule of Accommodation. Layout, Grouping, Zoning & Phasing of Activities. Circulation & Movements of Patients, Staff, Visitors.

Unit II (15 Hours)

Planning for Out Patient Department/Accident/Emergency Indoor accommodation, Ward design, Bed wise planning, special requirements of certain departments such as ICU, OT, Pediatric, Maternity ward. Planning for Water supply, Electricity, Drainage, Sewage disposal & disposal of waste. Planning for Equipments & Purchase. Planning for various categories of Staff, Administrative action For Appointment, Training. Planning of supportive services in the Hospital – food services, central sterilization deptt. Pharmacy, Environmental & linen-services. Fire Fighting. Dealing with Crisis Situation. Mob violence, Bomb threat, Terrorist strike, Mass casualties, Political agitation, Prisoners. Standard Operating Procedures (SOPs).

Unit III (15 Hours)

Routine Admission/Discharge Procedures/Discharge Summary Hospital Utilisation Statistics. Average Length of Stay (ALS) Bed Occupancy Rare Turn Over Interval. Daily Reports / Returns. Hospital Census Matron's Report , Medical Officer's Report Casualty Report, Medico-Legal Cases Report from ICU / ICCU Security Report, Maintenance Department Report OT Lis Patient's Complaints, Medical Certificates. Hospital Committees. Role, Composition, Frequency of Meetings, Minutes of the Meetings, Follow up Actions. Patient Satisfaction Survey. Interviews, Questionnaires, Observations, Group Discussions, Patient Opinion Polls, Report Writing, Duty Roster of various categories of Staff.

Unit IV (15 Hours)

Availability of Materials Critical Items, Stock Level, Procurement Methods. Administration of Patient Related Schemes. - Medical Insurance (Cashless Benefit), CGHS, ECHS, CSMA, TPA, ESI. Front Office: Duties & Responsibilities. Duties & Responsibilities of the Hospital Administrator/CEO. In Profit Making Hospitals In Non-Profit Making Hospitals Marketing of Hospital. Telephone Courtesy, Guest Lectures, Orgnaisation of Camps, Seminars, Workshops, Continuous Medical Education, Public Participation. Hospital Security. Staff, Patients, New born babies, Female staff/ Patients, Stores.

Planning of supportive services in the Hospital – food services, central sterilization deptt., Pharmacy, Environmental & linen-services. Fire Fighting. Dealing with Crisis Situation. Mob violence, Bomb threat, Terrorist strike, Mass casualties, Political agitation, Prisoners. Standard Operating Procedures (SOPs).

Reference Books:
1. Sana's Guidelines for Hospital Infection Control – By Mohd. S. Khan Jaypee Brothers, New Delhi.
2. Hospital Waste Management & it's Monitoring – By Madhuri Sharma Jaypee Brothers, New Delhi.
3. Medical Stores Management – By Shakti Gupta & Sunil Kant - JaypeeBrothers, New Delhi.
4. Principles Of Hospital Administration And Planning by Sakharkar
5. Hospital Administration Principles and Practice by DK Sharma.

HEALTH CARE AND MANAGEMENT SERVICE

Subject Code: GHPMS1-102   L   T   P   C   **60 Hours**

                                   3   1   0   4

COURSE OBJECTIVES:

Verify the documentation in the health record is timely, complete, and accurate, Collect and maintain health record data in India. Discuss and learn public health care system in India as per the guidelines, Develop, implement and manage various public health programs. Recognize the various sections of healthcare legislations in India and initiate appropriate actions in public health practice

COURSE OUTCOME:

1. Students should discuss and learn public health care system in India

2. Knowledge about developing, implementing and managing various public health programs.

3. Knowledge about rrecognizing the various sections of healthcare legislations in India and initiate appropriate actions in public health practice

COURSE SYLLABUS

Unit I (15 Hours)

Health Administration in India: Heal4th Care Delivery System. National Health Policy. National Health Programmes. Tuberculosis's control Programme, Dots Programme for control of Blindness Family welfare programme AIDS control programme, role & functions of National AIDS Control Organization (NACO).

Unit II (15 Hours)

Epidemiological Triad, Levels of Disease Prevention. Research Methodology. Radiology Services. Pathology & Clinical Laboratory.

Unit III (15 Hours)

Central Sterile Supply Department. Laundry & Linen Services. House Keeping Services. Disposal of Biomedical Waste Kitchen Canteen Services. Marketing: Billing, Claming, Insurance Companies/Employers. Public Relations

Unit IV (15 Hours)

Medical Records Department. Engineering Services. Maintenance of Building, Campus & Utilities Biomedical services Fire safety Quality Management in Health Care. Quality control ISO, ISO standards Hospital Accreditation Role of Quality Council of India (QCI) National Accreditation Board of Hospitals (NABH).

Text Books:

1. Essential of Hospital Support Services & Physical Infrastructure – By Madhuri Sharma – Jaypee Brothers, New Delhi.
2. Hospital Services Management – By S.K. Parthsarthi – K.J. Hospital, Madras.
3. Medical Records Organisation & Management – By G.P. Mogli –Jaype Brothers, New Delhi.
4. Management Information System – By Waman s. Javdekar – cGrawHill.
5. Health care management by Anam Faruqi

HUMAN RESOURCE MANAGEMENT & ORGANIZATIONAL BEHAVIOR

Subject Code: GHPMS1-103   L   T   P   C   **60 Hours**
                                      3   1   0   4

COURSE OBJECTIVES: Verify the record of Staff Relationship and Manpower Planning is timely, complete, and accurate. Apply various principles of planning and management in implementing health projects and programmers.

COURSE OUTCOME:
1. Students should understand about Staff Relationship, Manpower Planning & Development.
2. Knowledge about applying various principles of planning and management in implementing health projects and programmers.

COURSE SYLLABUS

Unit I (15 Hours)
Functions of Human Resource Management The Managerial Perspective Objectives of Personnel Department Human Resource Development (HRD). Position of the Personnel Department. Organization of the Personnel Department Line – Staff Relationship. Manpower Planning & Development. Manpower Needs. Job Analysis, Job Description & Specifications for Hospital Staff. Selection & Recruitment. Orientation. Manpower Developing & Training. Counseling

Unit II (15 Hours)
Wage Administration, Salary Administration. Employee Benefits & Social Security. Performance Appraisals: Techniques & Practices. Industrial Relations. Unions & their role Settlement of disputes Industrial Dispute Act Collective bargaining

Unit III (15 Hours)
Issues Relating to Management of Professionals, Consultants, Specialists, Medical Officers, Nursing Staff, Other Paramedical Staff. Development of staff. In service Training, on job Training, Higher Courses, Specialized Training. Discipline. Punctuality Dress code Identification Behaviors of staff Disciplinary action Law of natural justice

Unit IV (15 Hours)
Organizational Behavior Definition Importance Historical Background Fundamental Concepts of OB 21st Century Corporate Different models of OB i.e. autocratic, custodial, supportive, collegial & SOBC Personality & Attitudes Meaning of Personality Development of Personality Nature & dimensions of attitude Job Satisfaction Organizational Commitment

Suggestive Readings
Text Books:
1. Personnel Management & Industrial Relations – By Rustom S. Davar– Vikas Publishing House.
2. Human Resource Management – By Garry Dessler – Prentice Hall India.
3. Human Resource & Personnel Management – By Aswathappa – Tata McGraw Hill.
4. Human Resource Management – By Khan.
5. Management of Organisation Behaviour –By Paul Hersey &Blanchard – Prentice Hall India.

COMPUTER FUNDAMENTALS & SOFTWARE RELATED TO HOSPITAL

Subject Code: GHPMS1-104	L T P C	60 Hours
	3 1 0 4	

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate. Collect and maintain health record data, Key concepts, theories and techniques for analyzing different organizational situations. Use debit and credit accounting of health records and maintain proper balance sheet.

COURSE OUTCOME:

1. Students learn to maintain the complete accurate record of health timely.

2. Knowledge about collecting and maintaining health record data and Key concepts, theories and techniques for analyzing different organizational situations.

3. Knowledge about the Use debit and credit accounting of health records and maintain proper balance sheet.

COURSE SYLLABUS

Unit-1 (15 Hours)

Computer basics: Definition of a Computer, Block Diagram of elements of digital computer-their functions, Computer Hardware & Software, Computer generations, Types of computers, Memory, CPU, I-O devices, Secondary storages, Magnetic Tape, Disk, CD-ROM. Other recent developments-Scanners, Digitizer, Plotters, Printers, Hardware and Software. Micro, Mini, Main-frame and super computers, Discussion on recent IT trends. Representation of Data: Decinal, Binary, Octal, Hexadecimal number systems, BCD, EBCDIC, ASCII Conversions. Simple Additions, Subtractions, Multiplications, Divisions, Data and Information.

Unit-II (15 Hours)

Software Concepts: Introduction to Programming, Flowcharts and Algorithms. Types of Softwares System software's, Application software's, Firmware software's, Computer Languages like machine, Assembly, and Higher Level Languages, Stored program Concept. Operating System Introduction: Definition of an Operating System, Functions of an OS, Types of an OS, Process management-FCFS, Round Robbin, Priority based. Memory management segmentation, paging, virtual memory. I-O management-concept of I-O port. File management FAT, file handling functions. Software and hardware interrupts.

Unit-III (15 Hours)

File Management: Concept of file. File organization and accessing techniques-Indexed, Line, Rules for Naming of the files, sequential, Hashed. File handling functions, Types of computer files. Broad view of Operating Systems: Difference between two OS (Single & multi-useros) Operating system applications.

Unit-IV (15 Hours)

Introduction to Virus and Vaccines, Various types of Viruses & Vaccines and their applications, multimedia concepts and Computer applications. Basic Concept of Networking and Data

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Communications: Introduction to Networking & types of Networking. Basic communication concepts. Topologies, Protocols, Ethernet, TCP/IP etc.

Recommended Text Books / Reference Books:
1. Computers Today: by Sanders.
2. Computers: by Trainor & Krasnewich (McGraw Hill).
3. Fundamentals of Computing: by Tuck er, Cupper,
4. Operating System Concept: by Peterson Biberachaty.
5. Operating System: by Millan Milenkoric.
6. Fundamentals of Computers: by Rajaraman.
7. Know your PC: by Peter Norton.
8. Computer Networks: by Andrew S. Tenenbaum.
9. Computer Network and Distributed Processing: by James martin.

HOSPITAL PLANNING & ADMINISTRATION PRACTICAL

Subject Code:GHPMS1-105   **L T P C**   **60 hours**
                              0 0 4 2

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate, Collect and maintain health record data, Apply mortality and morbidity codes as per the guidelines, Identification of the legal use of health records and relevant documents, Identification of discrepancies between documentation and disease coding.

COURSE OUTCOME:

1. Knowledge about practically maintaining the complete accurate record of health timely.

2. Knowledge about the legal use of health records and relevant documents.

3. Knowledge about preparing hospital layout.

COURSE SYLLABUS

Standard Operating Procedures (SOPs)
1. Duties & Responsibilities of the Hospital Administrator/CEO
2. Marketing of Hospital, Telephone Courtesy, Guest Lectures, Orgnaisation of Camps, Seminars, Workshops, Continuous Medical Education
3. Hospital Design of the Hospital.
4. Selection of the Contractor Preparation of Architect's Brief.
5. Selection of the Size
6. Preparation of the Master plan.
7. Preparation of Schedule of Accommodation. Layout, Grouping, Zoning & Phasing of Activities.

Reference Books:
1. Sana's Guidelines for Hospital Infection Control – By Mohd. S. Khan Jaypee Brothers, New Delhi.
2. Hospital Waste Management & it's Monitoring – By Madhuri Sharma Jaypee Brothers, New Delhi.
3. Medical Stores Management – By Shakti Gupta & Sunil Kant - JaypeeBrothers, New Delhi.
4. Principles Of Hospital Administration And Planning by Sakharkar
5. Hospital Administration Principles and Practice by DK Sharma

COMPUTER FUNDAMENTALS & SOFTWARE RELATED TO HOSPITALS PRACTICAL

Subject Code: **GHPMS1-106** **L T P C** **60 Hours**
                                    0   0   4   2

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate. Collect and maintain health record data, Key concepts, theories and techniques for analyzing different organizational situations. Use debit and credit accounting of health records and maintain proper balance sheet.

COURSE OUTCOME:

1. Knowledge about using the different software to mating the hospital data according

2. Knowledge about the Use debit and credit accounting of health records and maintain proper balance sheet.

COURSE SYLLABUS

1. Demonstration of Microsoft word
2. Demonstration of Microsoft Excel
3. Software demonstration
4. File organization and accessing techniques

Recommended Text Books / Reference Books:

1. Computers Today: by Sanders.
2. Computers: by Trainor & Krasnewich (McGraw Hill).
3. Fundamentals of Computing: by Tuck er, Cupper,
4. Operating System Concept: by Peterson Biberachaty.
5. Operating System: by Millan Milenkoric.
6. Fundamentals of Computers: by Rajaraman.
7. Know your PC: by Peter Norton.
8. Computer Networks: by Andrew S. Tenenbaum.
9. Computer Network and Distributed Processing: by James martin.

CLINICAL/HOSPITAL VISIT

Subject Code: **GHPMS1-107** **L T P C** **60 Hours**
                                    0   0   8   4

1. Visit will include visit to the entire chain of healthcare delivery system - sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.
2. Governance at village level including interaction and group discussion with village panchayat and frontline health workers.
3. Clinical visit to their respective professional department within the hospital.

2nd

SEMESTER

MATERIAL MANAGEMENT & FINANCIAL CONTROL			

Subject Code:GHPMS1-201	L T P C	60 Hours
	3 1 0 4	

COURSE OBJECTIVES:

Use basic financial statement ratio analysis to evaluate financial performance.

Understand the roles of managers and administrators in firms and health care set up, and also analyses the internal and external decisions

COURSE OUTCOME:

1. Knowledge about use basic financial statement ratio analysis to evaluate financial performance.

2. Knowledge to understand the roles of managers and administrators in firms and health care set up.

3. Knowledge about analyses the internal and external decisions.

COURSE SYLLABUS

Unit-1 (15 Hours)

Principles of Materials Management: Definition Scope & Functions Objectives. Materials Planning. Classification of Materials, Consumable and Non consumable working out quantities required, forecasting Budgeting. Purchase Management. Objectives Purchase system, Centralized Decentralized, Local purchase Legal aspects of purchasing. Out sourcing of Services

Unit-II (15 Hours)

Purchase Procedures. Selection of Suppliers Tendering procedures Analyzing bids Price negotiations Issue of purchase orders Rate Contracts Follow up action 2.2. Receipt of Materials. Inspection of materials Preparation of defect/Discrepancy Report Disposal of rejected items Stocking of accepted items Accounting of materials. 2.3. Store Management. Organization & layout Functions of Store Manager Materials handling, Flow of goods/FIFO Computerization of inventory transactions Security of stores Disposal of scrap/unserviceable materials Sub-stores in various departments Physical stock taking

Unit-III (15 Hours)

Inventory Control. Aims & objectives Scope of Inventory Control Lead-time, Buffer stock, Reorder level, Two Bin System, EOQ. 3.2. Tools & Techniques of Inventory Control. Classification of Inventory Techniques of Inventory Control 1. ABC 2. VED 3. Others. 3.3. Medical Stores. Functions Storage condition/Monitoring, Expiry Dates & Action Cold Chain Role of drug Review Committee 1. Hospital formulary 2. Obsolescence

Unit-IV (15 Hours)

Preparation of Final Accounts Profit making Hospitals Non-profit making Hospitals.. 4.2. Working Capital Management Needs of Working Capital Estimation of Working Capital requirement Different sources of funds Norms to be considered for Bank Loans. Changes in

Financial Statements Ratio Analysis Limitation of Ratio Analysis. 5.2. Budgetary Control Difference between Budget, Estimate & Projection Types of Budget – with special reference to Functional Budget How to monitor a Budget Elements of Cost of a Product/Service Direct & Indirect Cost Allocation of Overhead Cost Analysis of Marginal Costing & Unit Costing.

Recommended Text Books / Reference Books:
1. Handbook of Materials Management – By P. Gopalkrishnan – Prentice Hall India.
2. Purchasing & Materials Management – By P. Gopalkrishnan – Tata McGraw Hill.
3. Materials & Logistic Management – By Prof. L.C. Jhamb – Everest Publications.
4. Introduction to Materials Management – By Tony Arnold – Peerson.
5. Stores, Management & Logistics – By – P. Gopalkrishanan – Sultanchand & Co., New Delhi.
6. Basic Accounts & Finance for Non-Accounts – By Prof. D.K.Chatterjee - Himalaya Publishing House.

HEALTH INFORMATION MANAGEMENT

Subject Code:GHPMS1-202   **L T P C**   **60 Hours**
                                        3 1 0 4

COURSE OBJECTIVES:

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system

COURSE OUTCOME:

1. Learn about the gross morphology, structure and functions of various organs of the human body.
2. Knowledge about the various homeostatic mechanisms and their imbalances.
3. Learn to identify the various tissues and organs of different systems of human body.
4. Knowledge about Perform the various experiments related to special senses and nervous system.

COURSE SYLLABUS:

Unit-1 (15 Hours)

Organizational Aspects of the Centralized Admitting Services: Principles of Identification of a Patient, Methods of Collection of Identification Data, Types of Central Admitting Services, Admitting Policies, Procedure Outlines for Admissions, Flow of Records following Admissions, Advantages of good Admitting Policies and Procedures.

Unit-II (15 Hours)

Medical Record Department Management Planning, Organizing, Directing and Controlling Organizational Aspects of Medical Record Department/Services Policy development, Functions, Location, Space and Layout, Equipments, Forms Designing and Control, Medical Records Flow and processing

Unit-III (15 Hours)

Heath Care Statistics, Quality control of Data Collection & Presentation, Heath Care Statistics, Inpatient census and rates computed from it., Processing and reporting of Vital Health Statistics, Reporting of Notifiable Diseases to Public Health Authorities. Fundamentals of Health Informatics: Hospital Information System (HIS) with Electronic Medical Records (EMR) or Electronic Health Information Management System EHR – definitions – contents and examples of EHR practices. Preliminary steps in implementation of HER, Issues and challenges in implementation of HER, Planning for the introduction of HER, Factors to be considered when developing EHR & implementation plan

Unit-IV (15 Hours)

Quality Management: Quality Assurance and Quality Improvement, Utilization management & Utilization review processing, Accreditation requirements, licensing regulations, and certification requirements relevant to department/organization. International Standards Organization [ISO], Quality Council of India, Joint Commission International [JCI] & National Accreditation Board of Hospitals [NABH]

Reference books

1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.

2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.

3. Health Information Management: Principles and Organization for Health Information

Services, 6th Edition,Margareit A. Shurka(Editor)

4. Essentials of Health Information Management: Principles and Practices Book by Mary Jo Bowie and Michelle A. Green

5. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis

MEDICAL TERMINOLOGY AND PROCEDURES

Subject Code: **GHPMS1-203**   **L T P C**   **60 Hours**
                                         3 1 0 4

COURSE OBJECTIVES:
1. Explain the fundamentals of Medical Terminology
2. Describe the various Organs & Systems
3. Identify the various Common Diseases

COURSE OUTCOME:
1. Knowledge about fundamentals of Medical Terminology
2. Learn about the various Organs & Systems
3. Learn about various Common Diseases

COURSE SYLLABUS

Unit-1 (15 Hours)

Fundamentals of Medical Terminology Word Roots Prefix Suffix Abbreviations & Symbols. Introduction to Anatomy & Physiology. Nervous Stroke (Cerebro Vascular Accident) Brain Tumor Brain Injuries Spinal Cord Injuries Lumbar Puncture, Myelography, CT scan, MRI, EEG, EMG 5.2. Oncology Investigations

Unit-II (15 Hours)

Organs & Systems 1. Gastro Intestinal 2. Respiratory 3. Circulatory 4. Renal 5. Reproductive 6. Nervous 2.2. Common Diseases & Procedures 1. Gastro Intestinal Cholecystitis Cholelithiasis Appendicitis Intestinal Obstruction Hernia Peritonitis Gastroscopy: Endoscopy, Laparotomy, Laparoscopy.

Unit-III (15 Hours)

Common Diseases & Procedures Respiratory Tuberculosis Bronchial Asthma Respiratory Failure Pulmonary Embolison Pneumonia Branchosopy, Pulmonary Function Test, Cardio-Pulmonary Resuscitation. 3.2. Circulatory Hypertension Coronary Artery Disease Arrhythmias Cardiac Arrest Shock. Deep Vein Thrombosis (DVT), ECG, 2D Echo Cardiogram, Coronary Angiography, Cardiac Catheterisation, Stress Test, Pacemaker

Unit-IV (15 Hours)

Renal Nephrotic Syndrome Urinary Tract Infection Renal Failure Renal / Bladder Stones Intravenous Pylography, Cystoscopy, Urinalysis Hoemodialis, Peritoneal Dialysis. Reproductive Female – Breast Cancer/Self Examination Menstrual Disorders, Dysmenorrheal, Premenstrual Syndrome(PMS), Menorrhagia Ovarian Cyst, Fibroids, Malignancy, Infertility Mammography, Ultra Sound, Laparoscopy, IVF, Tubectomy, D & C. Male - Prostate Enlargement, Hydrocele, Impotence, Transurethral Resection of Prostate (TURA)

Recommended Text Books / Reference Books:

1. Principles of Anatomy & Physiology – By Gerard J. Tortora.
2. Anatomy & Physiology in Health & Illness – By Anne Waugh –Churchil Livingstone.
3. Anatomy & Physiology for Nurses – By Evelyn Pearce – Indian Edition – Jaypee Brothers, New Delhi.
4. Dorland's Pocket Medical Dictionary.
5. Taber's Cyclopedic Medical Dictionary – Fadavis Philadelphin.
6. Manical Manual of Anatomy – By Sampath Madhyastha – CBS Publication.

MATERIAL MANAGEMENT & FINANCIAL CONTROL PRACTICAL

Subject Code:GHPMS1-204   **L T P C**   **60 Hours**
                                                          0 0 4 2

COURSE OBJECTIVES:
Understand the roles of managers and administrators in firms and health care set up, and also analyses the internal and external decisions

COURSE OUTCOME:
1. Knowledge to understand the roles of managers and administrators in firms and health care set up.
2. Knowledge about analyses the internal and external decisions.

COURSE SYLLABUS

1. Selection of Suppliers Tendering procedures
2. layout of Storage area
3. Hospital formulary
4. Disposal management

Reference Books:
1. Sana's Guidelines for Hospital Infection Control – By Mohd. S. Khan Jaypee Brothers, New Delhi.
2. Hospital Waste Management & it's Monitoring – By Madhuri Sharma Jaypee Brothers, New Delhi.
3. Medical Stores Management – By Shakti Gupta & Sunil Kant - JaypeeBrothers, New Delhi.
4. Handbook of Materials Management – By P. Gopalkrishnan – Prentice Hall India.
5. Purchasing & Materials Management – By P. Gopalkrishnan – Tata McGraw Hill

HEALTH INFORMATION MANAGEMENT PRACTICAL

Subject Code:GHPMS1-205   **L T P C**   **60 Hours**
                                0   0   4   2

COURSE OBJECTIVES: Verify the documentation in the health record is timely, complete, and accurate, Collect and maintain health record data, Apply mortality and morbidity codes as per the guidelines, Identification of the legal use of health records and relevant documents,

COURSE OUTCOME:

1. Students learn to maintain the complete accurate record of health timely.

2. Knowledge about the legal use of health records and relevant documents.

3. Students learn to identify and filing Methods, Storage, and Retention

Practical:

Actual handling of medical records

1. **Medical Records for different patient encounters with health care facility**

a. Ambulatory Care Records {Emergency & Outpatient Records]

b. Clinical Records in Long Term Care and Rehabilitation Facilities

2. **Filing Methods, Storage, and Retention**

a. Numbering and Filing Systems

b. Filing

c. Storage- Microfilming and Disk Storage

d. Retention

e. Registers & Indexes

f. Record movement control & Tracking system

Reference books

1. Oachs PK, Watters A, editors. Health information management: Concepts, principles, and practice. Chicago, IL: Ahima; 2016.

2. LaTour MK. Eichenwald Shirley Maki (2010) Health Information Management, Concepts, Principles, and Practice. American Health Information Management Association; Chicago, Illinois.

3. Health Information Management: Principles and Organization for Health Information

Services, 6th Edition,Margareit A. Shurka(Editor)

4. Essentials of Health Information Management: Principles and Practices Book by Mary Jo Bowie and Michelle A. Green

5. Foundations of Health Information Management Book by Melissa LaCour and Nadinia A. Davis

MEDICAL TERMINOLOGY & PROCEDURES PRACTICAL

Subject Code: GHPMS1-206   L   T   P   C   **60 Hours**
                                      0   0   4   2

COURSE OBJECTIVES:

1 Identify structures in the body and analyze their relationship when other structures

2. Employ the scientific process for understanding principles of Anatomy and Physiology.

3. Demonstrate practical knowledge of human gross and microscopic Anatomy using human cadavers and prepared histological slides.

COURSE OUTCOME:

1 Knowledge about Identifying structures in the body and analyze their relationship when other structures

2. Understand the principles of Anatomy and Physiology.

3. Knowledge about demonstrating the practical knowledge of various organ system.

COURSE SYLLABUS

1. Demonstration of Digestive system
2. Demonstration of Respitatory system
3. Demonstration of Circulatory system
4. Demonstration of Reproductive system
5. Demonstration of Nervous system

Recommended Text Books / Reference Books:

1. Principles of Anatomy & Physiology – By Gerard J. Tortora.
2. Anatomy & Physiology in Health & Illness – By Anne Waugh –Churchil Livingstone.
3. Anatomy & Physiology for Nurses – By Evelyn Pearce – Indian Edition – Jaypee Brothers, New Delhi.
4. Dorland's Pocket Medical Dictionary.
5. Taber's Cyclopedic Medical Dictionary – Fadavis Philadelphin.
6. Manical Manual of Anatomy – By Sampath Madhyastha – CBS Publication.

PROJECT / FIELD WORK

Subject Code:GHPMS1-207   **240 Hours**

L T   P C
0   0   16 8

Course Objectives: This subject will lead to practical understanding of the procedures. Project report making lead to an introduction on research investigations.

Course details:
Students have to carry out a research project under the supervision of a faculty/hospital administration. The project report has to be prepared on the basis of the research work carried out. The assessment is done on the basis of the work done and the presentation and viva.

Total Credits = 21

SEMESTER 3rd		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MMBLS1-301	Food Microbiology	3	1	0	40	60	100	4
MMBLS1-302	Environmental Biotechnology	3	1	0	40	60	100	4
MMBLS1-303	Industrial Microbiology	3	1	0	40	60	100	4
MMBLS1-304	Applied & Industrial microbiology	3	1	0	40	60	100	4
MMBLS1-305	Food Microbiology Lab	0	0	4	60	40	100	2
MMBLS1-306	Environmental & Industrial Microbiology Lab	0	0	6	60	40	100	3
	Total	-	-	-	**320**	**380**	**700**	**21**

Total Credits = 23

SEMESTER 4th		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MMBLS1-401	Genome Technology	3	1	0	40	60	100	4
MMBLS1-402	Agricultural Microbiology	3	1	0	40	60	100	4
MMBLS1-403	Drug Design and Discovery	3	0	0	40	60	100	3
MMBLS1-404	Biosafety, Bioethics & IPR	3	0	0	60	40	100	3
MMBLS1-405	Research Assignment*	0	0	6	60	40	100	3
MMBLS1-406	Project Work**	0	0	12	50	150	200	6
	Total	-	-	-	**290**	**410**	**700**	**23**

* Based on seminars to be delivered by M.Sc. It semester students. Since each year the chosen topics will be different therefore no syllabus can be defined in sections. The exam of the above will be conducted internally.

** **Project work** the main objective of this course is to acquaint the student with various techniques used in contemporary research in microbiology/biotechnology that will be useful in successful completion of their project work in the fourth semester.

To develop synopsis of a defined research problem.

To conduct the bench work

To prepare the research report and its oral demonstrations.

A grant proposal on any relevant topic in biology will have to be prepared by students. The students will also be required to defend the proposal before a panel of experts. Both the written proposal and its defense will be taken into consideration for evaluation.

Students will be evaluated on all the topics discussed in the two years programmed by a panel of experts

Overall Marks / Credits

Semester	Marks	Credits
1st	800	29
2nd	700	24
3rd	700	21
4th	700	23
Total	**2900**	**97**

<div style="background:#f0a020">**FOOD MICROBIOLOGY**</div>

Subject Code: MMBLS1-301　　　　**L T P C**　　　　　**(Duration: 60hrs)**

　　　　　　　　　　　　　　　　　3 1 0 4

Course Objective:

- To study general principles of food microbiology, food preservation, fermented and microbial foods.
- To study epidemiology of food-borne microorganisms of public health significance and food spoilage microorganisms.
- To study microbiological examination of foods, microbiological quality Control and quality schemes.

Course Outcome:

- Illustrate the role of microorganisms in food safety
- Cultivate and enumerate microorganisms from various food samples
- Compare various physical and chemical methods used in the control of microorganisms

Unit: 1 (15Hrs)

- **Food as nutrient for microorganisms:** Extrinsic and intrinsic factors of food affecting the growth of microorganisms. Causes of food spoilage: Microbiological and food enzymes, General principles of food preservation.

Unit: 2 (15Hrs)

- **Micro-organisms (yeast, bacteria and molds)**: important in food microbiology. Concept of probiotics. Processing and spoilage of fermented food products: vegetables and fruits (sauerkraut, pickles, wine, cider);

Unit: 3(15Hrs)

- **Processing and spoilage of fermented food products:** Cereal products (Soya sauce, miso, tempeh. Idli, dosa, bread); Milk and milk products: Cheese, yogurt, kefir, koumiss, fermented milks. FSSAI-brief introduction and food safety and standard regulation, 2011 (licensing and registration of food businesses, General Hygienic and Sanitary practices to be followed by Food Business Operators, packaging and labeling).

Unit: 4 (15Hrs)

- **Microbiology quality control -** Hazard analysis and critical control points (HACCP). Sampling plan. Methods for microbiological examination of foods (direct examination,

cultural techniques), enumeration methods. Alternate indirect methods (dye reduction, electrical, ATP), rapid methods for detection of specific organisms and toxins (immunological/molecular methods). cleaning-in-place (CIP) in food industry.

Books Recommended:

1. Banwart, G.J. 1989, Basic Good Microbiology. 2ndEdition. Van Nostrand Reinnold.

2. Frazier, W.C. and Westerner, D.C., 1988. Food Microbiology. 5th edition. McGraw Hill Inc., New York.

3. Jay, J.M., Loessner M.J. and Golden D.A.1986. Modern Food Microbiology 7th Edition, Springer,   New York, U.S.A.

4. Hayes P.R. (1992). Food microbiology and hygiene. Elsevier Science Publishers Ltd., England.

5. Blackburn, C.W. 2006, Food Spoilage microorganisms, CHIPS, New York, USA.

6. Doyle. M.P., Beuchat, L.R, Montville, T.J. 2001, Food Microbiology Fundamentals and Frontiers. 2nd Edition, ASM press, USA.

7. Blackburn, C.W. and McClure, P.J. 2002, Food borne pathogens hazards risk analysis and control. Wood head Publishing, U.K.

8. Brown, M., 2002, Microbiological risk assessment in food processing, WoodHead Publishing, U.K. http://fda.up.nic.in/2011.htm

FOOD MICROBIOLOGY LAB

Subject Code: MMBLS1-305   **L T P C**   **(Duration: 60hrs)**

                                           0 0 4 2

Course Objective:

- To study microbiological examination, production, estimation and prevention.
- To study the extraction and estimation of toxin and isolation food poisoning.
- To study analytical techniques in food quality control.

Course Outcome:

- Illustrate the role of microorganisms in food safety
- Cultivate and enumerate microorganisms from various food samples
- Compare various physical and chemical methods used in the control of microorganisms

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Experiment

- Production and estimation of lactic acid by Lactobacillus Sp. Or Streptococcus Sp.

- Extraction and estimation of diacetyl.

- Sauerkraut fermentation

- Isolation of food poisoning bacteria from contaminated foods, Dairy products

- Extraction and detection of afla toxin for infected foods.

- Preservation of potato/onion by UV radiation

- Production of fermented milk by Lactobacillus acidophilus.

- Rapid analytical techniques in food quality control using microbial Biosensors.

References

1. Food Microbiology. 2nd Edition By Adams

2. Basic Food Microbiology by Banwart George J.

3. Food Microbiology: Fundamentals and Frontiers by Dolle

4. Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology. Volume 2 by Joshi.

5. Fundamentals of Dairy Microbiology by Prajapati.

6. Essentials of Food Microbiology. Edited by John Garbult. Arnold International Students Edition.

7. Microbiology of Fermented Foods. Volume II and I. By Brian J. Wood.Elsiever Applied Science Publication.

8. Microbiology of Foods by John C. Ayres. J. Orwin Mundt. William E. Sandinee. W. H.

9. Freeman and Co. Dairy Microbiology by Robinson. Volume II and I.

ENVIRONMENTAL BIOTECHNOLOGY

Subject Code: MMBLS1-302   **L T P C**   **(Duration: 60hrs)**

                                                                    3 1 0 4

Course Objective:

- To study the presence of pathogens in drinking water.

- To study the relationship between microorganisms and geochemistry.

- To understand the role of microorganisms as agents of environmental change.

- To use microorganisms as indicators of alteration of an ecosystem.

- To know and understand the role of microbes in the environment and evaluation of anthropogenic activities on pollution, climate change as well as environmental protection.

Course Outcome:

- Students will learn about the different fields in microbiology.

- Students will gain knowledge about the different types of microorganisms and their significance.

- Students will study different techniques used in microbiology.

Unit: 1 (15Hrs)

- **Introduction to Microbial Ecology:** Evolution of Life on Earth, History and scope of ecology, Concept of autecology, synecology, population, community, biome. Ecological succession.

- **Microorganism in aquatic Environment:** major physical and chemical factors (light, temperature, gases, nutrients). Aquatic biota: phytoplankton, zooplankton, benthos, periphyton, macrophytes. Biofilms, Production in lakes, rivers, estuaries and wetlands. Nutrient dynamics in lakes, rivers, estuaries and wetlands.

Unit: 2 (15Hrs)

- **Aquatic Microbiology:** Fresh and marine ecosystem (estuaries, mangroves, deep sea, hydrothermal vents, salt pans, coral reefs). Zonation of water ecosystem; upwelling, eutrophication; food chain in aquatic ecosystems. Role of methanotrophs in ecosystem. Potability of water, microbial assessment of water, water purification. Ground water types and their contamination. Biofilm. Waste treatment: Sewage and effluent treatment; Primary, secondary and tertiary treatment, Solid waste treatment. Solid wastes as sources of energy and food.

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Unit: 3 (15Hrs)

● **Aerobiology:** Airspora in different layers of the atmosphere, bioaerosol, assessment of air quality using air sampler based principles of sedimentation, impaction, impingement, suction and filtration. Brief account of transmission of airborne microbes, indoor and outdoor microbial quality. Allergy: Causes and tests for detection of allergy. Endotoxin in air and its hazards. Molecular methods for air quality assessment. Historical development of space microbiology, Life detection methods a) Evidence of metabolism (Gulliver) b) Evidence of photosynthesis (autotrophic and heterotrophic)

Unit: 4 (15Hrs)

● **Role of microbes in degradation:** Biodegradation of xenobiotic – hydrocarbons, pesticides and plastics. Biodeterioration of wood, pulp and paper; Biosorption/ bioaccumulation of heavy metal. Bioremediation of soil, air and water: various methods, advantages and disadvantages. Bioleaching of iron, copper, gold and uranium.

Books Recommended:

1. Bioremediation by Baker K.H. And Herson D.S. 1994.. MacGraw Hill Inc. N.Y.

2. Waste Water Engineering - Treatment, Disposal and Re-use by Metcalf and Eddy, Inc., Tata MacGraw Hill, New Delhi.

3. Pollution: Ecology and Biotreatment by Ec Eldowney, S. Hardman D.J. and Waite S. 1993. - Longman Scientific Technical.

4. Environmental Microbiology edited by Ralph Mitchell. A John Wiley and Sons. Inc. 5. Waste Water Microbiology 2nd Edition by Bitton.

5. Chemistry and Ecotoxicology of pollution. Edited by Des. W. Connell, G.J. Miller. Wiley Interscience Publications.

6. Environmental Biotechnology. Edited by C. F. Forster and D.A., John Wase. Ellis Horwood Ltd. Publication.

7. Advances in Waste Water Treatment Technologies. 1998. Volumes II and I by R. K. Trivedy. Global Science Publication.

8. Biocatalysis and Biodegradation: Microbial transformation of organic compounds. 2000 by Lawrence P. Wacekett, C. Douglas Hershberger. ASM Publications.

9. A Manual of Environmental Microbiology. 2nd Edition. 2001 by Christon J. Hurst (Chief Editor), ASM Publications. 11. Biodegradation and Bioremediation, Academic Press, San

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Diego. 12. Biotechnology in the sustainable environment, Plenum Press, N.Y. 13. Basic Principles of Geomicrobiology by A. D. Agate, Pune.

INDUSTRIAL MICROBIOLOGY

Subject Code: MMBLS1-303   **L T P C**   **(Duration: 60hrs)**

3 1 0 4

Course Objective:

- To understand the importance of industrially significant microorganisms and their metabolites.
- To understand fermentation processes and product recovery.

Course Outcome:

- Students will be able to understand the industrial production of important microbial metabolites and products.
- Students will gain knowledge of isolation, maintenance and handling of industrially important microbial cultures in laboratory settings.

Unit: 1 (10Hrs)

- **Introduction to bioprocess:** Historical development of bioprocess technology, an overview of traditional and modern applications of biotechnology in industry, outline of an integrated bioprocess and unit operations involved in bioprocesses, process flow sheets. Industrially important microorganisms – Isolation, Screening for new metabolites (general, primary and secondary metabolites) and Preservation; Strain development-(Mutation, Recombination, Protoplast fusion technique), Inoculum development for industrial fermentation.

Unit: 2 (20Hrs)

- **Media for industrial fermentations:** Criteria, Media formulation, Typical media, Water, Carbon sources, Nitrogen sources, Minerals, Vitamin sources, Nutrient recycle, Buffers, Precursors Growth factors, Oxygen requirement, Chelaters, Antifoaming agents. Design of a fermenter - Bioreactor design, parts and their functions; Manual and automatic control systems; online monitoring. Types of bioreactors (Tower, Jet, Loop, Airlift, Bubble, Column, Packed bed, Fluidized bed). Sterilization - Design of sterilization process (batch and continuous), Sterilization of Bioreactor, Media, Air and Exhaust air. Filter sterilization. Fermentation - Meaning and Brief history of fermentation, an

overview of aerobic and anaerobic fermentation processes and their application. Types of fermentation processes (Surface, Submerged, Batch, Continuous, Solid-substrate, Dual, Fed batch fermentation and its applications)

Unit: 3 (20Hrs)

● **Kinetics of microbial growth and product formation:** Phases of cell growth in batch cultures, Simple unstructured kinetic models for microbial growth, Monod model, Growth of filamentous organisms. Growth associated (primary) and non - growth associated (secondary), product formation Kinetic Recovery and purification of fermentation products - Filtration (Micro, Cross-flow and Ultra), Centrifugation (High-speed, Continuous and Ultra), Cell disruption methods, Precipitation, Coagulation, Flocculation, Solvent /Aqueous 2-phase extractions, Dialysis, Electro-dialysis, Reverse osmosis, Ultra filtration, SDS-PAGE, HPLC & Column Chromatography, Gel Filtration, Ion Exchange, Drying, Crystallization

Unit: 4 (10Hrs)

● **Immobilized cells and enzyme technology** - Definition and concept of immobilization, Methods immobilization (Carrier-Binding, Adsorption, Entrapment, Ionic bonding, Encapsulation, Cross Linking), whole cell and enzyme immobilization, Application of immobilized cells/ enzymes in fermentation. Fermentation economics and Feasibilities. Enzymes (Amylase, Proteases), Organic acids (Lactic acid, Citric acid, Vinegar), Amino acids (L-lysine, L-glutamic acid), Antibiotics (Penicillin, Streptomycin),Alcoholic beverages (Beer, Wine, Brandy, Rum) Antitumours and Anticholesterol agents, SCP and SCO.

Books Recommended:

1. Food Microbiology. 2nd Edition By Adams
2. Basic Food Microbiology by Banwart George J.
3. Food Microbiology: Fundamentals and Frontiers by Dolle
4. Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology. Volume 2 by Joshi.
5. Fundamentals of Dairy Microbiology by Prajapati.

6. Essentials of Food Microbiology. Edited by John Garbult. Arnold International Students Edition. Microbiology of Fermented Foods. Volume II and I. By Brian J. Wood.Elsiever Applied Science Publication.

7. Microbiology of Foods by John C. Ayres. J. Orwin Mundt. William E. Sandinee. W. H. Freeman and Co.

8. Dairy Microbiology by Robinson. Volume II and I.

APPLIED & INDUSTRIAL MICROBIOLOGY

Subject Code: MMBLSI-304   **L T P C**   **(Duration: 60hrs)**

                                      3 1 0 4

Course Objectives: Applied Microbiology course aims to impart the knowledge of basic principles of Microbiology and their applications to humankind.

Course Outcome: After completion of the course, a student will be able to achieve these outcomes

- Learn about industrial microbiology.
- Learn about the microbial production of metabolites
- Gain knowledge of fermented microbial products.
- Acquire knowledge on microbial enzymes.
- Learn Biofuels & Biopolymers

Unit- 1 (15 hrs.)

- **Basics of Industrial Microbiology:** Historical account of microbes in industrial microbiology; sources and characters of industrially important microbes; their isolation, purification and maintenance; Screening of useful strains; primary screening and secondary screening; Strain improvement through random mutation and genetic engineering; types of fermentation and fermenters. Microbial growth kinetics in batch, continuous and fed-batch fermentation process

Unit- 2 (15 hrs.)

- **Microbial production of metabolites:** Microbial production of Primary and secondary metabolites. Metabolic engineering, Pathways involved in secondary metabolite production, Commercial production of antibiotics with special reference to penicillin, streptomycin and their derivatives. Microbial transformations: steroids and alkaloids

production. Large scale production of recombinant molecules interferon, human proteins-insulin, somatostatin, vaccines and anticancer agents.

Unit- 3 (15 hrs.)

● **Fermented Microbial products:** Microbiology and production of alcoholic beverages; Malt beverages, distilled beverages, wine and champagne; Pathways involved in primary metabolite production, Commercial production of organic acids like acetic, lactic, citric, and gluconic acids; Commercial production of important amino acids (glutamic acid, lysine and tryptophan), and vitamins (riboflavin and vitamin A).

Unit- 4 (15 hrs.)

● **Microbial enzymes:** Immobilization of microbial enzymes and whole cells and their applications in industries; Industrial enzymes production; Cellulases, Xylanases, Pectinases, Amylases, Lipases and Proteases and their applications. Enzymes involved in microbial biocatalysis / transformations.

● **Biofuels & Biopolymers:** Biofuels (ethanol and methane) from organic residues; fuels from algae; Microbial fuel cells, Mushroom cultivation; other microbial products - Biopolymers and EPS, Bioplastics, Biosurfactants.

Recommended Text Books:

1. Nduka Okafor, Benedict C. Okeke (2017). Modern Industrial Microbiology and Biotechnology. 2nd Edition: CRC Press Publishers.

2. Waites, M.J., Morgan, N.L., Rockey, J.S. and Higton, G. (2002). Industrial Microbiology: An Introduction. Blackwell Science Publishers.

3. W. Crueger & A. Crueger (2017). Cruegers Biotechnology: A Text Book of Industrial Microbiology. Edited by K.R. Aneja. Panima Publishing Corporation.

4. Reed. G. (1999). Prescott and Dunn's Industrial Microbiology. CBS Publishers.

5. Demain, A. L. (2001). Industrial Microbiology and Biotechnology IInd Edition. ASM Press, Washington.

6. P.F. Stanbury, W. Whitaker & S.J. Hall (2016). Principles of Fermentation Technology. 3rd edition. Elsevier publication.

7. Richard H. Baltz, Julian E. Davies, and Arnold L. Demain (2010). Manual of Industrial Microbiology and Biotechnology. 3rd Edition, ASM Press.

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8. Daniel Forciniti (2008). Industrial Bioseparations: Principles and Practice. 1 st Edition, Wiley-Blackwell.

9. Nduka Okafor, Benedict C. Okeke (2017). Modern Industrial Microbiology and Biotechnology. 2nd Edition: CRC Press Publishers.

ENVIRONMENTAL & INDUSTRIAL MICROBIOLOGY LAB

Subject Code: MMBLS1-306   **L T P C**   **(Duration: 90hrs)**

                                                              0 0 6 3

Course Objectives: Aims to impart the knowledge of basic principles of Microbiology and their applications to humankind.

- To study analysis, determine BOD/COD
- To study isolation, utilization and purification of microbes
- To study biotransformation and microbial dye

Course Outcome: After completion of the course, a student will be able to achieve these outcomes

- Learn about the microbial production of metabolites
- Gain knowledge of fermented microbial products.
- Acquire knowledge on microbial enzymes.
- Students will learn about the different fields in microbiology.
- Students will study different techniques used in microbiology.

Experiment:

- Physical analysis of sewage/industrial effluent by measuring total solids, total dissolved solids and total suspended solids.
- Determination of indices of pollution by measuring BOD/COD of different effluents.
- Bacterial reduction of nitrate from ground waters
- Isolation and purification of degradative plasmid of microbes growing in polluted environments.
- Recovery of toxic metal ions of an industrial effluent by immobilized cells.
- Utilization of microbial consortium for the treatment of solid waste [Muncipal Solid Waste].
- Biotransformation of toxic chromium (+ 6) into non-toxic (+ 3) by Pseudomonas species.

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- Tests for the microbial degradation products of aromatic hydrocarbons /aromatic compounds.
- Reduction of distillery spent wash (or any other industrial effluent) BOD by bacterial cultures.
- Microbial dye decolourization/adsorption.

Book Reference:

1. Bioremediation by Baker K.H. And Herson D.S. 1994.. MacGraw Hill Inc. N.Y.
2. Waste Water Engineering - Treatment, Disposal and Re-use by Metcalf and Eddy, Inc., Tata MacGraw Hill, New Delhi.
3. Pollution: Ecology and Biotreatment by Ec Eldowney, S. Hardman D.J. and Waite S. 1993. - Longman Scientific Technical.
4. Environmental Microbiology edited by Ralph Mitchell. A John Wiley and Sons. Inc.
5. Waste Water Microbiology 2nd Edition by Bitton.
6. Chemistry and Ecotoxicology of pollution. Edited by Des. W. Connell, G.J. Miller. Wiley Interscience Publications.
7. Environmental Biotechnology. Edited by C. F. Forster and D.A., John Wase. Ellis Horwood Ltd. Publication.
8. Advances in Waste Water Treatment Technologies. 1998. Volumes II and I by R. K. Trivedy. Global Science Publication.
9. Biocatalysis and Biodegradation: Microbial transformation of organic compounds. 2000 by Lawrence P. Wacekett, C. Douglas Hershberger. ASM Publications.

4th

SEMESTER

GENOME TECHNOLOGY

Subject Code: MMBLS1-401   **L T P C**   **(Duration: 60hrs)**

3 1 0 4

Course objective: The Genome Technology course aimed to transform advanced developments in genomic science to the students.

Course outcome: This course would develop the students becoming knowledgeable/skilled in new methods, technologies and instruments that enable rapid, low-cost determination of DNA sequence, SNP genotyping, functional genomics and synthetic biology.

Unit-I (15 Hrs.)

- **An introduction to genetic technology:** Enzymes used in genetic engineering-Restriction endonucleases, DNA polymerases, Reverse transcriptase, Ligases, Polynucleotide kinase, Alkaline phosphatase, Nucleases, Klenow fragment, Terminal deoxynucleotidyl transferase, RNase. Vectors for cloning- Plasmids, Bacteriophage , Filamentous phage vectors, Cosmids, Phagemids, PACs, YACs. Ligation of DNA fragments with vectors - Homopolymer tailing, Ligation of cohesive termini, Blunt-end ligation, Linker molecules.

Unit-II (15 Hrs.)

- **Introducing genes into bacterial systems**: Natural gene transfer methods-Transformation, transduction, calcium chloride mediated transformation, Transfection with phage vectors. Introducing genes into eukaryotes- Gene transfer by viral transduction, Calcium phosphate mediated transformation; Liposome mediated transformation, Microinjection, Electroporation.

Unit-III (20 Hrs.)

- Producing genomic libraries, Genomic libraries in high-capacity vectors, cDNA cloning, Shotgun cloning, Cloning in E.coli, Identifying the recombinant DNA and its productsGenome Engineering, genome editing and CRISPR-CAS tools.

- Prokaryotic expression systems Gene expression based on bacteriophage T7 RNA polymerase, Eukaryotic expression systems- Fused genes, Unfused genes, Secreted proteins, Gene expression by transcription factors- Nfkb, PPAR, Antisense RNA technology- SiRNA, miRNA.

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Unit IV (10 Hrs.)

● **Techniques in genetic technology-** Hybridization technique, Southern, Northern-Western blotting techniques, Site directed mutagenesis, Restriction mapping, DNA profiling in forensic science, Chromosome walking, Chromosome jumping, DNA sequencing, PCR. Basic concepts of Intellectual property rights.

Recommended Text Books:

1. Sandy B. Primrose, Richard Twyman (2004), Genomics : Applications in Human Biology. Wiley and Sons.

2. Mount D (2004). Bioinformatics: Sequence and Genome Analysis by. Cold Spring

3. Diana Marco (2014). Metagenomics of the Microbial Nitrogen Cycle: Theory, Methods and Applications Book: 978-1-908230-48-5. ebook: 978-1-908230-60-7, Caister Academic Press.

4. Pilar Francino, M (2012). Horizontal Gene Transfer in Book: 978-1-908230-10-2. ebook: 978-1-908230-72-0, Caister Academic Press.

5. Muhammad Jamal (2017). The CRISPR/Cas System: Emerging Technology and Application. Caister Academic Press.

6. Manuel Fuentes, Joshua LaBaer (2014). Proteomics: Targeted Technology Innovations and Applications. Book: 978-1-908230-46-1. ebook: 978-1-908230-62-1. Caister Academic Press.

7. Patrick Arbuthnot and Marc S. Weinberg (2014). Applied RNAi: From Fundamental Research to Therapeutic Applications. Book: 978-1-908230-43-0. ebook: 978-1- 908230-67. Caister Academic Press.

8. Jianping Xu (2014). Next-generation Sequencing: Current Technologies and Applications. Edited by: Published: 2014 Book: 978-1-908230-33-1. Ebook: 978-1-908230-95-9. Caister Academic Press.

9. Maria S. Poptsova (2014). Genome Analysis: Current Procedures and Applications. Book: 978-1-908230-29-4. ebook: 978-1-908230-68-3. Caister Academic Press.

10. Diana Marco (2011). Metagenomics: Current Innovations and Future Trends. Book: 978-1-904455-87-5. Horizon Scientific Press.

11. S. B. Primrose (2002). Principles of Genome Analysis. A Guide to Mapping and Sequencing DNA from Different Organisms. Blackwell publishing.

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AGRICULTURAL MICROBIOLOGY

Subject Code: MMBLS1-402   **L T P C**   **(Duration: 60 hrs)**

3 1 0 4

Course objective: This course designed to introduce the essential fundamentals of Agriculture Microbiology.

Course outcome: This course focuses on the concepts of Agricultural Microbiology such as Soil Environment, Major plant diseases caused by fungi, bacteria and viruses, biopesticides & biofertilizers and plant microbe-interactions.

Unit-I (15 Hrs.)

- **Soil Environment-** Microorganisms, soil structure, soil profile, Physico-chemical conditions, Microbial composition, sampling techniques, role of Microorganisms in organic matter decomposition (cellulose, Hemicellulose, Lignins). Biogeochemical cycles – Carbon cycle, Nitrogen cycle – Nitrogen fixation, nitrification, de-nitrification, sulphur, iron and phosphorus cycles. PGPR-Rhizosphere – Rhizosphere Microorganisms, Siderophores. PGPM-Plant growth promoting microorganisms. plant-microbe beneficial interactions. Mechanisms of plant growth promotion

Unit-II (15 Hrs.)

- Major plant disease symptoms caused by fungi, bacteria and viruses. Plant diseases – Principles, symptoms and control measures of the following diseases: Fungal – Tikka, red rot of sugarcane, Fusarium wilts (red gram and cotton), Sclerotium rolfsii and Macrophomina phaseolina (collar rot disease, charcoal rot). Bacterial – Blight of rice, citrus canker, Xanthomonas (black rot). Viral and mycoplasmal – Bud necrosis of groundnut, citrus mosaic, little leaf of brinjal, tomato leaf curl. Principles of plant disease control. Protection - Diseases of field, vegetable, orchard and plantation crops of India and their control; causes and classification of plant diseases; principles of plant disease control biological control of diseases.

Unit-III (15 Hrs.)

- **Biofertilizers –** Introduction, biofertilizers using nitrogen fixing microbes – phosphate solubilization- Rhizobium, Azotobacter, Azospirillum, Azolla; Anabaena Symbiosis, blue green algae and Ecto- and Endomychorizae. Cultivation, mass production and inoculation of Rhizobium, Azotobacter, Azospirillum, Azolla and cyanobacteria, Carrier-based

inoculants, methods of application, quality control, agronomic importance. Application methods for different biofertilizers – Vermicomposting

Unit-IV (15 Hrs.)

- **Biopesticides –** Principles of biological control – antagonism, parasitism, Bacillus thuringiensis, B. sphaericus, B. popilliae, Pseudomonas syringae. Biocontrol- nematophagy - Microbial control of plant pathogens- Trichoderma. Useful genes from microorganisms for agriculture (herbicide resistant, Bt, viral). Biological Control – Use of Baculovirus, NPV virus, protozoa & fungi in biological control.

- **Molecular plant microbe-interactions:** Cell signalling, Quorum sensing, and Biofilm formation. Invasion of plant tissue- resistance mechanisms against attack by plant pathogens. Molecular detection of pathogens. Integrated pest management-concepts and components; host plant resistance-biological control of insect pests; Recycling of agricultural wastes - Microbiology and biochemistry of biogas, bioethanol and other value added products.

Recommended Text Books:

1. Dirk J, Elas V, Trevors JT, Wellington, EMH (1997) Modern Soil Microbiology, Marcel Dekker INC, New York.

2. Agricultural Microbiology by G.Rangaswamy and Bagyaraj, Prentice Hall India.

3. Bio-fertilizers in Agriculture and Forestry, 1995, by N.S. Subba Rao.

4. Microbes For Sustainable Agriculture by K.V.B.R. Tilak, K.K. Pal, Rinku Dey

5. Soil Microbiology and Plant Growth, 1995, by N.S. Subba Rao.

6. Plant Growth and Health Promoting Bacteria by Dinesh K. Maheshwari

7. Plant-microbe interactions, Volume 1 by Gary Stacey and Noel T. Keen

8. Biological control of crop diseases Volume 89 of Books in soils, plants, and the environment by S. S. Gnanamanickam

9. Plant-microbe interactions and biological control Volume 63 of Books in soils, plants, and the environment by Greg J. Boland, L. David Kuykendall

<div style="background-color:orange">**DRUG DESIGN AND DISCOVERY**</div>

Subject Code: MMBLS1-403   **L T P C**   **(Duration: 45 hrs)**

3 0 0 3

Course Objectives: Drug Design and Discovery course introduce the basic principles of modern drug design, discovery and development. The course deals with the different source of drug with specific focus on microbial source, drug development and manufacturing process

Course Outcome: The course will imparts knowledge on detection, selection, and validation of new antibacterial targets, vaccines and the use of gene technology in pharmaceutical industry

Unit-I (12 Hrs.)

- **Introduction**- History of drug design, Current approaches and philosophies in drug design, Molecular mechanisms of diseases and drug action with examples. Pharmaceutical products, Pharmaceuticals of microbial origin (macrolides, ansamycins, Peptide and other antibiotics) animal origin (sex hormones androgens, Oestrogens, Progesterone and progestogens etc), plant origin (Alkaloids Atropine and scopolamine Morphine and cocaine Additional plant alkaloids)

Unit-II (10 Hrs.)

- **Sources of Drugs-** Microbial drugs, Plants as a source of drugs, E. coli as a source of recombinant therapeutic proteins. Expression of recombinant proteins in yeasts, animal cell culture systems. Additional production systems: Fungal production systems, Transgenic animals, Transgenic plants and Insect cell-based systems. Rational drug design and Combinatorial approaches to drug discovery, Antibody Drug Conjugates.

Unit-III (5 Hrs.)

- **Drug development process-** Impact of genomics and related technologies upon drug discovery: Gene chips, Proteomics, Structural genomics and Pharmacogenetics, Model systems in the development of drugs, Nanoscaffolds for Drug Delivery.

- **Drug manufacturing process-** Guides to good manufacturing practice, Production of final product - Cell banking systems, Upstream processing, Microbial cell fermentation, Mammalian cell culture systems, Downstream processing, Final product formulation, Freezedrying, Labelling and packing.

Unit-IV (18 Hrs.)

- **Vaccines and adjuvant-** Traditional vaccine preparations, attenuated, dead or inactivated bacteria, Attenuated and inactivated viral vaccines, Toxoids, antigen-based and other vaccine preparations. Impact of genetic engineering on vaccine technology. Peptide vaccines Vaccine vectors. Development of an AIDS vaccine, Difficulties associated with vaccine development, AIDS vaccines in clinical trials, Cancer vaccines, Recombinant veterinary vaccines. Adjuvant technology: Adjuvant mode of action, Mineral-based adjuvants, Oil-based emulsion adjuvants Bacteria/bacterial products as adjuvants, Biosimilars.

- **Nucleic acid as drugs**- Gene therapy: Basic approach to gene therapy, Vectors used in gene therapy -Retroviral vectors, Additional viral-based vectors, Manufacture of viral vectors, Non-viral vectors. Gene therapy and genetic disease, cancer, Gene therapy and AIDS. Gene based vaccines.

Recommended Text Books:

1. Kristian Stromgaard, Povl Krogsgaard-Larsen and Ulf Madsen (2017). Textbook of Drug Design and Discovery, Fifth Edition, CRC press, 2017.

2. Thomas J. Dougherty and Steven J. Projan. Microbial Genomics and Drug Discovery, Taylor and Francis, 2003.

3. Kenneth M. Merz, Dagmar Ringe and Charles H. Reynolds. Drug Design: Structure- and Ligand-Based Approaches, Cambridge University press, 2010.

4. Kristian Stromgaar, Povl Krogsgaard-Larsen and Ulf Madsen (2017). Textbook of Drug Design and Discovery, Fifth Edition, CRC press, 2017.

5. David B. Weiner and William V. Williams. Biological Approaches to Rational Drug Design (Handbooks in Pharmacology and Toxicology) CRC press, 1994.

6. Gary Wlash (2004). Biopharmaceuticals, Biochemistry and Biotechnology. 2nd edition. Wiley publisher.

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BIOAFETY, BIOETHICS & IPR

Subject Code: MMBLS1-404   **L T P C**   **(Duration: 45 hrs)**

3 0 0 3

Course Objective: This soft course teaches students about biosafety, bioethics and IPR, which are highly essential and must to learn for science students.

Course Outcome: Through this course students will acquire knowledge on good laboratory practices, safety guidelines and ethics to be followed in science. This course will be helpful for students to perform best in the bioscience laboratory.

Unit-I (10 Hrs.)

- **Introduction to Biosafety:** Biological laboratory, Biosafety, Need for biosafety, Good laboratory practices (GLP) - Fundamental points and resources of GLP, Standard operating procedures (SOPs), Implementation of GLP.

Unit-II (10 Hrs.)

- **Biosafety levels:** Types of biosafety levels (Biosafety level I, II, III, IV), Requirements of Biosafety levels, Operational guidelines for biosafety levels. Biosafety Levels of Specific Microorganisms; Recommended Biosafety Levels for Infectious Agents and Infected Animals

Unit-III (5 Hrs.)

- **Biosafety facilities:** Animal Biosafety facilities (ABSL), Plant Biosafety facilities (PBSL), Aquatic organism Biosafety facilities (AQBSL), Operational guidelines for ABSL, PBSL, AQBSL.

Unit-IV (20 Hrs.)

- **Bioethics:** Introduction to Ethics, Ethical issues in Biosciences, Ethical committee, Guidelines for research that involve animals, Human, Microorganism, Genetic engineering, Gene therapy, organ transplantation & Stem cells.
- **IPR:** Forms of IPR, IPR in India, WTO ACT, Convention on Biodiversity (CBD), Patent Co-operation Treaty (PCT), forms of patents and patentability, process of patenting, Indian and international agencies involved in IPR & patenting, Global scenario of patents and India's position, patenting of biological materials.

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Reference Books:

1. Lewis Vaughn. Bioethics: Principles, Issues and Cases, 2nd Edition. Oxford University Press

2. Deepa Goel, Shomini Parashar. (2013). IPR, Biosafety and Bioethics.Pearson.

3. Handbook Good Laboratory Practices, World Health Organization, Second edition.

4. Regulations and guidelines on biosafety of recombinant DNA research and biocontainment, DBT, Government of India, 2017.

Total Credits = 22

SEMESTER 3rd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHFSS1-301	Forensic Dermatoglyphics	3	0	0	40	60	100	3
BHFSS1-302	Technological Methods in Forensic Science	3	0	0	40	60	100	3
BHFSS1-303	Forensic Psychology	3	0	0	40	60	100	3
BHFSS1-304	Introduction to Biometry	3	0	0	40	60	100	3
BHFSS1-305	Forensic Biology and Serology	3	1	0	40	60	100	4
BHFSS1-306	Forensic Dermatoglyphics Practical	0	0	4	60	40	100	2
BHFSS1-307	Technological Methods in Forensic Science Practical	0	0	4	60	40	100	2
BHFSS1-308	Forensic Psychology Practical	0	0	4	60	40	100	2
	Total	-	-	-	**380**	**420**	**800**	**22**

Total Credits = 26

SEMESTER 4th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHFSS1-401	Forensic Chemistry	3	1	0	40	60	100	4
BHFSS1-402	Questioned Documents	3	1	0	40	60	100	4
BHFSS1-403	Forensic Biology	3	1	0	40	60	100	4
BHFSS1-404	Handwriting Identification and Recognition	3	1	0	40	60	100	4
BHFSS1-405	Security Document & Bank Notes	3	1	0	40	60	100	4
BHFSS1-406	Forensic Chemistry Practical	0	0	4	60	40	100	2
BHFSS1-407	Questioned Documents Practical	0	0	4	60	40	100	2
BHFSS1-408	Forensic Biology Practical	0	0	4	60	40	100	2
	Total	-	-	-	**380**	**420**	**800**	**26**

Total Credits = 20

SEMESTER 5th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHFSS1-501	Forensic Ballistics	3	1	0	40	60	100	4
BHFSS1-502	Forensic Toxicology	3	1	0	40	60	100	4
BHFSS1-503	Digital Forensics	3	1	0	40	60	100	4
BHFSS1-504	Economic Offences	3	1	0	40	60	100	4
BHFSS1-505	Forensic Ballistics Practical	0	0	4	60	40	100	2
BHFSS1-506	Forensic Toxicology Practical	0	0	4	60	40	100	2
	Total	-	-	-	**280**	**320**	**600**	**20**

Total Credits = 32

SEMESTER 6th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHFSS1-601	Forensic Anthropology	3	1	0	40	60	100	4
BHFSS1-602	Forensic Medicine	3	1	0	40	60	100	4
BHFSS1-603	Forensic Serology/Accident Investigations	3	1	0	40	60	100	4
BHFSS1-604	Dissertation	0	0	32	0	700	700	16
BHFSS1-605	Forensic Anthropology Practical	0	0	4	60	40	100	2
BHFSS1-606	Forensic Medicine Practical	0	0	4	60	40	100	2
	Total	-	-	-	**240**	**960**	**1200**	**32**

Overall Marks / Credits

Year	Marks	Credits
1st	1200	38
2nd	1600	48
3rd	1800	52
Total	**4600**	**138**

FORENSIC DERMATOGLYPHICS

Course Code: BHFSS1-301	L T P C	Duration - 45 hrs
	3 0 0 3	

Course Objectives:

After studying this paper the students will know –

- The fundamental principles on which the science of fingerprinting is based.
- Fingerprints are the most infallible means of identification.
- The world's first fingerprint bureau was established in India.
- The method of classifying criminal records by fingerprints was worked out in India, and by Indians.
- The physical and chemical techniques of developing fingerprints on crime scene evidence.
- The significance of foot, palm, ear and lip prints.

Course Outcome:

- It enables the scholar to study the different ridge pattern of skin dealing with it is a well-established study that deals with the fingerprints that are unique for identification at a personal level that helps to link the suspect in a particular crime scene.

Unit 1 (5 Hrs)

- Basics of Fingerprinting: Introduction and history, with special reference to India. Biological basis of fingerprints. Formation of ridges.

Unit 2 (10 Hrs)

- Fundamental principles of fingerprinting: Types of fingerprints. Fingerprint patterns. Fingerprint characters/minutiae. Plain and rolled fingerprints. Classification and cataloging of fingerprint records. Automated Fingerprint Identification System. Significance of poroscopy and edgeoscopy.

Unit 3 (15 Hrs)

- Development of Fingerprints: Latent prints, Constituents of sweat residue. Latent fingerprints' detection by physical and chemical techniques, Mechanism of detection of fingerprints by different developing reagents, Application of light sources in fingerprint detection, Preservation of developed fingerprints, Digital imaging for fingerprint enhancement, Fingerprinting the deceased, Developing fingerprints on gloves.

Unit 4 (15 Hrs)

- Other Impressions: Importance of footprints, Casting of footprints, Electrostatic lifting of latent footprints. Palm prints. Lip prints - Nature, location, collection and examination of lip prints. Ear prints and their significance. Palm prints and their historical importance.

Suggested Readings

- J.E. Cowger, *Friction Ridge Skin*, CRC Press, Boca Raton (1983).
- D.A. Ashbaugh, *Quantitative-Qualitative Friction Ridge Analysis*, CRC Press, Boca Raton (2000).
- C. Champod, C. Lennard, P. Margot and M. Stoilovic, *Fingerprints and other Ridge Skin Impressions*, CRC Press, Boca Raton (2004).
- Lee and Gaensleen's, *Advances in Fingerprint Technology*, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

FORENSIC DERMATOGLYPHICS PRACTICAL

Course Code: BHFSS1-306   **L T P C**   **Duration - 60 Hrs**

0 0 4 2

Course Objectives: Teaching the students and defining the correct identification techniques used for footprints, fingers and palms. It is an essential trait of human morphology that also demonstrates sexual morphology.

Course Outcome:

- It enables the scholar to study the different ridge pattern of skin dealing with it is a well-established study that deals with the fingerprints that are unique for identification at a personal level that helps to link the suspect in a particular crime scene.

Experiment

- To record plain and rolled fingerprints.
- To carry out ten digit classification of fingerprints.
- To identify different fingerprint patterns.
- To identify core and delta.
- To carry out ridge tracing and ridge counting.
- To investigate physical methods of fingerprint detection.
- To investigate chemical methods of fingerprint detection.
- To use different light sources for enhancing developed fingerprints.
- To prepare a cast of footprints.

Suggested Readings

- J.E. Cowger, *Friction Ridge Skin*, CRC Press, Boca Raton (1983).
- D.A. Ashbaugh, *Quantitative-Qualitative Friction Ridge Analysis*, CRC Press, Boca Raton (2000).
- C. Champod, C. Lennard, P. Margot and M. Stoilovic, *Fingerprints and other Ridge Skin Impressions*, CRC Press, Boca Raton (2004).
- Lee and Gaensleen's, *Advances in Fingerprint Technology*, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

TECHNOLOGICAL METHODS IN FORENSIC SCIENCE

Course Code: BHFSS1-302　　　　**L T P C**　　　　**Duration - 45 hrs**

3 0 0 3

Course Objectives: After studying this paper the students will know –
- The importance of chromatographic and spectroscopic techniques in processing crime scene evidence.
- The utility of colorimetry, electrophoresis and neutron activation analysis in identifying chemical and biological materials.
- The significance of microscopy in visualizing trace evidence and comparing it with control samples.
- The usefulness of photography and videography for recording the crime scenes.

Course Outcome: This course will enable the students to:
- Students are expected to learn the use of proper techniques for the investigation and identification facts related to using chemical treatments around the crime scenes and learning the techniques to combating global terrorism.

Unit 1 (15 Hrs)
- **Instrumentation:** Sample preparation for chromatographic and spectroscopic evidence. Chromatographic methods. Fundamental principles and forensic applications of thin layer chromatography, gas chromatography and liquid chromatography.

Unit 2 (15 Hrs)
- **Spectroscopic methods:** Fundamental principles and forensic applications of Ultraviolet-visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy, atomic emission spectroscopy and mass spectroscopy. X-ray spectrometry. Colorimetric analysis and Lambert-Beer law. Electrophoresis – fundamental principles and forensic applications. Neutron activation analysis – fundamental principles and forensic applications.

Unit 3 (10 Hrs)
- **Microscopy:** Fundamental principles. Different types of microscopes. Electron microscope. Comparison Microscope. Forensic applications of microscopy.

Unit 4 (5 Hrs)
- **Forensic photography:** Basic principles and applications of photography in forensic science. 3D photography. Photographic evidence. Infrared and ultraviolet photography. Digital photography. Videography. Crime scene and laboratory photography.

Suggested Readings

- D.A. Skoog, D.M. West and F.J. Holler, *Fundamentals of Analytical Chemistry,* 6th Edition, Saunders College Publishing, Fort Worth (1992).
- W. Kemp, *Organic Spectroscopy*, 3rd Edition, Macmillan, Hampshire (1991).
- J.W. Robinson, *Undergraduate Instrumental Analysis*, 5th Edition, Marcel Dekker, Inc.,New York (1995).
- D.R. Red sicker, *The Practical Methodology of Forensic Photography*, 2nd Edition,CRC Press, Boca Raton (2000).

TECHNOLOGICAL METHODS IN FORENSIC SCIENCE PRACTICAL

Course Code: BHFSS1-307   **L T P C**   **Duration - 60 Hrs**
                                      0 0 4 2

Course objective: There are many different modern technologies that are currently employed in the field of forensics for the proper conduction of investigation to examine the crime evidence. Many of the methods include the details of microscopy including TEM and SEM.

Course outcome: student's to be experts in scanning electron microscopy, DNA fingerprinting, alternative light photography, facial reconstruction and LA-ICP-MS. This is because they are easy to use and are affordable and easy to use.

Experiment

- To determine the concentration of a colored compound by colorimetry analysis.
- To carry out thin layer chromatography of ink samples.
- To carry out separation of organic compounds by paper chromatography.
- To identify drug samples using UV-Visible spectroscopy.
- To take photographs using different filters.
- To take photographs of crime scene exhibits at different angles.
- To record video graphy of a crime scene.

Suggested Readings

- D.A. Skoog, D.M. West and F.J. Holler, *Fundamentals of Analytical Chemistry,* 6th Edition, Saunders College Publishing, Fort Worth (1992).
- W. Kemp, *Organic Spectroscopy*, 3rd Edition, Macmillan, Hampshire (1991).
- J.W. Robinson, *Undergraduate Instrumental Analysis*, 5th Edition, Marcel Dekker, Inc.,New York (1995).
- D.R. Red sicker, *The Practical Methodology of Forensic Photography*, 2nd Edition,CRC Press, Boca Raton (2000).

FORENSIC PSYCHOLOGY		
Course Code: BHFSS1-303	L T P C 3 0 0 3	Duration - 45 hrs

Course Objectives: After studying this paper the students will know –
- The overview of forensic psychology and its applications.
- The legal aspects of forensic psychology.
- The significance of criminal profiling.
- The importance of psychological assessment in gauging criminal behavior.
- The tools and techniques required for detection of deception.
- The critical assessment of advanced forensic techniques like polygraphy, narco analysis and brain electrical oscillation signatures.

Course Outcome: This course will enable the students to:
- Identity: the various types of Personality
- Describe: the science of psychology Differentiate: Between the Cognition, motivation and emotion
- Analyze: the establishment of identity from the various forms of cognitive behavior of a person.
- Review: the science of psychology.

Unit 1 (15 Hrs)

- **Basics of Forensic Psychology**: Definition and fundamental concepts of forensic psychology and forensic psychiatry. Psychology and law. Ethical issues in forensic psychology. Assessment of mental competency. Mental disorders and forensic psychology. Psychology of evidence – eyewitness testimony, confession evidence. Criminal profiling. Psychology in the courtroom, with special reference to Section 84 IPC.

Unit 2 (10 Hrs)

- **Psychology and Criminal Behavior:** Psychopathology and personality disorder. Psychological assessment and its importance. Serial murderers. Psychology of terrorism. Biological factors and crime – social learning theories, psycho-social factors, abuse. Juvenile delinquency – theories of offending (social cognition, moral reasoning), Child abuse (physical, sexual, emotional), juvenile sex offenders, legal controversies.

Unit 3 (5 Hrs)

- **Tools for detection of deception:** interviews, non-verbal detection, statement analysis, voice stress analyzer, hypnosis.

Unit 4 (15 Hrs)

- **Polygraphy –** operational and question formulation techniques, ethical and legal aspects, the guilty knowledge test. Narco analysis and brain electrical oscillation signatures – principle and theory, ethical and legal issues

Suggested Readings
- *A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).*
- *R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).*
- *J.C. DeLadurantey and D.R. Sullivan, Criminal Investigation Standards, Harper & Row, New York (1980).*
- *J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999).*
- *E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).*

FORENSIC PSYCHOLOGY PRACTICAL

Course Code: BHFSS1-308   **L T P C**   Duration - 60 Hrs
                                                  0 0 4 2

Course Objective: The significance of criminal profiling and importance of psychological assessment in gauging criminal behavior. The tools and techniques required for detection of deception.

Course Outcome: The students will enable to do advance forensic techniques like polygraphy, narco analysis and brain electrical oscillation signatures.

Experiment

- To cite a crime case where legal procedures pertaining to psychic behavior had to be invoked.
- To prepare a report on the relationship between mental disorders and forensic psychology.
- To review a crime case involving serial murders. Comment on the psychological traits of the accused.
- To cite a crime case involving a juvenile and argue for and against lowering the age for categorizing an individual as juvenile.
- To study a criminal case in which hypnosis was used as a means to detect deception.
- To prepare a case report on the thematic apperception test.
- To prepare a case report on the Minnesota multiphasic personality inventory test.
- To prepare a case report on the thematic apperception test.
- To prepare a case report on a word association test.
- To prepare a case report on Bhatia's battery of performance test of intelligence.
- To cite a criminal case in which narco analysis was used as a means to detect deception.

Suggested Readings

- *A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).*
- *R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).*
- *J.C. DeLadurantey and D.R. Sullivan, Criminal Investigation Standards, Harper & Row, New York (1980).*
- *J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999).*
- *E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).*

INTRODUCTION TO BIOMETRY

Course Code: BHFSS1-304   **L T P C**   **Duration - 45 hrs**

3 0 0 3

Course Objectives: After studying this paper the students will know –

- The basis of biometry.
- The classification of biometric processes.
- The importance of behavioral biometry.

Course Outcome: This course will enable the students to:
- The subject will elucidate the origin, classification of biometry and biometric processes. It unravels the importance of physiological and behavioral biometry.

Unit 1 (20 Hrs)

- **Fundamental Aspects:** Definition, characteristics and operation of biometric systems. Classification of biometric systems – physiological and behavioral. Strength and weakness of physiological and behavioral biometrics. Multimodal biometrics. Key biometric processes – enrollment, identification and verification. Positive and negative identification.

Unit 2 (10 Hrs)

- **Performance measures used in biometric systems**: FAR, FRR, GAR, FTA, FTE and ATV. Biometric versus traditional technologies.

Unit 3 (10 Hrs)

- **Physiological Biometrics:** Fingerprints, palm prints, iris, retina, geometry of hand and face.

Unit 4 (5 Hrs)

- **Behavioral Biometrics:** Handwriting, signatures, keystrokes, gait and voice.

Suggested Readings

- ***S. Nanavati, M. Thieme and R. Nanavati, Biometrics, Wiley India Pvt. Ltd. (2002).***
- P. Reid, *Biometrics for Network Security*, New Delhi (2004).
- J.R. Vacca, *Biometric Technologies and Verification Systems*, Butterworth-Heinemann,Oxford (2007).

FORENSIC BIOLOGY AND SEROLOGY

Course Code: BHFSS1-305   **L T P C**   **Duration - 60 hrs**
                                 3 1 0 4

Course Objectives:

After studying this paper the students will know –
- The significance of biological and serological evidence.
- The forensic importance of hair evidence.
- The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.
- The importance of bloodstain patterns in reconstructing the crime scene.

Course Outcome: This course will enable the students to:
- It will familiarize the students with different techniques of advanced molecular biology viz. PCR, DNA fingerprinting, DNA sequencing as well as basic morphological and scalp patterns of hair of different organisms.

Unit 1 (20 Hrs)

- **Biological Evidence:** Nature and importance of biological evidence. Significance of hair evidence. Transfer, persistence and recovery of hair evidence. Structure of human hair. Comparison of hair samples. Morphology and biochemistry of human hair. Comparison of human and animal hair. Types and identification of microbial organisms of forensic significance. Identification of wood, leaves, pollens and juices as botanical evidence. Diatoms and their forensic significance.

Unit 2 (20 Hrs)

- **Forensic Importance of Body fluids:** Identification of body fluids. Composition and functions of blood. Collection and preservation of blood evidence. Distinction between human and non-human blood. Determination of blood groups. Antigens and antibodies. Semen. Forensic significance of semen. Composition, functions and morphology of spermatozoa. Collection, evaluation and tests for identification of semen. Individualization on the basis of semen examination. Composition, functions and forensic significance of saliva, sweat, milk and urine. Tests for their identifications.

Unit 3 (10 Hrs)

- **Bloodstain Pattern Analysis:** Bloodstain characteristics. Impact blood stain patterns. Cast-off bloodstain patterns.

Unit 4 (10 Hrs)

- **Projected Bloodstain patterns.** Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence. Crime scene reconstruction with the aid of bloodstain pattern analysis.

Suggested Readings

- L. Stryer, *Biochemistry*, 3rd Edition, W.H. Freeman and Company, New York (1988).
- W.G. Eckert and S.H. James, *Interpretation of Bloodstain Evidence at Crime Scenes*, CRC Press, Boca Raton (1989).
- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- G.T. Duncan and M.I. Tracey, Serology and DNA typing in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, BocaRaton (2008).

4th Semester

FORENSIC CHEMISTRY		
Course Code: BHFSS1-401	**L T P C**	**Duration - 60 Hrs**

3 1 0 4

Course Objectives:

After studying this paper the students will know –

- The methods of analyzing trace amounts of petroleum products in crime scene evidence.
- The methods of analyzing contaminants in petroleum products.
- The method of searching, collecting, preserving and analyzing arson evidence.
- The classification of explosives, including the synthesis and characterization of representative analogs.
- The significance of bomb scene management.
- The techniques of locating hidden explosives.
- The classification and characteristics of narcotics, drugs and psychotropic substances.

Course Outcome: This course will enable the students to:
- It will develop the scholar to identify the crime scene evidence and define the root cause of any crime.

- The student will be able to define the location, scenic pattern, methods of analyzing trace amounts of petroleum products in crime scene evidence, classification of explosives, including the synthesis and characterization of representative analogs, bomb scene management, categorization and features of the narcotics, drugs and psychotropic matter.

Unit 1 (15 Hrs)
- Petroleum and Petroleum Products: Distillation and fractionation of petroleum. Commercial uses of different petroleum fractions. Analysis of petroleum products. Analysis of traces of petroleum products in forensic exhibits. Comparison of petroleum products. Adulteration of petroleum products.

Unit 2 (5 Hrs)
- Cases Involving Arson: Chemistry of fire. Conditions for fire. Fire scene patterns. Location of point of ignition. Recognition of type of fire.

Unit 3 (20 Hrs)
- Searching the fire scene. Collection and preservation of arson evidence. Analysis of fire debris. Analysis of ignitable liquid residue. Post-flashover burning. Scientific investigation and evaluation of clue materials. Information from smoke staining.

Unit 4 (20 Hrs)
- Explosives: Classification of explosives – low explosives and high explosives. Homemade explosives. Military explosives. Blasting agents. Synthesis and characteristics of TNT, PETN and RDX.

- Explosion process. Blast waves. Bomb scene management. Searching the scene of the explosion. Mechanism of explosion. Post blast residue collection and analysis. Blast injuries. Detection of hidden explosives.

Suggested Readings

- J.D. DeHaan, *Kirk's Fire Investigation*, 3rd Edition, Prentice Hall, New Jersey (1991).
- A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, The Foundation Press, Inc., New York (1995).
- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime SceneInvestigation*, CRC Press, Boca Raton (2013).
- S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in *Forensic Science*, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

FORENSIC CHEMISTRY PRACTICAL

Course Code: BHFSS1-406   **L T P C**   **Duration - 60 Hrs**
                                                      0 0 4 2

Course Objectives: The discipline arose due to the combination of forensics with techniques of chemistry. The subject deciphers the classification of explosives, composition and identification. It attempts to inform the chemistry, conditions of fire, scene patterns, scientific investigation protocols and identification of clues.

Course Outcome: This course will enable the students to:
- It will develop the scholar to identify the crime scene evidence and define the root cause of any crime.
- The student will be able to define the location, scenic pattern, methods of analyzing trace amounts of petroleum products in crime scene evidence, classification of explosives, including the synthesis and characterization of representative analogs, bomb scene management, categorization and features of the narcotics, drugs and psychotropic matter.

Experiment
- To carry out analysis of gasoline.
- To carry out analysis of diesel.
- To carry out analysis of kerosene oil.
- To analyze arson accelerators.
- To prepare a case report on a case involving arson.
- To carry out analysis of explosive substances.
- To separate explosive substances using thin layer chromatography.
- To prepare a case report on bomb scene management.

Suggested Readings
- J.D. DeHaan, *Kirk's Fire Investigation*, 3rd Edition, Prentice Hall, New Jersey (1991).
- A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, The Foundation Press, Inc., New York (1995).
- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime SceneInvestigation*, CRC Press, Boca Raton (2013).
- S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in *Forensic Science*, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

QUESTIONED DOCUMENTS

Course Code: BHFSS1-402   **L T P C**   **Duration - 60 Hrs**

3 1 0 4

Course Objectives: After studying this paper the students will know –

- The importance of examining questioned documents in crime cases.
- The tools required for examination of questioned documents.
- The significance of comparing handwriting samples.
- The importance of detecting frauds and forgeries by analyzing questioned documents.

Course Outcome: This course will enable the students

- To attempt to showcase the importance of investigating questioned documents, tools necessary for the examination of the same. It imparts the information relevant for comparing different handwriting evidence of crime scenes. Its attempts to highlight the importance of identifying frauds and forgeries by evaluating questioned documents.

Unit 1 (5 Hrs)

- Nature and Scope of Questioned Documents: Definition of questioned documents. Types of questioned documents. Preliminary examination of documents.

Unit 2 (15 Hrs)

- Basic tools needed for forensic documents' examination – ultraviolet, visible, infrared and fluorescence spectroscopy, photomicrography, microphotography, visible spectral comparator, electrostatic detection apparatus. Determining the age and relative age of documents.

Unit 3 (20 Hrs)

- Comparison of Documents: Comparison of handwriting. Development of individuality in handwriting. Natural variations and fundamental divergences in handwritings. Class and individual characteristics. Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting.

Unit 4 (20 Hrs)

- Standards for comparison of handwriting. Comparison of paper, ink, printed documents, typed documents, Xeroxed documents.
- Forgeries: Alterations in documents, including erasures, additions, over-writings and obliterations. Indented and invisible writings. Charred documents. Examination of counterfeit Indian currency notes, passports, visas and stamp papers. Disguised writing and anonymous letters.

Suggested Readings

- ***O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton(1982).***
- ***A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).***
- R.N. Morris, *Forensic Handwriting Identification: Fundamental Concepts andPrinciples*, Academic Press, London (2000).
- E. David, *The Scientific Examination of Documents – Methods and Techniques*, 2ndEdition, Taylor & Francis, Hants (1997).

QUESTIONED DOCUMENTS PRACTICAL

Course Code: BHFSS1-407   **L T P C**   **Duration - 60 Hrs**

0 0 4 2

Course Objectives: This course will enable the students to be able to identify natural disparity such as line quality defects, alterations, obliteration in handwriting characters for comparative analysis.

Course Outcome: The subject will provide information for the detection and tracing of simulated forgery by analyzing various factors.

Experiment:

- To identify handwriting characters.
- To study natural variations in handwriting.
- To compare handwriting samples.
- To detect simulated forgery.
- To detect traced forgery.
- To study the line quality defects in handwriting samples.
- To examine the security features of currency notes, passports and plastic money.
- To study alterations, obliterations and erasures in handwriting samples.
- To cite a case wherein Section 45 of Indian Evidence Act was invoked, seeking expert opinion for authentication of handwriting and/or signatures.
- To cite a case wherein Section 489A of the Indian Penal Code was invoked in context of fake. currency.

Suggested Readings

- *O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton(1982).*
- *A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).*
- R.N. Morris, *Forensic Handwriting Identification: Fundamental Concepts andPrinciples*, Academic Press, London (2000).
- E. David, *The Scientific Examination of Documents – Methods and Techniques*, 2ndEdition, Taylor & Francis, Hants (1997).

FORENSIC BIOLOGY

Course Code: BHFSS1-403 **L T P C** **Duration - 60 Hrs**
  3 1 0 4

Course Objectives: After studying this paper the students will know –
- The significance of biological and serological evidence.
- The forensic importance of hair evidence.
- The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.
- How wildlife forensics aid in conserving natural resources.
- How forensic entomology assists in death investigations.

Course Outcome: This course will enable the students to:
- The subject provides detailed information regarding the significance of biological and serological evidence at crime scenes and the connotation of different DNA typing, PCR and post PCR processing techniques.

Unit 1:(15 Hrs)
- Biological Evidence: Nature and importance of biological evidence. Significance of hair evidence. Transfer, persistence and recovery of hair evidence. Structure of human hair. Comparison of hair samples.

Unit 2 (15 Hrs)
- Morphology and biochemistry of human hair. Comparison of human and animal hair. Types and identification of microbial organisms of forensic significance. Identification of wood, leaves, pollens and juices as botanical evidence. Diatoms and their forensic significance.

Unit 3: (20 Hrs)
- Wildlife Forensics: Fundamentals of wildlife forensic. Significance of wildlife forensic. Protected and endangered species of animals and plants. Illegal trading in wildlife items, such as skin, fur, bone, horn, teeth, flowers and plants. Identification of physical evidence pertaining to wildlife forensics. Identification of pug marks of various animals.

Unit 4 (10 Hrs)
- Forensic Entomology: Basics of forensic entomology. Insects of forensic importance. Collection of entomological evidence during death investigations.

Suggested Readings
- L. Stryer, *Biochemistry*, 3rd Edition, W.H. Freeman and Company, New York (1988).
- R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, *Harper's Biochemistry*,APPLETON & Lange, Norwalk (1993).
- S. Chowdhuri, *Forensic Biology*, BPRD, New Delhi (1971).
- R. Saferstein, *Forensic Science Handbook*, Vol. III, Prentice Hall, New Jersey (1993).
- G.T. Duncan and M.I. Tracey, Serology and DNA typing in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton(1997)

FORENSIC BIOLOGY PRACTICAL

Course Code: BHFSS1-408   **L T P C**   **Duration - 60 Hrs**

0 0 4 2

Course Objective: This course will enable the students to familiarize the students with different techniques of advanced molecular biology viz. PCR, DNA fingerprinting, DNA sequencing as well as basic morphological and scalp patterns of hair of different organisms.

Course Outcome: This course will enable the students to:

● The subject provides detailed information regarding the significance of biological and serological evidence at crime scenes and the connotation of different DNA typing, PCR and post PCR processing techniques.

Experiment:

● To examine hair morphology and determine the species to which the hair belongs.
● To prepare slides of scale patterns of human hair.
● To examine human hair for cortex and medulla.
● To carry out microscopic examination of pollen grains.
● To carry out microscopic examination of diatoms.
● To cite a crime case in which diatoms have served as forensic evidence.
● To prepare a case report on forensic entomology.
● To prepare a case report on problems of wildlife forensics.

Suggested Readings

● L. Stryer, *Biochemistry*, 3rd Edition, W.H. Freeman and Company, New York (1988).
● R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, *Harper's Biochemistry*,APPLETON & Lange, Norwalk (1993).
● S. Chowdhuri, *Forensic Biology*, BPRD, New Delhi (1971).
● R. Saferstein, *Forensic Science Handbook*, Vol. III, Prentice Hall, New Jersey (1993).
● G.T. Duncan and M.I. Tracey, Serology and DNA typing in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton(1997)

HANDWRITING IDENTIFICATION AND RECOGNITION

Course Code: BHFSS1-404   **L T P C**   **Duration - 60 Hrs**

3 1 0 4

Course Objectives: After studying this paper the students will know –

- Important features in handwriting identification.
- Basis of handwriting characteristics.
- Significance of forensic documentation.

Course Outcome: A student should learn the great need and importance of such expertise in courts and law because it is required for the authenticity of different signatures. Different types of handwritings along with alterations, as different individual personalities.

Unit 1 (5 Hrs)

- Handwriting Identification: Basis of handwriting identification. Characteristics of handwriting – scope and application. Class and individual characteristics.

Unit 2 (15 Hrs)

- Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting – physical, mechanical, genetic and physiological.

Unit 3 (20 Hrs)

- Handwriting Examination: Basis of handwriting comparison. Collection of handwriting samples. Forgery detection. Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examinations.

Unit 4 (20 Hrs)

- Handwriting Recognition: Basis of handwriting recognition. Off-line and on-line handwriting recognition. Steps involved in handwriting recognition – pre-processing, feature extraction and classification. Applications of handwriting recognition.

Suggested Readings

- O. Hilton, *Scientific Examination of Questioned Documents*, CRC Press, Boca Raton(1982).
- A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, Foundation Press, New York (1995).
- R.N. Morris, *Forensic Handwriting Identification: Fundamental Concepts andPrinciples*, Academic Press, London (2000).
- E. David, *The Scientific Examination of Documents – Methods and Techniques*, 2ndEdition, Taylor & Francis, Hants (1997).
- Z. Liu, J.H. Cai and R. Buse, Handwriting Recognition: *Soft Computing and Probabilistic Approach* (Volume 133), Springer Science and Business Media (2003).

SECURITY DOCUMENTS & BANK NOTES

Course Code: BHFSS1-405   **L T P C**   **Duration - 60 Hrs**
                                      3 1 0 4

Course Objectives: The course focuses on the following objectives-
- Developing an understanding and appreciation for the scope of security documents Questioned Documents.
- Develop an understanding of different types of security documents and their salient features and characteristics.
- Brief description of Bank notes, security features and their examination.

Course Outcome:
- This course will describe the basic principles of different types of security documents and their salient features and characteristics, security features and their examination. The students will gain an understanding of the threats to information resources and learn about counter measurements and their Limitations.

Unit 1 (5 Hrs.)
- Introduction to Security Documents Introduction of security documents, identity documents in India, Introduction to security feature used in various.

Unit 2 (15 Hrs.)
- Disputed Documents Types of security documents, passports, stamp paper, stamps, voter ID Cards, PAN Card credit cards, Aadhar card, Ration card, driving license, educational documents, etc.

Unit 3 (20 Hrs.)
- Bank Notes Introduction to Bank Notes, Currency notes, brief description on currency Governing and Manufacturing bodies in India, salient features for identification of genuine bank notes of 50, 100, 500, 1000 rupees Introduction to counterfeiting, comparison of genuine and counterfeiting.

Unit 4 (20 Hrs)
- Examination of Fake currencies Latest introduced security features, Process underlying the examination and Instrumentation used to differentiate, salient features of identification of original and fake security features in various documents.

Suggested Readings

- Charles, C. Thomas, I.S.Q.D. Identification System for Questioned Documents, Billy Prior Bates, Springfield, Illinois, USA, 1971.
- Lingard, J. R., (1985). Bank Security Documents, Butterworths.
- Budhram, T., (2007). Examining the Unique Security Features of a Credit Card with the Aim of Identifying Possible Fraudulent Use, University of South Africa.
- Fumy, W. and Paeschke, M. (2011). Handbook of e- ID Security, Publicis Publishing.
- Kelly, J. S. Lindblom, B. S. (2006). Science, Handwriting Examination and the Courts. Scientific Examinations of Questioned Documents, 2nd edition, CRC Press, Taylor & Francis group

5th Semester

FORENSIC BALLISTICS

Course Code: BHFSS1-501   **L T P C**   **Duration - 60 Hrs**
                                     3 1 0 4

Course Objectives: After studying this paper the students will know –

- The classification of firearms and their firing mechanisms.
- The methods of identifying firearms.
- The characteristics of ammunition.
- The importance of firearm evidence.
- The nature of firearm injuries.
- The methods for characterization of gunshot residue.

Course Outcome:
- This course will enable the students to the information is deduced in a purified form that is admissible in the court of law or any other legal system. Scientific analysis of bullet impacts to arrive at a basic logical inference defining about the incident.

Unit 1 (15 Hrs)

- Firearms :History and development of firearms. Classification of firearms. Weapon types and their operation. Firing mechanisms of different firearms. Internal ballistics – Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barreltime, erosion, corrosion and gas cutting.

Unit 2 (15 Hrs)

- External Ballistics – Vacuum trajectory, effect of air resistance on trajectory, base drag, drop, drift, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data. Terminal Ballistics – Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, influence of range. Ricochet and its effects, stopping power.

Unit 3 (15 Hrs)
- Ammunition :Types of ammunition. Constructional features and characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles. Headstamp markings on ammunition. Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks.

Unit 4 (15 Hrs)
- Firearm Evidence: Matching of bullets and cartridge cases in regular firearms. Identification of bullets, pellets and wads fired from improvised, country made firearms. Automated method of bullet and cartridge case comparison. Determination of range of fire and time of fire. Mechanisms of formation of gunshot residues. Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothings. Identification and nature of firearms injuries. Reconstruction with respect to accident, suicide, murder and self defence.

Suggested Readings

- ***B.J. Heard, Handbook of Firearms and Ballistics, Wiley and Sons, Chichester (1997).***
- W.F. Rowe, Firearms identification, *Forensic Science Handbook*, Vol. 2,R. Saferstein(Ed.), Prentice Hall, New Jersey (1988).
- A.J. Schwoeble and D.L. Exline, *Current Methods in Forensic Gunshot ResidueAnalysis*, CRC Press, Boca Raton (2000).
- E. Elaad in *Encyclopedia of Forensic Science, Volume 2*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

FORENSIC BALLISTICS PRACTICAL

Course Code: BHFSS1-505   **L T P C**   **Duration - 60 Hrs**

0 0 4 2

Course Objective: This practical lab is very essential for the forensic students as this involves the tool that marks evidence, firearm and ammunition. Moreover, this helps to match the bullet grain with the firearm from where it has been fired.

Course Outcome: Understanding the skills required to study ballistic fingerprinting is based on inevitable variations of firearms.

Experiment

- To describe, with the aid of diagrams, the firing mechanisms of different types of firearms.
- To correlate the velocity of the bullet with the impact it produces on the target.
- To correlate the striking angle of the bullet with the impact on the target.
- To estimate the range of fired bullets.
- To carry out the comparison of fired bullets.
- To carry out the comparison of fired cartridge cases.
- To identify gunshot residue.
- To correlate the nature of injuries with distance from which the bullet was fired.
- To differentiate, with the aid of diagrams, contact wounds, close range wounds and distant wounds.

Suggested Readings

- ***B.J. Heard, Handbook of Firearms and Ballistics, Wiley and Sons, Chichester (1997).***
- W.F. Rowe, Firearms identification, *Forensic Science Handbook*, Vol. 2,R. Saferstein(Ed.), Prentice Hall, New Jersey (1988).
- A.J. Schwoeble and D.L. Exline, *Current Methods in Forensic Gunshot ResidueAnalysis*, CRC Press, Boca Raton (2000).
- E. Elaad in *Encyclopedia of Forensic Science, Volume 2*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

FORENSIC TOXICOLOGY

Course Code: BHFSS1-502   **L T P C**   **Duration - 60 Hrs**
                                      3 1 0 4

Course Objectives: After studying this paper the students will know –

- The significance of toxicological studies in forensic science.
- The classification of poisons and their modes of actions.
- The absorption of poisons in body fluids.
- The forensic identification of illicit liquors.
- The classification and characteristics of narcotics, drugs and psychotropic substances.
- The menace of designer drugs.
- The methods of identifying and purifying narcotics, drugs and psychotropic substances.

Course Outcome:
- This course will enable the students and scholars to learn to make such intricate scientific tests on bodily fluids and samples of tissues for the identification of any drug or chemicals that are present in the body. Learning the techniques of pathology and autopsy.

Unit 1 (15 Hrs)
- Basics of Toxicology: Significance of toxicological findings. Techniques used in toxicology. Toxicological analysis and chemical intoxication tests. Postmortem Toxicology. Human performance toxicology. Dose-response relationship. Lethal dose 50 and effective dose 50.
- Poisons: Classification of poisons. Physico-chemical characteristics and mode of action of poisons. Accidental, suicidal and homicidal poisonings. Signs and symptoms of common poisoning and their antidotes. Collection and preservation of viscera, blood and urine for various poison cases. Identification of biocides and metal salts in body fluids. Metabolism and excretion of poisons. Application of immunoassays in forensic work.

Unit 2 (15 Hrs)
- Animal poisons. Snake venom. Mode of action. Carbon monoxide poisoning. Vegetable poisons. Poisonous seeds, fruits, roots and mushrooms. Beverages. Alcoholic and non-alcoholic illicit liquors. Analysis and identification of ethyl alcohol. Estimation of ethyl alcohol in blood and urine. Proof spirit. Crime scene management in illicit liquor cases.

Unit 3 (20 Hrs)
- Narcotics, Drugs and Psychotropic Substances: Definition of narcotics, drugs and psychotropic substances. Broad classification– Narcotics, stimulants, depressants and hallucinogens. General characteristics and common examples of each classification. Natural, synthetic and semi- synthetic narcotics, drugs and psychotropic substances. Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substances Crime scene search for narcotics, drugs and psychotropic substances – searching a suspect, searching a dwelling, searching a vehicle. Clandestine drug laboratories. Collection and preservation of drug evidence. Testing of narcotics, drugs and psychotropic substances.

Unit 4 (10 Hrs)

- Isolation techniques for purifying narcotics, drugs and psychotropic substances – thin layer chromatography, gas-liquid chromatography and high performance liquid chromatography. Presumptive and screening tests for narcotics, drugs and psychotropic substances. Microcrystalline testing of drugs of abuse. Analysis of narcotics, drugs and psychotropic substances in breast milk, saliva, urine, hair and antemortem blood. Drugs and driving. Dope tests. Analysis of narcotics, drugs and psychotropic substances in postmortem blood. Postmortem Changes affecting the analysis of narcotics, drugs and psychotropic substances.

Suggested Readings

- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- F.G. Hofmann, *A Handbook on Drug and Alcohol Abuse*, 2nd Edition,OxfordUniversity Press, New York (1983).
- S.B. Karch, *The Pathology of Drug Abuse*, CRC Press, Boca Raton (1996).
- A. Poklis, Forensic toxicology in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, *Alcohol, Drug and Driving*, 4, 99 (1988 W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

FORENSIC TOXICOLOGY PRACTICAL

Course Code: BHFSS1-506   **L T P C**   **Duration - 60 Hrs**

0 0 4 2

Course Objective: This practical laboratory teaches the students the application of different scientific analysis and their usefulness in the judicial system, most of the time this proves the main events of a crime scene.

Course Outcome: Training the students in such techniques makes them understand how to analyze and interpret the evidence. Such evidence also includes blood, saliva, firearms residue and tire tracks, etc.

Experiment

- To identify biocides.
- To identify metallic poisons.
- To identify organic poisons.
- To identify ethyl alcohol.
- To identify methyl alcohol.
- To carry out quantitative estimation of ethyl alcohol.
- To prepare iodoform.
- To identify drugs of abuse by spot tests.
- To perform color tests for barbiturates.
- To separate drugs of abuse by thin layer chromatography

Suggested Readings

- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- F.G. Hofmann, *A Handbook on Drug and Alcohol Abuse*, 2nd Edition, OxfordUniversity Press, New York (1983).
- S.B. Karch, *The Pathology of Drug Abuse*, CRC Press, Boca Raton (1996).
- A. Poklis, Forensic toxicology in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, *Alcohol, Drug and Driving*, 4, 99 (1988
- W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

DIGITAL FORENSICS

Course Code: BHFSS1-503   **L T P C**   **Duration - 60 Hrs**
                                     3 1 0 4

Course Objectives: After studying this paper the students will know –
- The basics of digital forensics.
- The cases which fall under the purview of digital crimes.
- The types of digital crimes.
- The elements involved in investigation of digital crimes.

Course Outcome: After studying this course, you should be able to:
- The origins of forensic science
- The difference between scientific conclusions and legal decision-making
- The role of digital forensics and the relationship of digital forensics to traditional forensic science, traditional science and the appropriate use of scientific methods
- Outline a range of situations where digital forensics may be applicable
- Identify and explain at least three current issues in the practice of digital forensic investigations.

Unit 1 (15 Hrs)
- Fundamentals and Concepts: Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS and LBA addressing, encoding methods and formats. Memory and processor. Methods of storing data. Operating system. Software. Introduction to network, LAN, WAN and MAN.

Unit 2 (15 Hrs)
- Computer Crimes: Definition and types of computer crimes. Distinction between computer crimes and conventional crimes. Reasons for commission of computer crimes. Breaching security and operation of digital systems.

Unit 3 (15 Hrs)
- Computer virus, and computer worm – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, computer terrorism, hate speech, private and national security incyber space. An overview of hacking, spamming, phishing and stalking.

Unit 4 (15 Hrs)
- Computer Forensics Investigations: Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene. Extraction of information from the hard disk. Treatment of exhibits. Creating bitstreams of the original media. Collection and seizure of magnetic media. Legal and privacy issues. Examining forensically sterile media. Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users.

Suggested Readings
- R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, *Computer Crimes and ComputerForensics*, Select Publishers, New Delhi (2003).
- C.B. Leshin, *Internet Investigations in Criminal Justice*, Prentice Hall, New Jersey (1997).
- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- E. Casey, *Digital Evidence and Computer Crime*, Academic Press, London (2000).

ECONOMIC OFFENSES

Course Code: BHFSS1-504   **L T P C**   **Duration - 60 Hrs**

3 1 0 4

Course Objectives: After studying this paper the students will know –

- Basic economic and financial terminology.
- Economic crimes in India are linked to several other crimes.
- Economic crimes often have a bearing on national security.
- Types of common economic offenses and their consequences.
- Steps involved in mitigating economic crimes.

Course Outcome: This course will enable the students to:

- Such subjects focus towards the development of studies that enhance student's knowledge about the functionality of government and law.
- Understanding the process that leads towards the development of the economy at a fast pace.

Unit 1 (15 Hrs)

- Taxonomy of Economic Offenses/Criminogenic Factors: Fundamentals of economics in economic offenses. Tax evasion. Excise duty evasion. Fraudulent bankruptcy. White collar crime. Economic Exclusion. Black money. Corruption and bribery of public servants.

Unit 2 (15 Hrs)

- Money laundering and hawala transactions. Insurance frauds. Corporate frauds. Bank frauds. Ponzi scheme. Pyramid scheme. Illicit trafficking in contraband goods. Illicit trafficking in arms. Illicit trafficking in explosives. Illicit drug trafficking. Trafficking in human organs. Cultural objects trafficking. Racketeering in employment. Racketeering in false travel documents.

Unit 3 (15 Hrs)

- Applied Economics in Processing Evidence: Forensic accountancy and forensic auditing. Valuation of economic losses. Violation of Intellectual Property Rights.

Unit 4 (15 Hrs)

- Prevention of Economic Offenses: Legislations to deal with different forms of economic offenses. RBI Act. SEBI Act. Competition Commission of India Act. Credit card frauds. Enforcement agencies to deal with different forms of economic offenses. International perspectives – measures adopted by the FBI and INTERPOL. Case histories of economic offenses.

Suggested Readings

- R.V. Clarke, *Situational Crime Prevention: Successful Case Studies*, 2nd Edition,Criminal Justice Press, New York (1997).
- S.P. Green, *Lying, Cheating and Stealing: A Moral Theory of White Collar Crime*,Oxford University Press, Oxford (2006).

- G. Geis, R. Meier, L. Salinger (Eds.), *White-Collar Crime: Classic & ContemporaryViews*, Free Press, New York (1995).
- J. Reiman, *The Rich get Richer and the Poor get Prison*, Allyn & Bacon, Boston(1998).
- Indian Audit and Accounts department, *Audit of Fraud, Fraud Detection and ForensicAudit*, 2007.
- State Crime Branch, Haryana*, Investigation of Economic Offences*.

6th Semester

FORENSIC ANTHROPOLOGY

Course Code: BHFSS1-601   **L T P C**   **Duration - 60 Hrs**

3 1 0 4

Course Objectives: After studying this paper the students will know –

- Importance of forensic anthropology in identification of persons.
- Different techniques of facial reconstruction and their forensic importance.
- Significance of somatoscopy and somatometry.

Course Outcome: This course will enable the students to:
- Eventually one should be able to hone the skills required by teamwork, for achieving different and shared goals. A scholar should be able to learn the problem solving art that supports an individual for facing difficulties and setbacks. Initiative taking capacity that is required when being asked to perform a substantial task linked with the improvement of things

Unit 1 (15 Hrs)
- Significance of Forensic Anthropology: Scope of forensic anthropology. Study of human skeleton. Nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material.

Unit 2 (15 hrs)
- Personal Identification – Somatoscopy and Somatometry: Somatoscopy – observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasal tip, chin, Darwin's tubercle, ear lobes, supra-orbital ridges, physiognomic ear breadth, circumference of head. Scar marks and occupational marks.

Unit 3 (15 Hrs)
- Somatometry – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height.
- Indices - cephalic index, nasal index, cranial index, upper facial index.

Unit 4 (15 Hrs)
- Facial Reconstruction: Portrait Parle/ Bertillon system. Photofit/identi kit. Facial superimposition techniques. Craniofacial superimposition techniques – photographic superimposition, video superimposition, Roentgenographic superimposition. Use of somatoscopic and craniometric methods in reconstruction. Importance of tissue depth in facial reconstruction. Genetic and congenital anomalies – causes, types, identification and their forensic significance.

Suggested Readings

- M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- D. Ubelaker and H. Scammell, *Bones*, M. Evans & Co., New York (2000).
- S.Rhine, *Bone Voyage: A Journey in Forensic Anthropology*, University of MexicoPress, Mexico (1998).

FORENSIC ANTHROPOLOGY PRACTICAL

Course Code: BHFSS1-605 **L T P C** **Duration - 60 Hrs**

0 0 4 2

Course Objective: Dealing with different types of crime scenes enables students to learn how to collect the evidence left behind the criminals and convicts. One should know the skills necessary for investigation in a crime laboratory.

Course Outcome: This course will enable the students to:
- A scholar should be able to learn the problem solving art that supports an individual for facing difficulties and setbacks. Initiative taking capacity that is required when being asked to perform a substantial task linked with the improvement of things

Experiment

- To determine age from skull and teeth.
- To determine of sex from skull.
- To determine sex from pelvis.
- To study identification and description of bones and their measurements.
- To investigate the differences between animal and human bones.
- To perform somatometric measurements on living subjects.
- To carry out craniometric measurements of human skull.
- To estimate stature from long bone length.
- To conduct portrait parley using photofit identification kit.

Suggested Readings

- M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- D. Ubelaker and H. Scammell, *Bones*, M. Evans & Co., New York (2000).
- S.Rhine, *Bone Voyage: A Journey in Forensic Anthropology*, University of MexicoPress, Mexico (1998).

FORENSIC MEDICINE

Course Code: BHFSS1-602　　　　**L T P C**　　　　　　**Duration - 60 Hrs**

3 1 0 4

Course Objectives: After studying this paper the students will know –

- The duties of the first responding officer who receives a call on a homicide or suicidecase.
- The steps involved in processing the death scene.
- The importance of ascertaining whether the crime was staged to appear as suicide or accident.
- The importance of bloodstain patterns in reconstructing the crime scene.
- The importance of autopsy.
- The importance of forensic odontology

Course Outcome: This course will enable the students to:
- Students are taught such basic tools of forensic medicine that deal with an autopsy that has been used for the identification of dead, autopsies that are conducted to determine the cause of death.

Unit 1 (15 Hrs.)

- **Death Investigations:** Fundamental aspects and scope of forensic medicine. Approaching the crime scene of death. Obtaining first hand information from the caller. Rendering medical assistance to the victim, if alive. Protecting life. Recording dying declaration. Identifying witnesses and, if possible, suspects. Interviewing onlookers and segregating possible witnesses. Suspect in custody – initial interrogation and searching for evidence. Miranda warning card. Assessing the crime scene. Request for forensic team. Importance of command post and logbook. Management of crowd and media.

Unit 2 (15 Hrs.)

- Importance of taking notes. Items to be a part of nothing. Documenting the death scene. Processing evidence. Evaluation of injuries. Importance of canvass form. Indexing the death investigation. Handling buried body cases – search for buried bodies, methods of exhumation.
- Suicide cases – evaluating the type of injuries, gauging the psychological state of victim, suicide notes.

Unit 3 (15 Hrs.)
- Autopsy: Forensic pathology. Medico-legal aspects of death. Causes of death. Determination of time since death. Investigation of sexual offences. Death by drowning. Injuries. Types and classification of injuries. Antemortem and post mortem injuries. Aging of injuries. Artificial injuries.

Unit 4 (15 Hrs.)
- **Forensic Odontology:** Development, scope and role of forensic odontology in mass disaster and anthropology. Types of teeth and their comparative anatomy.
- Bite marks. Forensic significance of bite marks. Collection, preservation and photography of bite marks evidence. Legal aspects of bite marks. Estimation of age from teeth.

Suggested Readings

- K. Smyth, *The Cause of Death*, Van Nostrand and Company, New York (1982).
- M. Bernstein, Forensic odontology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- J. Dix, *Handbook for Death Scene Investigations*, CRC Press, Boca Raton (1999).
- H.B. Baldwin and C.P. May in, *Encyclopedia in Forensic Science*, *Volume 1*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).
- V.J. Geberth, *Practical Homicide Investigation*, CRC Press, Boca Raton (2006).
- T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, Boca Raton (2008).
- 7. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

FORENSIC MEDICINE PRACTICAL

Course Code: BHFSS1-606	L T P C	Duration - 60 Hrs

0 0 4 2

Course Objective: Students are taught with the basics of medicine that has fundamental application of medicine to establish the facts for the civil or criminal cases, because such investigations are helpful during the time of suspicious death.

Course Outcome: This course will enable the students to:
Students are taught such basic tools of forensic medicine that deal with an autopsy that has been used for the identification of dead, autopsies that are conducted to determine the cause of death

Experiment

- To design a questionnaire for the first responder to the death scene.
- To design a protocol to deal with the media at the crime scene.
- To design a checklist for the forensic scientists at the death scene.
- To design a canvass form giving a description of an unidentified victim.
- To analyze and preserve bite marks.

Suggested Readings

- K. Smyth, *The Cause of Death*, Van Nostrand and Company, New York (1982).
- M. Bernstein, Forensic odontology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
- J. Dix, *Handbook for Death Scene Investigations*, CRC Press, Boca Raton (1999).
- H.B. Baldwin and C.P. May in, *Encyclopedia in Forensic Science*, *Volume 1*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).
- V.J. Geberth, *Practical Homicide Investigation*, CRC Press, Boca Raton (2006).
- T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, Boca Raton (2008).
- 7. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

FORENSIC SEROLOGY/ACCIDENT INVESTIGATION

Course Code: BHFSS1-603   **L T P C**   **Duration - 60 Hrs**
                                  3 1 0 4

Course Objectives: After studying this paper the students will know –

● The significance of serological evidence.
● The usefulness of genetic markers in forensic investigations.
● The forensic fluids blood, urine, semen, saliva, sweat and milk in crime investigations of bloodstain patterns

Course Outcome: This course will enable the students to:

● The subject provides detailed information regarding the significance of serological evidence at Accident/ Motor Vehicle analysis and the connotation of body fluid genetic marker blood stream pattern analysis.

Unit 1 (15 Hrs.)

● Forensic Importance of Body fluids :Common body fluids. Composition and functions of blood. Collection and preservation of blood evidence. Distinction between human and non-human blood. Determination of blood groups. Antigens and antibodies. Forensic characterization of bloodstains. Typing of dried stains. Blood enzymes and proteins. Semen. Forensic significance of semen. Composition, functions and morphology of spermatozoa. Collection, evaluation and tests for identification of semen. Individualization on the basis of semen examination. Composition, functions and forensic significance of saliva, sweat, milk and urine. Tests for their identifications.

Unit 2 (15 Hrs.)

● **Genetic Marker Analysis**: Cellular antigens. ABO blood groups Extracellular proteins and intracellular enzymes. Significance of genetic marker typing data. Sexual assault investigations.
● **Bloodstain Pattern Analysis:** Bloodstain characteristics. Impact bloodstain patterns. Cast-off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence. Crime scene reconstruction with the aid of bloodstain pattern analysis.

Unit 3 (15 Hrs.)

● **Motor Vehicle Accidents:** Accident scene. Sources of forensic information. Eyewitness accounts. Extent of vehicle damage. Visibility conditions. Photographs of the accident site. Estimation of speed. Tire marks, skid marks, scuff marks. Maintenance of vehicles. Abandoned vehicles. Importance of airbags. Railway accidents.

Unit 4 (15 Hrs.)

● **Accident Analysis:** Pre-crash movement. Post-crash movement. Collision model. Gauging driver's reaction. Occupants' kinematics. Types of injuries resulting from accidents. Biomechanics of injuries. Hit and run investigations. Trace evidence at accident sites.
● Forensic significance of tachograph data. Tachograph charts. Principles of chart analysis. Accuracy of speed record. Tire slip effects. Falsification and diagnostic signals. Route tracing.

Suggested Readings

- W.G. Eckert and S.H. James, *Interpretation of Bloodstain Evidence at Crime Scenes*,CRC Press, Boca Raton (1989).
- G.T. Duncan and M.I. Tracey in *Introduction to Forensic Sciences*, 2nd Edition, W.G.Eckert (Ed.), CRC Press, Boca Raton (1997).
- R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, BocaRaton (2008).
- T.S. Ferry, *Modern Accident Investigation and Analysis*, Wiley, New York (1988).
- D. Lowe, *The Tachograph*, 2nd Edition, Kogan Page, London (1989).
- T.L. Bohan and A.C. Damask, *Forensic Accident Investigation: Motor Vehicles*, MichieButterworth, Charlottesville (1995).
- S.C. Batterman and S.D. Batterman in *Encyclopedia of Forensic Sciences*, Volume 1, J.A.Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

DISSERTATION

Course Code: BHFSS1-604

L	T	P	C
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The dissertation will be based on a research topic in Forensic Science/Criminology. The topic will be assigned in consultation with police and forensic science establishments, giving due consideration to the problem areas faced by these institutions. The students will be expected to undertake extensive field work, in collaboration with mobile police laboratories.

Course Code: BDLTS1-301   **L T P C**   **Duration - 60 hrs**

4 0 0 4

Course Objective:
- To enable students, understand the fundamental of dialysis
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcomes
- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Unit:1   **(20 Hrs)**

- **Anatomy & Physiology** (normal kidney structure and functions), Derangement of kidney functions (aetiology, clinical manifestation, diagnosis of acute and chronic renal failure)

Unit:2   **(15 Hrs)**

- **Dialysis** – the concept (Brief history, definition, mechanism) Components of Dialysis Access, blood flow, anticoagulant, dialysate)

Unit:3   **(15 Hrs)**

- **Hemodialysis** – Basics (Blood circuit: tubing, pump, dialyzer, flow rate, dialysate circuit, concentrates, delivery systems, flow rate)

Unit:4   **(10 Hrs)**

- **Anticoagulation** (Heparin, alternatives to Heparin, regional no anticoagulation), Vascular access (Temporary, Permanent).
- **Dialysis water and water treatment:** Dialysis and Dialyzer (including reuse)

Reference books
- Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
- Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed,Elesvier: St Louis
- Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi

● Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

<mark>**Introduction to Dialysis Practical**</mark>

Course Code: BDLTS1-305　　　　**L T P C**　　　　　　　**Duration - 30 hrs**
　　　　　　　　　　　　　　　　　0 0　2 1

Course Objective:
 • To enable students, understand the fundamental of dialysis
 • To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcomes
 • Practice personal safety & standard precautions.
 • Handling complications during dialysis procedures.
 • Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Experiment:

● A Hemodialysis unit
● Demineralization plant
● Machine
● Initiation of Dialysis
● Conduction of Dialysis
● Dialysis – closure
● Washing, cleaning, reuse
● Maintenance of hygiene in Dialysis unit
● Access – core
● Anticoagulation

Reference books
 ● Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
 ● Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed,Elesvier: St Louis
 ● Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi

 ● Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

<mark>Fundamental of Dialysis</mark>

Course Code- BDLTS1-302	L T P C	Duration:45 Hrs
	3 0 0 3	

Course Objective

- To enable students, understand the correct cannulation techniques.
- To demonstrate patient positioning and preparation
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcome

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Unit:1 (10 Hrs)

- **Medical Abbreviations Patient pedigree:** Common medical abbreviations, Patient encounter, History taking of patient: - Present, Past, Family History.
- **Physical Examination:** Inspection of whole body of the patient e.g. Chest, abdomen, pedal edema & Facial edema. Significance of edema as per the dialysis patient concern. Palpation – Method for palpation, Percussion - Resonance, hyper-resonance and dullness, Heart sounds & murmurs & any other abnormal body sound.

Unit:2 (15 Hrs)

- **Vital signs:** Assessing Pulse - Radial, Brachial, Apical & Femoral, Assessing Respiration - Normal rhythm and rate, Common disorders, Assessing Blood Pressure - Normal values, Hyper and hypotension, Assessing Temperature - Methods, Common abnormalities.
- **Essential Care:** Blood leaks, clotting, acute bleeding, hypotension, hypertension, fever, nausea, pyrogenic vomiting, headache, cardiac arrhythmias, chest pain, reactions muscle cramps, restlessness pruritus, convulsion, hemolysis.
- **Total patient care:** Nutritional consideration in CKD and dialysis patient, Diet, hygiene, fluid, rehabilitation. Recording and reporting.

Unit:3 (5 Hrs)

- **Safety Practices:** Identify specific risks associated with any work activities undertaken as a renal dialysis technician, The principles and practice of health and safety at work.

Safe lifting and handling techniques when moving equipment and/or supplies. Correct handling procedures for chemicals and toxic agents. Health and Safety regulations and guidance, the consequences of current flow within the body& control measures to be taken to manage risks, clinical risks posed by the application of technologies to treat

Unit:4   **(15Hrs)**

- **Aseptic Technique:** Hand Washing: Medical & surgical Management, use of appropriate personal protective equipment for all personnel involved in the renal area, type and range of personal protective equipment and the reasons for their use. Procedures for infection control within the renal environment. Methods to control spread of infection by hospital personnel.
- **Patient Management:** Cannulating, Line cannula termination. Positioning during the procedure of dialysis.

Reference books

- Water quality in hemodialysis by E. Bonnie - Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken

- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

MRSPTU (B.Sc. Dialysis Technology)
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SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)
<mark>**Fundamentals of Dialysis Practical**</mark>

Course Code- BDLTS1-306   **L T P C**   **Duration:60 Hrs**
                                   0 0 4 2

Course Objective

- To enable students, understand the correct cannulation techniques.
- To demonstrate patient positioning and preparation
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcome

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.

Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit

Experiment:
- Checking Vitals
- Physical Examination
- Patient and Technologist safety practices
- Aseptic Techniques
- Medication techniques (Demo): Oral, IM, IS, IV & cathedral
- Diet Plan & Intake and output plan

Reference books

- Water quality in hemodialysis by E. Bonnie - Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken

- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

==Pharmacology in Dialysis==

Course Code- BDLTS1-303   **L T P C**   **Duration:30 Hrs**
                                     2 0 0 2

Course Objective

- This course is designed to enable students to acquire understanding of Pharmacodynamics
- Pharmacokinetics and principles of therapeutics and Dialysis implications.

Course Outcomes

At the end of the course the students are able to:

- Understand the basic concepts of pharmacology
- Understand the pharmacology of common chemotherapeutics.
- Understand common antiseptics, disinfectants and insecticides.
- Understand drug acting on various systems of the human body.
- Understand alternative systems of medicines.

Unit:1   **(10Hrs)**

- **Introduction to Pharmacology:** Definitions, Terminology used, Types: Classification, Pharmacodynamics: Actions, therapeutic, Adverse, toxic effects, Pharmacokinetics: Absorption, distribution, metabolism, interaction, excretion, Review: Routes and principles of administration of drugs, Indian pharmacopoeia: Legal issues, Storage of various drugs, Calculation of drugs dosage, Rational use of drugs, Principles of therapeutics in Kidney Dialysis.
- **Fluid therapy with special emphasis in renal diseases:** Define IV fluids, differentiate the various IV fluids. Use of crystalloids and colloids in renal diseases. Mode of action, contraindication, precautions and side effects of using various IV fluids.

Unit:2   **(10 Hrs)**

- **Anti hypertensive:** Definition, classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in Hypotension.
- **Drugs & dialysis:** Dose & duration of drugs used in dialysis. The administration of drugs and the effect of dialysis on the action of drugs, Dialyzable drugs List of drugs that are dialyzable, action, dosage, side effects and contraindications of phenobarbitone, lithium, methanol etc.

Unit:3 (05 Hrs)

- **Heparin including low molecular weight heparin:** Introduction to heparin and Low molecular weight heparin. Description of Heparin & LMWH, pharmacokinetics, mode of action, indications and use, dosage and route of administration & side effects Protamine sulphate

- **Introduction to protamine**, mode of action, pharmacokinetics, indications,uses, dosage, route of administration, side effects, precautions, contraindications Formalin, sodium hypochlorite, hydrogen peroxide Action, characteristics, the use of the drugs and its role as disinfectants & adverse effects of residual particles applicable too formalin.

Unit:4 (05 Hrs)

- **Hemodialysis:** concentrates Composition & dilution (acetate & bicarbonates). Peritoneal dialysis fluid in particular hypertonic solutions – composition Fluids used in peritoneal dialysis, the composition and strength of concentration. Mode of action, uses, indications and precaution Potassium exchange resins with special emphasis on mode of administration Introduction to potassium exchange resins, chemical composition. Types, mode of action, indications for use, side effects, precautions and contraindications

Recommended Text Books:

- Satoskar, Bhandarkar, Ainapure: Pharmacology and Pharmacotherapeutics, 18 Edition Popular Prakashan Mumbai.

- M M Das: Pharmacology, Books & Allied (p) Ltd, 4 Edition 2001.

- Rodman & Smith: Clinical pharmacology in nursing, 2 Edition, J B Lippincott company, Philadelphia.

- Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan

- Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed, Elesvier: St Louis.

- Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi

- Ajay, P., Medhi - Bikash (2010). Pharmacology, Jaypee Brothers medical

  publishers: New Delhi

Community Orientation & Clinical Visit (Including related practical's to the parent course) Practical

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students will apply knowledge from clinical learning experience under the supervision of a senior technologist Students are tested on intermediate clinical cardiac care skills.

(Total- 360 hrs)

Medical Bioethics & IPR

Course Code- BDLTS1-307   **L T P C**   **Duration:45 Hrs**

           3 0 0 3

CourseObjective

- To introduce the wide range of ethical issues in health care.
- To provide basic skills in: A) Approaching ethical issues. B) Analysis andstatement of issues. C) Understanding the relevant ethical principles invoked.
- Imparting knowledge and skills that will enable students to develop ethicalanswers to these issues
- To acquire acquire specialized knowledge of law and IPR.
- The main objective of the IPR is to make the students aware of their rights forthe protection of their invention done in their project work.

Course Outcomes

- Upon successful completion of the course, students will be able to: Recognizewhat constitutes an ethical concern in health care
- Understanding ethical issues in Health care.
- Understand better the complexity and multi-dimensionality of medical ethicalconcerns and uniqueness of each problem.
- Capacity to rationally justify your decision
- Develop the ability to reason through difficult medical/clinical ethical issuesboth orally, in the context of a group of their peers, and through written
- The students get awareness of acquiring the patent and copyright for theirinnovative works.
- They also get the knowledge of plagiarism in their innovations which can bequestioned legally.

Unit:1   **(15 Hrs)**

- **Introduction to Bioethics:** Bioethical issues related to Healthcare & Medicine
- **Anatomy** - Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling
- **Physiology -** Animal ethics, Health policy privacy.

Unit:2   **(10 Hrs)**

- **Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights,Disposal of investigative material, Integrity, Blood transfusion
- **Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization,   Animal Ethics

Unit:3   **(5 Hrs)**

- **Microbiology -** Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and biohazard.Medico legal aspects of medical records

Unit:4   **(15 Hrs)**

- **Introduction to Intellectual Property:** Concept of Intellectual Property Kinds of Intellectual Property Patents, Copyrights Designs, Trademarks, Geographical Indication, Infringement of IPR, Its protection andRemedies Licensing and its types

Reference Books:

- Contemporary issues in bioethics – Beauchamp & walters (B&W) 4th edition.
- Classic philosophical questions by Gloud (8th Edition)
- Case book series and booklets by UNESCO Bioethics Core curriculum 2008
- Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
- Intellectual property rights- Ganguli-Tat Mc Grawhill. (2001) ISBN-10: 0074638602,
- Intellectual Property Right- Wattal- Oxford Publication House.(1997) ISBN:0195905024.

MRSPTU (B.Sc. Dialysis Technology)
(Faculty of Pharmacy)
SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)

<mark>Organizational Behavior</mark>

Course Code- BDLTS1-308T　　　　　　**L T P C**　　　　　**Duration:45 Hrs**
　　　　　　　　　　　　　　　　　　　　3 0 0 3
Course Objective

- To understand the initial insights into underlying principles and fundamental theories of organizational behavior.
- The Student should develop a sense of what falls under the domain of organizational behavior.
- He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations.
- This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.

Course Outcomes

- Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives.
- Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviors in team and organizational settings.
- Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques.
- Analyze and apply leadership theories and better understand their own leadership style.

Unit:1　　　　　　　　　　　　　　　　　　　　　　　　　**(15 Hrs)**

- **Organizational Behavior:**　Definition - Importance - Historical Background - Fundamentalconcepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive
- **Organization Structure and Design**:　Authority and Responsibility Relationships - Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design Mechanistic vs Adaptive Structures – Formal and Informal Organization.

Unit:2　　　　　　　　　　　　　　　　　　　　　　　　　**(15 Hrs)**

- **Perception Process** - Nature & Importance - Perceptual Selectivity - Perceptual Organization -Social Perception - Impression Management
- **Learning** - Process of Learning - Principles of Learning - Organizational Reward Systems -Behavioral Management

Unit:3   **(10 Hrs)**

- **Motivation** - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity - Morale Indicators
- **Leadership** - Definition - Importance - Leadership Styles - Models and Theories of LeadershipStyle

Unit:4   **(5 Hrs)**

- **Conflict Management** - Traditional vis-a-vis Modern view of conflict - Constructive andDestructive conflict - Conflict Process - Strategies for encouraging constructive conflict Strategies for resolving destructive conflict

Reference Books:

- Organizational Behavior, 9th Ed. - Stephen Robbins
- Human Behavior at work - Davis and Newstrom
- Organizational Behavior - Uma Sekaran
- Organizational Behavior - Fred Luthans
- Organizational Behavior - K.Aswathappa
- Human Behavior at Work - Keith Davis
- Organizational Behavior - Jit S.Chandran
- Human Relations & Organizational Behavior - R.S.Dwivedi
- Organizational Behavior - McShane

MRSPTU (B.Sc. Dialysis Technology)
(Faculty of Pharmacy)
SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)

==**Concept of Renal Disease & Disorders**==

Course Code- BDLTS1-401T   **L T P C**   **Duration:60Hrs**
                                         3 1 0 4

Course Objective
- Describe the purpose, significance of results related to diagnostic studies of the urinary system**.**
- Comprehend the congenital abnormalities of the urinary system.
- Describe the appropriate techniques used in the physical assessment and significant subjective and objective data related to the urinary system.
- Describe the purpose, significance of results related to diagnostic studies of the urinary system
- Comprehend the congenital abnormalities of the urinary system
- Classify and enumerate kidney diseases, including Glomerular, tub interstitial and vascular diseases

CourseOutcomes
- To develop understanding regarding different disorder and its management.
- To develop knowledge in childhood anomalies' and it's significance.

Unit:1   **(15 Hrs)**

- **Assessment and Diagnostic studies of the Urinary system:** Physical assessment of a person with kidney disease, basics of assessment, list various diagnostic tests done for kidney diseases, Laboratory tests, imaging studies, normal values, interpretation of the tests including the roles and responsibilities of a technologist.

Unit:2   **(15 Hrs)**

- **Classification of renal diseases:** Define renal disorders,   introduction to the classification of the various types of renal disorders.
- **Glomerular diseases:** causes, types & pathology: Definition, etiology, type'spathophysiology, medical and surgical management.
- **Tubulo interstitial diseases & Renal vascular disorders, asymptomatic urinary abnormalities:** Definition, etiology, type's pathophysiology, medical and surgical management.

Unit:3   **(15 Hrs)**

- **Obstructive Diseases:** Acute Kidney Injury & End stage renal diseases, Obstructive Uropathies– Causes & pathology, renal calculi & renal tumors: definition, etiology,type's pathophysiology, medical and surgical management.

- **Congenital & Inherited Renal Diseases:** Peniel, scrotum, urinary bladder, Kidney:size, shape, positioning malformation: definition, cause and its management.

Unit:4 (15 Hrs)

- **Pathology of kidney in hypertension, diabetes mellitus, pregnancy:** Pathology of peritoneum – peritonitis – bacterial, tubercular & sclerosing Peritonitis, urinary tract infections, Pyelonephritis & tuberculosis pyelonephritis
- **Pathology of peritoneum, UTI & nephritis:** peritonitis, bacterial, tubercular & sclerosing Peritonitis, Pathology of urinary tract infections- common organisms involved, Pyelonephritis & tuberculous pyelonephritis: definition, etiology, types pathophysiology, medical and surgical management.
- **Dialysis In ICU:** Emergency care & Intensive care of a dialysis patient, Principles of Extracorporeal Short-Wave Lithotripsy, Plasmapheresis, CRRT & SLED, common urosurgical procedures & instruments and their maintenance, Preparation of dialysis patients for various surgical procedure and post-operative Dialysis support, Basic and advanced cardiac life support.

Reference books:

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University PresS
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences.
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley

Concept of Renal Disease & Disorders Practical

Course Code- BDLTS1 404 P   **L T P C**   **Duration:30 Hrs**

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- Describe the purpose, significance of results related to diagnostic studies of the urinary system.
- Comprehend the congenital abnormalities of the urinary system.
- Describe the appropriate techniques used in the physical assessment and significant subjective and objective data related to the urinary system.
- Describe the purpose, significance of results related to diagnostic studies of the urinary system
- Comprehend the congenital abnormalities of the urinary system
- Classify and enumerate kidney diseases, including Glomerular, tub interstitial and vascular diseases

CourseOutcomes
- To develop understanding regarding different disorder and its management.
- To develop knowledge in childhood anomalies' and it's significance

Experiment:

- Care of Patient with CKD
- Care of Patient with ARF
- Health teaching on prevention of UTI
- Health teaching on prevention of peritonitis

Reference books:

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University PresS
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences.
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley

<mark>Nutrition in Dialysis</mark>

Course Code-BDLTS1-402T   **L T P C**   **Duration:45 Hrs**
                                          3 0 0 3

Course Objective

- Discuss the basic nutrition and their role in growth, development, maintained and restoration
- Articulate the rationale for calculating body mass index (BMI) in nutritional assessment of dialysis patients.

Course Outcomes

- To describe basic nutrient and their role in growth, development, health maintained and restoration.
- To identify and interpret appropriate dietary plan for dialysis patient.

Unit:1   **(5 Hrs)**

- **Introduction Nutrition in Dialysis:** Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition, food selection, storage & preservation, prevention of food adulteration.
- **Types of nutrients:** protein, carbohydrate, lipids, vitamins, minerals, water. And their calorie values and calculation.

Unit:2   **(10 Hrs)**

- **Carbohydrates:** Monosaccharides: glucose, fructose, galactose. Disaccharides - Maltose, lactose, sucrose. Polysaccharide: Dextrin, starch, glycogen, resistance starch.
- **Proteins -** Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.
- **Lipids -** Sources, daily requirements, functions. Digestion & Absorption. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.

Unit:3   **(10 Hrs)**

- **Water –** sources of drinking water, requirements, preservation of water. Vitamins - types, sources, requirements deficiencies of vitamins.

544

- **Energy in Human Nutrition:** Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements deficiency and excess, Determination of Energy in food, B.M.R. and its regulation, -S.D.

Unit:4   **(20 Hrs)**

- **Clinical Signs:** Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs, other disease and disorders in relation with renal conditions.
- **Nutritional anthropometry:** Need and importance, standard for reference, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart of dialysis patient.
- **Minimum Nutritional Requirement for dialysis patients and RDA:** Formulation of RDA and Dietary Guidelines Reference Man and Reference Woman. Adult consumption unit. Planning nutritional diet & maintenance of Intake output chats of dialysis patient.

Reference book

- Jelliffe, D. B. : Assessment of the Nutritional Status of the Community; World

  Health Organisation.

- Sain, D. R. Lockwood, R., Scrimshaw, N. S. : Methods the Evaluation of the

  Impact of Food and Nutrition Programmes, United Nations University.

- Ritchie, J.A.S. : Learning Bettor Nutrion FAO, Rome.
- Gopalon. C,: Nutrition Foundation of India, Special Publication service.
- Beghin, 1. Cap. M: Dujardan. B. : A Guide to Nutrition Status Assessment.
- W. H. 0. Geneva. Gopaldas, t. Seshadri, S. : Nutrition Monitoring a Assessment: Oxford

  University Press.

- Mason, J. B., Habicht, J. P.; Tabatabai. H. Valverde. U. :Nutrational Surveillance, W.H.O.

MDT Directed Clinical Education – II (one month in vacation)

Course code- BSMD403   **(Total-450 hrs)**

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

SEMINAR

BDLTS1-405

For seminar/presentation there will be a maximum of 50 marks. Seminar / presentations will be evaluated by the teachers of thedept. The marks obtained in the same will be kept confidentially with the Head of the Dept. and will be submitted along with the internal assessment marks.

Human Rights & Professional Values /Pursuit of Inner Self Excellence (POIS)

Course Code- BDLTS1 406T   **L T P C**   **Duration:45 Hrs**
                                         3 0 0 3

Course Objective

- To understand interaction between society and educational institutions.
- To sensitize the citizens so that the norms and values of human rights and duties of education programmes are realized.
- To encourage research activities.
- To encourage research studies concerning the relationship between HumanRights and Duties Education.
- To inculcate moral values in students – Self-Discipline, Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members.
- Develop Effective means of communication & presentation skills in students
- To develop wisdom in students for deciding their career based on their areas of interest and inner skills.
- Introduce techniques for Relaxation, Meditation & Connecting with inner self.

Course Outcomes

SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)

- This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice.
- It will include awareness of civil society organizations and movements promoting human rights. This will make the students realize the difference between the values of human rights and their duties

- Students will become self-dependent, more decisive and develop intuitive ability for their study and career related matter.
- Student's ability to present their ideas will be developed.
- Enhanced communication skills, public speaking & improved Presentation ability.
- Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused

Unit:1   **(10 Hrs)**

- **Background** - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights.
- **Human rights at various level**- Human Rights at Global Level UNO,
- **Instruments**: U.N. Commission for Human Rights, European Convention on Human Rights.

- **Spiritual Values for human excellence** : The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali's Ashtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Why spirituality? Concept – significance ; Thought culture

Unit:2   **(10 Hrs)**

- **Human rights in India** - Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993. National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman.

- **Ways and Means :** Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master

Unit:3   **(10 Hrs)**

- **Human Rights Violations** -Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.
- **Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality.

- **Integrating spiritual values and life:** Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny

Unit:4 **(15 Hrs)**

- **Personal values-** ethical or moral values, Attitude and behavior- professional behavior, treating people equally.
- **Code of conduct**- professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment.

- **Experiencing through the heart for self-transformation(Heart fullness Meditation):** Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of egregore effect

Reference book

- Jagannath Mohanty Teaching of Humans Rights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. NewDelhi2009
- Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998
- Sivagami Parmasivam Human Rights Salem 2008
- Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.
- The Art of Learning: A Journey in the Pursuit of Excellence, Josh Waitzkin, Simon and Schuster, 2007
- Reality at Dawn. By Shri Ram Chandra, Published by ISRC

<mark>Biostatistics and Research Methodology</mark>

Course Code- BDLTS1 407T   **L T P C**   **Duration:45 Hrs**
                                       3 0 0 3

Course Objective

- To enable students to present, analyze and interpret data.
- To enable students to use concepts of probability in business situations.
- To enable students to make inferences from samples drawn from large datasets.
- To enable students to apply univariate and multivariate statistical techniques.

Course Outcomes

- To understand the importance & Methodology for research
- To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

Unit 1   **(15 hrs.)**
- **Introduction:** Statistics, Biostatistics, Frequency distribution
- **Measures of central tendency**: Mean, Median, Mode-
- **Measures of dispersion:** Dispersion, Range, standard deviation,
- **Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation

Unit 2   **(15 hrs.)**
- **Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression
- **Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM)
- **Parametric test:** t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

Unit 3   **(15 hrs.)**
- **Non Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test
- **Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

- **Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
- **Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Reference Book

- Mausner & bahn : Epidemiology-An Introductory text, 2nd Ed.,W.B. Saunders Co.
- Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

MRSPTU (B.Sc. Dialysis Technology)
(Faculty of Pharmacy)
SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)
==Applied Dialysis Technology – I==

Course Code- BDLTS1 501 T   **L T P C**   **Duration:60 Hrs**
                                        4 0 0 4

 Course Objective

- Students explain the history of Dialysis and nephrology.
- Students' understanding of the underlying anatomy and physiology on which peritoneal dialysis is based.
- Understands and demonstrate the Physiology of Dialysis
- Describes, procedure of Venipuncture and demonstrate it
- Able to maintain Records and Reports and demonstrate the procedure.

Course Outcomes

- Describes the anatomy and Physiology
- Performs Physiological principles of Dialysis
- Demonstrated Procedures as Venipuncture, Cannulation and maintenance of Sterilization of Equipment's and Dialysis Unit
- Demonstrate maintenance of Records and Reports

Unit:1   **(15 Hrs)**

- **History of Dialysis –**Indian History of dialysis
- **History of Nephrology :** Acute Kidney Injury, Renal angiogram , Biopsy and Transplant
- **Anatomy & Physiology of dialysis:** Peritoneal Anatomy (Basic), The peritoneal membrane as a "dialyzer.", The three-pore model. Peritoneal Physiology, Diffusion Ultra diffusion , Absorption, Clinical Assessment.
- **Principles of Dialysis, quantification of adequacy:** Principles of diffusion, filtration, ultrafiltration, convection, and osmosis. Solute transport and fluid movement during dialysis. Principles of fluid dynamics. Hemodialysis& Peritoneal Dialysis. Measuring dialysis adequately: Urea reduction ratio - Urea Kinetic Modeling. Pre –dialysis and post dialysis - BUN Measurement. Measurement of KT/V.

Unit:2   **(15 Hrs)**

- **Vascular Access – Temporary & Permanent:** Types of vascular access – Fistulae, Grafts, Catheters. Pre- dialysis assessments for all types of vascular access. Methods of needle insertion for AVFs and grafts. Pre - dialysis assessment, accessing procedure, exit site care, and monitoring of catheters.

- **Types of Dialysis:** Genesis of dialysis, invention and the process involved in the evolution of dialysis, indication of dialysis. Types of dialysis and classification. Dialysis for acute kidney injury, dialysis for chronic kidney disease. Introduction to Continuous renal replacement therapy (CRRT).

Unit:3   **(15 Hrs)**

- **Equipment, Accessories& Function** (hemodialysis machine, peritoneal dialysis machine): Types of equipment used in the dialysis process. Parts of a dialysis machine, tubing's and the water supply for dialysis. Overview of the various equipment,accessories and working of a dialysis machine-The technology, functioning, calibration, and sterilization of dialysis machine according to their: Type/ brand, Frequency and duration of use, Importance of Calibration and Sterilization , Recording (Calibration, Sterilization and set up details),Planning and Organizing Scheduled Maintenance, Various indicators, alarms and sensors of the dialysis machine. Corrective steps to be taken when a particular alarm goes off

Unit:4   **(15 Hrs)**

- **Infection control and sterilization:** Morphology of microorganisms, Sterilization and Disinfection, Microbiology of vascular access infection (femoral, jugular, subclavian catheters), Sampling methodologies for culture & sensitivity, Principles and Practice of Biomedical waste management
- **Renal data maintenance:** Records and reports maintained in the dialysis unit. Need for maintenance of records and report. The technologist's responsibility in maintenance of records and report. Medico legal aspects of maintenance of records

Recommended Text Books:
- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip

Applied Dialysis Technology – I Practical

Course Code- BDLTS1 504P   **L T P C**   **Duration:60Hrs**
                                          0 0 4 2

Course Objective

- Students explain the history of Dialysis and nephrology.
- Students' understanding of the underlying anatomy and physiology on which peritoneal dialysis is based.
- Understands and demonstrate the Physiology of Dialysis
- Describes, procedure of Venipuncture and demonstrate it
- Able to maintain Records and Reports and demonstrate the procedure.

Course Outcomes

- Describes the anatomy and Physiology
- Performs Physiological principles of Dialysis
- Demonstrated Procedures as Venipuncture, Cannulation and maintenance of Sterilization of Equipment's and Dialysis Unit
- Demonstrate maintenance of Records and Reports

Experiment:

- A.V. Cannulation
- A.V. Fistula
- Initiation of dialysis through central venous catheters – Internal
- Jugular – Femoral – Subclavian vein Packing and sterilization of dialysis trays
- Termination Dialysis

Reference book:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences

- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.

- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

Advance Dialysis Technology - I

Course Code- BDLTS1 502 T   L T P C   Duration: 60 Hrs

4 0 0 4

Course Objective

- Students Learn about Types of Dialysis and its Implications
- Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each
- Differentiate between peritoneal dialysis, SLED, CRRT, High efficiency dialysis & Hemodialysis in terms of purpose, indications, advantages, disadvantages and the responsibilities of a technologist.

Course Outcomes

- Practice and perform independently the water maintenance for the Hemodialysis room
- Independently maintain the Hemodialysis machine with respect to disinfection and priming.

Unit:1   **(15 Hrs)**

- **Hemodialysis:** The process of Haemodialysis, vascular access, Starting Haemodialysis, priming of the dialyser, alarms and the settings of a dialyser, completion of Haemodialysis, closing the Haemodialysis. Cleaning of the tubing and dialyser and the dialysis machine.
- **Complications of Haemodialysis Acute & chronic Complications of Haemodialysis:** acute complications – monitoring, prevention for acute complications. Chronic complications – list, prevention strategies, monitoring for chronic complications.

Unit:2   **(15 Hrs)**

- **Preparation and positioning of patient for dialysis, Patient Assessment – Pre, intra & post dialysis & Machine and patient monitoring during Hemodialysis:** Introduction to patient assessment, Understanding a treatment plan, Equipment preparation – Dialysate - Dialyser and Blood lines, Decisions regarding the appropriate size and type of catheter/ IV tubing to be used Connecting patients to the machine- Initiation of dialysis - Removing fluid - Replacing fluid - Drawing blood samples - Testing blood samples.
- **Measuring dialysis adequately:** Urea reduction ratio - Urea Kinetic Modelling. Pre – dialysis and post dialysis - BUN Measurement. Factors affecting dialysis treatment, communicating and documenting the findings prior to the dialysis process.

- **Starting the dialysis treatment:** Monitoring during dialysis - Patient Monitoring (blood pressure, temperature, rate of blood flow, proper mixture of dialysate, presence of air bubbles)- Technical Monitoring.

Unit:3   (15 Hrs)

- **Importance of reporting, HD Complications during dialysis:** Clinical complications - Technical Complications- Procedure to disconnect the patient - procedure for removing the IV cannula- Post dialysis procedures, Post dialysis patient evaluation, Recording of the Treatment, Recording changes in Patient's condition, Preparation of status   and progress   reports, Equipment clean up   and Maintenance, Recording the dialysis procedure on the medical report/chart of the patient.
- **Dialysate delivery system:** Definition of a delivery system, types of delivery systems.
- **Composition of dialysate:** Various dialysate compositions, its uses and indications. Method for obtaining various compositions of dialysate
- **Anticoagulation** Use of anticoagulation in the dialysis setting, various anticoagulants used Monitoring during use of anticoa. Method of administration Calculation of anticoagulant use & complications. Heparin free dialysis - need and indication. Regional citrate anticoagulation.
- **High flux / high efficiency dialysis:** Definition of high flux / high efficiency dialysis, differences between high flux dialysis and Haemodialysis, used and indications for high flux dialysis, complications of high flux dialysis, precautions and contraindications. Care during a high flux dialysis.

Unit:4   (15 Hrs)

- **Peritoneal Dialysis:** Acute and Chronic Peritoneal Dialysis. PD – Transport kinetics, ultrafiltration, UF, Intermittent PD, Continuous Ambulatory Peritoneal Dialysis, Automated Peritoneal Dialysis, Dialysis Solutions, Novel uses of PD. Adequacy of peritoneal dialysis chronic peritoneal Dialysis - KT/V Creatinine clearance. PET - Peritoneal Equilibrium test and interpretation.
- **Infectious   and   non infectious   complications of   PD   Introduction to complications in peritoneal dialysis. List of Complications:** Catheter Infections Peritonitis Inadequate flow or drainage of the dialysis fluid Lesions Ultrafiltration failure. Management of exit site infection, Early Exit Site Care. Chronic Care of the Healed Exit Site Diagnosing Exit Site Infections Treatment of exit-site infections Technique to culture exit site infection Medical management of CAPD peritonitis Initiation of therapy based on gram stain results Antibiotic selection. Medications in dialysis, Nutrition management in dialysis patients**.**Common drugs used for a patient on dialysis, Use of antibiotics during and post dialysis, considerations to be taken, Erythropoietin use in patients on dialysis - dosage and administration, Antihypertensive use - considerations during dialysis**,** Vaccines

for patients on haemodialysis - need and the schedule, Introduction to nutrition and RDA's. Renal diet, Teaching for a patient on renal diet, Diet & method of cooking to be employed, Planning a renal diet for a patient with CRF

Reference book

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press.
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- 3.Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
- Khanna,R., Krediet R.T.,(2009) Nolph and Gokal's Textbook of Peritoneal Dialysis, 3rd Ed Springer. Feehally J., Floege, J., Johnson R.J., (2007) Comprehensive Clinical Nephrology 3rd Ed Mosby

SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)
<mark>**Advance Dialysis Technology – I Practical**</mark>

Course Code- BDLTS1 505P   **L T P C**   **Duration: 60 Hrs**

0 0 4 2

Course Objective

- Students Learn about Types of Dialysis and its Implications
- Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each
- Differentiate between peritoneal dialysis, SLED, CRRT, High efficiency dialysis & Hemodialysis in terms of purpose, indications, advantages, disadvantages and the responsibilities of a technologist.

Course Outcomes

- Practice and perform independently the water maintenance for the Hemodialysis room
- Independently maintain the Hemodialysis machine with respect to disinfection and priming

Experiment:

- Setting up a dialysis machine for dialysis
- Preparation of concentrates – depending on the situation
- Reuse of dialysis apparatus
- Isolated ultrafiltration.
- Performance of peritoneal dialysis exchange – manually
- Setting up of automated peritoneal dialysis equipment

Reference book

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press.
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- 3.Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
- Khanna,R., Krediet R.T.,(2009) Nolph and Gokal's Textbook of Peritoneal Dialysis, 3rd Ed Springer. Feehally J., Floege, J., Johnson R.J., (2007) Comprehensive Clinical Nephrology 3rd Ed Mosby

SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)
Course code- BSMD 503 T: MDT Directed Clinical Education – III

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological and invasive techniques.

(Total- 360 hrs)

Basics of Clinical Skill Learning

Course Code- BDLTS1 506 T   **L T P C**   **Duration:45 Hrs**

3 0 0 3

Course Objective

- To Understand the basic ideas on how to check for Vital Signs of the Patien**t.**
- This course the Student will learn how to handle the patients and their positioning.
- They will also learn on the Basics of Nasal-Gastric Tube.
- The Students will learn on Administration of IV, IV and Medication.
- Also they will know about Cleanliness in the Asepsis.

Course Outcomes

- After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines.
- The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients.

Unit:1   **(10 Hrs)**

- **Measuring vital signs:** temperature: axillaries temperature, pulse: sites of pulse, measurement, respiratory, blood pressure, pain: pain scale
- **Physical examination:** observation, auscultation (chest),palpation, percussion, history taking

Unit:2   **(20 Hrs)**

- **Feeding: entral feeding, ng tube:** measurement, procedure, care, removal of nasal-gastric tube, nasal-gastric tube feeding, and parenteral nutrition.
- **Administrations:** oral, intravenous, intramuscular, subcutaneous, recapping of syringe, loading of drugs, calculation of drugs, venipuncture, iv infusion, cannula, attachment of iv infusion set, fluid collection, heparin lock, maintenance of iv set, performing nebulizer therapy, inhaler, oxygen therapy (nasal, prongs, nasal catheter, venturi mask, face mask).

Unit:3   **(10 Hrs)**

- **Asepsis:** hand wash techniques, (medical, surgical) universal precaution, protecting

- **Equipments:** using sterile gloves, opening a sterile package and establishing a sterile field, sterile dressing changes, surgical attire, wound dressing, suture removal, cleaning and application of sterile dressing, wearing and removal of personal protective equipment.

Unit:4 (5 Hrs)

- **Mobility and support:** Moving and Positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints.

Reference Book:

- Jansen van Vuuren, M. V. (2005). A framework for a skills laboratory curriculum in an undergraduate medical programme in South Africa (Doctoral dissertation, University of the Free State).

Course Code- BDLTS1 507 T   **L T P C**   **Duration:45 Hrs**

3 0 0 3

Course Objective:

- To promote scientific management of hospitals and advancement of health care systems so as to make it rational, responsive and cost efficient.
- To promote the development of high quality hospital care in the community and the country.
- It has to provide a satisfactory environment to the patient and also to the doctors for clinical research.

Course Outcomes:

- Understand and apply resource management concepts (personnel, finance, and material resources) and the processes and strategies needed in specific hospital sectors.
- Communicate effectively and develop their leadership and teambuilding abilities.
- Apply modern change management and innovation management concepts to optimize structures.
- Analyze existing hospital service policies and enhance their alignment within the local and national context

Unit 1   **(15 hrs.)**
- **Medico-legal cases:** introduction, laws associated with medico-legal cases, three core contents in medico-legal cases w.r.t doctors, patient & profession,
- **Considerations of ethics:** consent, confidentiality, mental health, end of life and organ transportation, research & clinical trials

Unit 2   **(10 hrs.)**
- **Hospital information system(his):** hospital information system management, software applications in registration, billing, investigations, reporting, medical records management, security and ethical challenges.

Unit 3   **(10 hrs.)**
- **Equipment operations management:** hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, amcs.

Unit 4   **(10 hrs.)**
- **Role of medical   records in health   care management:** computers for medical records, developments of computerized medical record information processing

system(emr's), computer stored (vs) manual hand written record, advantages of emr (vs) manual

Reference Book

- Hospital Operations: Principles of High Efficiency Health Care William S. Lovejoy
- Handbook of Healthcare Operations Management Brian T. Denton

Course Code- BDLTS1 601 T   **L T P C**   **Duration: 60 Hrs**

4 0 0 4

Course Objective

- Enumerate on the various complications of Hemodialysis in terms of the technologist's responsibility in prevention and worsening of the complications
- Dialysis in special Cases
- Students learns about various conditions and their association in Dialysis
- Student demonstrated Skills in Follow up care and quality maintenance in terms of renal dialysis treatment Modalities and Procedures

Course Outcomes

- Train patients in performing peritoneal dialysis, and personal care.
- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Maintain quality and safety.

Unit:1   **(10 Hrs)**

- **Acute and chronic dialysis prescription/ consideration:** Common drugs for patients with ARF & CRF, Actions, side effects
- **Special considerations:** Patients with Renal anemia, Congestive cardiac failure (CCF), advanced liver disease, Positive with HIV, HBSAG & HCV. Failed Transplant, Poisoning cases & pregnancy.

Unit:2   **(15 Hrs)**

- **Dialysis in Neonates, infants, children & adolescence:** Dialysis for infants and neonates, vascular access in this special group, dialysis settings, Monitoring for complications and management of complications. Role of technician in nosocomial infection & infection control.
- **Special Problems in dialysis patients:**   Cardiovascular   diseases, Diabetes, Hypertension, Infections (HBV, HCV, HIV), Bone diseases, Aluminum toxicity. Role of technician in nosocomial infection & infection control.

Unit:3   **(15 Hrs)**

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- **Psychosocial aspects & patient education Psychological impact of a chronic disease:** Psychology of patient with disease prognosis, the financial implications of the disease, the family and its role in the care of the patient with CRF. Patient education on diet, prevention of complications, drug compliance. Rehabilitation for acute and chronic CKD or dialysis patient.

Unit:4   **(20 Hrs)**

- **Instruct patients about in-home treatment and precaution:** Identification of the type of patient for whom in house treatment is possible and in line with doctor's advice, procedure of in-house treatment options, pros and cons of in-house treatment options, the relevant protocol and procedures to be followed to carry out the process.
- **General principle of hospital:** practice Hospital structure and organization, Care of Patient , Basic Assessment Skills, First aid & Basic Life Support, Maintenance of Hygiene & Infection Control Practices, Principles of asepsis, Maintenance of Medications in the department, Specialized Investigations - Care of Patients, Medico - Legal Issues.
- **Quality assurance in dialysis:** Standards of practice, Various risks to quality and safety, JCI recommendations, NABH recommendations. Infection control policies and procedures in the dialysis unit.

Refereence book:

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Science
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)
<mark>**Applied Dialysis Technology – II Practical**</mark>

Course Code- BDLTS1 604 P	L T P C	Duration: 30 Hrs
	0 0 4 2	

Course Objective

- Enumerate on the various complications of Hemodialysis in terms of the technologist's responsibility in prevention and worsening of the complications
- Dialysis in special Cases
- Students learns about various conditions and their association in Dialysis
- Student demonstrated Skills in Follow up care and quality maintenance in terms of renal dialysis treatment Modalities and Procedures

Course Outcomes

- Train patients in performing peritoneal dialysis, and personal care.
- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Maintain quality and safety.

Experiment:

- Dialysis Unit priming (Setting)
- A.V. Cannulation & Termination
- A.V. Fistula / A.V. Grafting
- Dialysis catheterization (Internal Jugular – Femoral – Subclavian vein
- Packing) including sterilization.

Recommended Text

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Science
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

Advance Dialysis Technology - II

Course Code- BDLTS1 602 T   L T P C   Duration: 60 Hrs

4 0 0 4

Course Objective

- Students learn about Advancements in Dialysis.
- Practice independently SLED, CRRT and high efficiency dialysis.
- Learn different Advanced Renal therapies.

Course Outcomes

- Demonstrate Knowledge about Advancements in Renal Dialysis and in renal therapies.
- Demonstrate peritoneal dialysis, and its self care.
- Involves family centered approach while providing patient care.
- Handling complications during dialysis procedures.

Unit:1   (15 Hrs)

- **New generation dialysis:** Recent advances in hemodialysis, Nocturnal dialysis, online dialysis, Daily dialysis, Telemedicine in dialysis practices.
- **Water treatment-pretreatment, deionizer, Reverse Osmosis:** Purpose of water treatment for dialysis. Components of a dialysis Centre's water treatment system. Advantages and disadvantages of water softeners, carbon tanks, reverse osmosis, deionization, and ultraviolet irradiation in the treatment of water for dialysis. Monitoring of water treatment systems – disinfection, microbiological testing, water sampling and chemical monitoring. Method for microbiological testing of the water treatment system.

Unit:2   (15 Hrs)

- **Typical water treatment monitoring schedule, reverse osmosis process and system:** definition of RO, cartridge pre-filter, reverse osmosis pump and monitor assembly, RO membranes, Quality assessment mechanisms, JCI requirements, ISO requirements, checklists and tools used for optimal compliance.

Unit:3   (15 Hrs)

- **Dialysis reuse:** History of dialyzer reprocessing. Reason for dialysis reprocessing. Steps involved in dialyzer reprocessing. Hazards of dialyzer reprocessing. Documentation for dialyzer reprocessing.

Unit:4   **(15 Hrs)**

- **Dialyzer Membranes:** Introduction to dialyzer membranes. Composition of the dialyzer membranes, types its use and sizes of the various membranes. Principles on which the dialyzer membranes work.
- **Renal Therapies (continuous):** Definition, indications, uses, method of initiation of dialysis, contraindications of therapy. Complications of therapy and ways to prevent complications. Monitoring during MARS dialysis, SLED and CRRT. Technologist's roles and responsibilities during MARS dialysis CRRT & SLED. Continuous therapies in hemodialysis, Hemo perfusion, Plasma Pheresis.

Recommended Text Books:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

Advance Dialysis Technology – II Practical

Course Code- BDLTS1 605 P   L T P C   Duration: 30 Hrs

0 0 4 2

Course Objective

- Students learn about Advancements in Dialysis.
- Practice independently SLED, CRRT and high efficiency dialysis.
- Learn different Advanced Renal therapies.

Course Outcomes

- Demonstrate Knowledge about Advancements in Renal Dialysis and in renal therapies.
- Demonstrate peritoneal dialysis, and its self care.
- Involves family centered approach while providing patient care.
- Handling complications during dialysis procedures

Experiment:
- First assistant in minor procedures
- Dialysis Reuse
- CPR Demonstrations
- Prepare Presentations based on various kinds of data collection

Recommended Text Books:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences

- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.

- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.

- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.

- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

Course code- BSMD 603 T: MDT Directed Clinical Education – IV

Students will gain additional skills in diagnosis in pediatric cases and pediatric interventional procedures. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical diagnostic and therapeutic skills. **(Total – 450 hrs)**

INTERNSHIP

Guidelines:

- The internship shall commence after the student has completed and passed all subjects up to VI semesters.
- The internship is compulsory.
- The duration of the internship shall be one year.
- The degree of Bachelor in Allied Health Sciences shall be awarded after the satisfactory completion of the internship.

Evaluation of Internees:

Formative Evaluation:

Day to day assessment of the internees during their internship postings should be done by the Head of the Department/Faculty assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records /Log Book by all internees. This will not only provide demonstrable evidence of the processes of training but more importantly of the internee's own acquisition of competence as related to performance.

Summative Evaluation:

It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issue a certificate of satisfactory completion of training, following which the university shall award the degree or declare him/her eligible for it.

To implement the project work uniformly for all the specialties in view of the curriculum and training to be acceptable internationally and the students to get opportunity for higher studies and employment.

SYLLABUS BATCH 2020 ONWARDS (3 YEARS COURSE)

Internship Programme: 05 days for orientation programme 120 days in Dialysis Unit 30 days in Nephrology Ward 60days in Nephrology OT 30 days for Nephrology OPD

Maharaja Ranjit Singh Punjab Technical University
Dabwali Road

Bathinda, Punjab 151001

CHOICE BASED CREDIT SYSTEM (CBCS)

Curriculum for

B.Sc. Cardiac Care Technology

Programme Outcome:

• Students will be trained to apply specialized occupational theory, skills and concepts to work independently as qualified cardiovascular technologists and become an integral member of the cardiac catheterization and electrophysiology laboratory teams.

• The CVT's primary role is to perform, at the direction of a qualified physician, technical procedures for the diagnosis and treatment of cardiovascular injury and disease.

Programme Specific Outcome:

• This Programme is designed to cover all aspects of cardiovascular disease management and care.

• It involves learning of complex diagnostic and therapeutic procedures that involve use of various catheterization equipment, computer hardware, tools, machines and pharmacological agents.

• This program enables students to acquire skills for management of various cardiac disorders.

==Applied Anatomy, Physiology, Pharmacology in Cardiac care==

Subject Code: BCCTS1-301   **L T P C**   **Duration: 60 (Hrs.)**
                                                                    4 0 0 4

Course Objective:

- Describe the structure and function of the heart including the electrical activity involved in the normal and abnormal cardiac cycle.
- Describe the structure and function of the myocytes & function of the peripheral and coronary circulatory systems at rest and during physical activity
- Discuss Anatomy of Coronaries of Heart
- Discuss the factors which impact the cardiac output and identify those factors impacted by physical activity and environmental factors
- To understand Indication and Contraindications, Uses and Adverse effects of drugs, Mechanism of Action

Course Outcomes:

- To understand Coronary Anatomy
- To enable students, differentiate between normal heart sounds and murmurs.
- To enable students, a preliminary understanding of the circulatory system from a physiological and
- Functional perspective, as well as related terminologies.
- Students will be proficient in Pharmacology with proficient knowledge about the different drugs/medicines
- To be given in various cardiovascular diseases, dose calculation and mode of administration Also recent advances in pharmacology will play a key role in research aspect of the students.

Unit 1   **(12 hrs)**

- **Anatomy of cardiovascular system:** anatomy of arteries and arterioles, anatomy of aorta, capillaries and sinusoids, anastomoses, veins and venules, anatomy of coronary arteries: left and right
- **Physiology of cardiovascular system:** physiology of aorta, physiology of carotid bifurcation, systemic, pulmonary, coronary and portal circulation, nerve supply of the heart, major arteries and veins supplying head, neck and thorax, major arteries and veins of upper limb, major arteries and veins of pelvis and lower limb.

Unit 2   **(28 hrs.)**

- **Anatomy of heart:** surface anatomy of heart, structure of the heart, surface and borders, pericardium, myocardium and endocardium, chambers: right atrium (venous area, septum, atrial appendage), right ventricle: (inflow, atrial sinus, outflow), left atrium (venous, ventricular septum, appendage, mv), left ventricle (inflow, body, outflow), anatomy of sa node and av node, anatomy of cardiac valves: eustachian, the

besian, a-v valves, semilunar valves, valve apparatus

- **Blood vessels and hemodynamics:** regulation of blood pressure: hormonal and neural regulation, pulse and sites for pulse assessment, shock and homeostasis
- **Clinical pathologies in physiology of cvs:** coronary artery disease (cad), congestive heart failure (chf), and atherosclerosis, shock and hemorrhage, syncope, hypertension.
- **Drugs used in cardiovascular system (with its moa, adrs, indications and complications):** anti-hypertensives, anti- anginal agents, anti- failure agents, antiarrhythmic agents, antithrombotic agents

Unit 3   **(14 hrs.)**

- **General pharmacology:** sources of drugs, route of drug administration, pharmacokinetics, pharmacodynamics, first pass metabolism, ad**verse drug reactions.**
- **Drugs used in nervous system (with its moa, adrs, indications and complications):** anticholinergics & adrenergic, narcotics, sedatives & hypnotics.

Unit 4   **(06 hrs.)**

- **Miscellaneous:** Iv fluids, neuromuscular blockers, electrolyte supplements, antihistamines, protamine, emergency drugs- atropine, adrenaline, steroids, sodium bicarbonate.

Reference books

- Ross and Wilson Anatomy & Physiology in Health and Illness, 12th Edition by Anne Waugh and Allison Grant
- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora & Bryan Derricks
- Textbook of Physiology (Vol.1,2) Dr. A.K. Jain
- Essentials of Medical Physiology, Sixth Edition by K Sembulingam and Prema Sembulingam
- Physical Examination of the Heart and Circulation, Fourth Edition by Joseph K. Perloff
- Pharmacology for Physiotherapy by Padmaja Uday kumar.
- Drugs for the Heart, South Asia edition by Lionel H. Opie and Bernard J. Gersh
- R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition
- K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.

==Basic Electrocardiography==

Subject Code: BCC TS1-302   **L T   P C**   **Duration: 45 (Hrs.)**

3 0 0 3

Course Objective:

- To enable students, understand the correct placement of all electrodes.
- To demonstrate patient positioning and preparation.
- To teach students about maintenance of the ECG machine, wires and electrodes.

Course Outcomes:

- To develop understanding regarding Electrocardiography and its procedure.
- Describe the proper hook-up procedure for a 12-Lead ECG.
- Identify basic normal ECG waveform morphology and common interpretation.
- Enumerate the measures to be taken before, after and during ECG procedure.

Unit 1   **(10 hrs.)**
- **Basic electrophysiology:** Heart: An electrical field, Electrical and Mechanical properties of the heart, Cardiac electrical field generation during activation, Cardiac wave fronts - Action potential: Repolarization and Depolarization, Cardiac electrical field generation during ventricular recovery, Conduction system of the heart: In detail
- **Basics of electrode placement and lead selection and axis deviation:** Basics of Electrodes and Leads, ECG deflections: Isoelectric, Upright, Negative and Biphasic, Types of ECG leads- Standard limb leads, Precordial leads and the Wisdom central, Augmented limb leads, Unipolar V/S Bipolar leads, Placement of leads with universal color code, Hexa-axial reference frame and Electrical axis, X axis – time presentation, Y axis – voltage presentation, Right & Left axis in Normal ECG, Einthoven's Triangle, Deviation of Axis.
- **BASICS OF STRESS TEST:** Protocols, lead placement, instruction to the patient, rhythm analysis.

Unit 2   **(15 hrs.)**

- **ECG COMPONENTS-WAVES AND INTERVALS:** ECG waveforms: Rate, Rhythm and Normal time intervals-The Normal Electrocardiogram, the Normal P wave & atrial repolar-ization, Atrioventricular node conduction and the PR segment, Ventricular activation and the QRS Complex, Genesis of QRS complex, Ventricular recovery and ST-T wave, Normal variants and Rotation of the heart, ECG PAPER, Rate measurement: Six second method, large box method, Small box method
- **Sinus rhythms & atrioventricular blocks (Description, Possible causes, ECG Criteria, Plan of assessment, Potential treatments):** Normal Sinus Rhythm, Sinus Bradycardia, Sinus Tachycardia, 1st Degree AV block, 2nd Degree AV block: Type-I or Mobitz-I, 2nd Degree AV block: Type-II or Mobitz-II, 3rd Degree AV block/ CHB.

Unit 3 (05 hrs.)

- **Basics of ecg interpretation:** basic steps for interpretation- Rate, Rhythm, P-wave Examination, P to R interval, QRS width, Rhythm interpretation.

Unit 4 (15 hrs.)

- **Atrial & ventricular arrhythmias (Description, Possible causes, ECG criteria, Plan of assessment, Potential treatments):** Premature Atrial Contractions (PACs), Atrial Flutter (AF), Atrial Fibrillation (A. Fib), Paroxysmal Atrial Tachycardia, Premature Ventricular Contractions (PVCs), Ventricular Tachycardia (V. Tach), Supraventricular Tachycardia (SVT), Ventricular Fibrillation (V. Fib), Asystole.

Reference books

- ECG Made Easy – Atul Luthra
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test
- An Introduction to Electrocardiography: Schamroth Colin
- Clinical Electrocardiography: Goldberger. A

Basic Electrocardiography Practical

Subject Code-BSCC-305P   **L T P C**   **Duration: 30 (Hrs.)**
                              0 0 2 1

Course Objective:

- To enable students, understand the correct placement of all electrodes.
- To demonstrate patient positioning and preparation.
- To teach students about maintenance of the ECG machine, wires and electrodes.

Course Outcomes:

- To develop understanding regarding Electrocardiography and its procedure.
- Describe the proper hook-up procedure for a 12-Lead ECG.
- Identify basic normal ECG waveform morphology and common interpretation.
- Enumerate the measures to be taken before, after and during ECG   procedure.

Experiments

- Steps to perform an ECG
- Patient positioning according to various conditions.
- Proper communication with patient to find out the history
- ECG machine operating and maintenance
- Maintain ECG catalog for self-assessment
- Common errors in ECG recording

Reference books

- ECG Made Easy – Atul Luthra
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test
- An Introduction to Electrocardiography: Schamroth Colin
- Clinical Electrocardiography: Goldberger. A

Basic Echocardiography

Subject Code: BSCC-303T **L T P C** **Duration: 30 (Hrs.)**
  2 0 0 2

Course Objective:

- To provide a brief introduction to Echocardiography, its techniques and types of Echocardiography.
- To provide practically and clinically useful application of Echocardiography.
- To explain echo techniques available and to put echo into a clinical perspective

Course Outcomes:

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography.
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Unit 1 **(15 hrs.)**

- **Introduction to echocardiography:** basics of ultrasound waves, characteristics of: sound wave, frequency and attenuation, basic principle of echocardiography, indications of echocardiography, types of echocardiography, importance of gel in echocardiography.
- **Murmurs:** types of murmurs heard in echocardiography- systolic and diastolic murmurs, possible causes of murmurs, conditions associated with murmurs, features of murmurs suggesting echocardiography.
- **Echocardiography techniques:** basic principles, indications and uses of: 2d transthoracic echocardiography, m-mode, echo windows and views used in transthoracic echocardiography, doppler echocardiography in detail: pulsed, continuous wave and color flow mapping.
- **Knobology and instrumentation:** transducer: basic principle and working, types of transducers, piezoelectric crystals and its effect, various knobs used on echo machine with its description and application.
- **Cardiac assessment:** measurement of cardiac dimensions, basics of: evaluation of systolic and diastolic left ventricular function, ejection fraction, fractional shortening, regional wall motion abnormalities: classification, stroke volume and cardiac output assessment, transvalvular gradients and orifice area.

Unit 2 **(15 hrs.)**

- **Doppler effect:** basics of doppler, applications of doppler, types of doppler, continuity equation
- **Echocardiography assessment in valvular heart disease:** Role Of Echo In Assessment Of Valvular Heart Diseases, 2D Findings, Doppler Calculations, M-Mode Findings And Views Seen In: Mitral Regurgitation, Mitral Stenosis With Different Types Of M-Mode Pattern, Mitral Valve Prolapse, Aortic Regurgitation, Aortic Stenosis: Types Of AS,   Infective Endocarditis, Tricuspid Regurgitation, Tricuspid Stenosis, Pulmonary Regurgitation, Pulmonary Stenosis.

Unit 3 (10 Hrs.)

- **Basics of toe, stress echo & contrast echo:** advantages & disadvantages, applications, indications & contraindications, complications, patient positioning and medications used.
- **Echo in special hospital settings:** clinical uses of echocardiography in: preoperative cases, intraoperative cases, intensive care unit (icu), coronary care unit (ccu), cardiac catheterization laboratory (ccl), accident &emergency (a&e) department, portable (hand-held) echo.
- **Echo assessment in cad:** assessment of ischemia, assessment of myocardial infarction, complications Of MI Detection By Echo, Myocardial Hibernation.

Unit 4 (05 Hrs.)

- **Artificial (prosthetic) valves:** Basics Of Artificial Valves, Types Of Artificial Valves, Echo Examination Of Prosthetic Valve, Basics Of Prosthetic Valve Malfunction, Echo Assessment Of: Endocarditis, Thrombus, Dehiscence, Regurgitation, Variance, Degeneration.
- **Hypertension and lvh:** Indications For Echo In Hypertension, Echo Findings In Hypertension, Left Ventricular Hypertrophy: Echo Findings.
- **Screening and follow-up echo:** Good Indications For Screening Echo, Less Clear-Cut Indications For Screening Echo, Follow-Up Echo.

Reference Books
- Echo made easy: sam kaddoura
- Reference by pgdcc – ignou handbooks for ecg, echo and stress test.
- Feigen baum's echocardiography
  Tajik jamil for echocardiography

Basic Echocardiography Practical

Subject Code: BSCC 306 P	L	T	P	C	Duration: 60 (Hrs.)
	0	0	4	2	

Course Objective:

- To provide a brief introduction to Echocardiography, its techniques and types of Echocardiography.
- To provide practically and clinically useful application of Echocardiography.
- To explain echo techniques available and to put echo into a clinical perspective

Course Outcomes:

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography.
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Experiments

- Learn about Probe and Scanner settings.
- Learn about Structural and Functional assessment of the heart.
- Learn about various windows and views used in Echocardiography
- Learn about qualitative reporting systems along with various software's associated with Echo reporting.

Reference Books

- Echo made easy: sam kaddoura
- Reference by pgdcc – ignou handbooks for ecg, echo and stress test.
- Feigen baum's echocardiography
- Tajik jamil for echocardiography.

Community Orientation & Clinical Visit (Including related practical's to the parent course) I Practical

Subject Code: BCCTS1-504	L	T	P	C	Duration: 240 (Hrs.)
	0	0	8	4	

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist.

Students are tested on intermediate technical skills.

Medical Bioethics & IPR

581

Subject Code: BSCC 307 T   **L T P C**   **Duration: 45 (Hrs.)**

                                                    3   0   0   3

Course Objective:

- To introduce the wide range of ethical issues in healthcare.
- To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked.
- Imparting knowledge and skills that will enable students to develop ethical answers to these issues
- To acquire specialized knowledge of law and IPR.
- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.

Course Outcomes:

- Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care.
- Understanding ethical issues in health care.
- Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
- Capacity to rationally justify your decision.
- Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written.
- The students get awareness of acquiring the patent and copyright for their innovative works.
- They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Unit 1   **(05 hrs.)**

- Introduction to Bioethics.
- Bioethical issues related to Healthcare & Medicine.

Unit 2   **(15hrs.)**
- **Anatomy -** Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling.
- **Physiology -** Animal ethics, Health policy privacy.

Unit 3   **(15 hrs.)**

- **Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion
- **Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics

Unit 4   **(10 hrs.)**

- **Medico legal aspects of medical records**
- **Introduction to Intellectual Property:** Concept of Intellectual Property Kinds of Intellectual Property Patents, Copyrights Designs, Trademarks, Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types

Reference Books:

- Contemporary issues in bioethics – Beauchamp & Walters (B&W) 4th edition.
- Classic philosophical questions by Gloud (8th Edition)
- Case book series and booklets by UNESCO Bioethics Core curriculum 2008
- Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
- Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
- Intellectual Property Right- Wattal- Oxford Publication House. (1997) ISBN: 0195905024

<mark>**Organizational Behavior**</mark>

Subject Code: BSCC 308 T   L   T   P   C   Duration:45(Hrs.)
                                  3   0   0   3

Course Objective:

● To understand the initial insights into underlying principles and fundamental theories of organizational behavior.
● The Student should develop a sense of what falls under the domain of organizational behavior.
● He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations.
● This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.

Course Outcomes:

● Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives.
● Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviors in team and organizational settings.
● Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques.
● Analyze and apply leadership theories and better understand their own leadership style.

Unit 1   (5 hrs.)

● **Organizational Behavior -** Definition - Importance - Historical Background – Fundamental concepts of OB- 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive

Unit 2   (15 hrs.)

● **Organization Structure and Design -** Authority and Responsibility Relationships – Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design - Mechanistic vs Adoptive Structures – Formal and Informal Organization

Unit 3   (5 hrs.)

● **Perception Process -** Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management

Unit 4   (20 hrs.)

- **Learning -** Process of Learning - Principles of Learning - Organizational Reward Systems – Behavioral Management
- **Motivation - Motives -** Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity – Morale Indicators

- **Leadership -** Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles
- **Conflict Management -** Traditional vis-a-vis Modern view of conflict - Constructive and Destructive
- **Conflict –** Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict.

Reference Books:

- Organizational Behavior, 9th Ed. - Stephen Robbins.
- Human Behavior at work - Davis and Newstrom
- Organizational Behavior - Uma Sekaran
- Organizational Behavior - Fred Luthans
- Organizational Behavior - K.Aswathappa
- Human Behavior at Work - Keith Davis
- Organizational Behavior - Jit S.Chandran
- Human Relations & Organizational Behavior - R.S.Dwivedi
- Organizational Behavior - McShane

Development of Cardiovascular system: Fetal & Neonatal

Subject Code: BSCC 401   **L   T   P   C**   **Duration:60(Hrs.)**
                                3   1   0   4

Course Objective:
- To understand the description of fate of certain fetal structures once postnatal circulation is established.
- To provide an outline of Cardiovascular Anatomy to improve the student's understanding of the technical and diagnostic procedures used with special emphasis on applied aspects in Cardiology

Course Outcomes:
- This course will provide overall information of the structural development of the cardiovascular system.
- To encourage students to apply this knowledge to understand developmental anomalies in the Cardiovascular System.

Unit1   **(15 hrs.)**
- **Early development of embryo:** Early development of embryo, Early blood vessel formation, Intra-embryonic blood vessel, Extra-embryonic blood vessel.
- **Development of the heart:** Formation and position of the heart tube, Formation and position Of the heart loop, Mechanism of cardiac looping, Formation of the embryonic ventricle, Development of the sinus venous, Formation of the cardiac septa, Atrial septation, the atrio-ventricular canal, the Muscular interventricular septum, the septum in truncus arteriosus and the cord is conus.

Unit 2   **(15 hrs.)**

- **Formation of the cardiac valves:** Formation of the cardiac valves, The Atrioventricular Valve, The semilunar valve.
- **Formation of the great systemic veins:** The cardiac veins, The vitelline veins, The Umbilical veins, the vena cava.

Unit 3   **(15 hrs.)**
- **Fetal & neonatal circulation:** Blood flow pattern, oxygenation & venous return to the
Heart, Cardiac output and its distribution, Intra - cardiac vascular pressure, Myocardial function & its Energy metabolism

- **Characteristics of fetal circulation and changes occur at birth:** Postnatal Circulation In Detail

Unit 4   **(15 hrs.)**

- **Etiology of cardiovascular malformation:** Congenital anomalies in detail
- **Adult circulation:** Systemic Circulation, Pulmonary Circulation.

Reference Books:

- Ross and Wilson Anatomy & Physiology in Health and Illness, 12th Edition by Anne Waughand Allison Grant
- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora & Bryan Derrickson
- Human Embryology; Inderbir Singh

<mark>**Cardiovascular Diseases Pertinent to Cardiac Care Technology**</mark>

Subject Code: BSCC 402   **L T P C**   **Duration: 45 (Hrs.)**
                                                                    3 0 0 3

Course Objective:

- To know the Definition and Pathophysiology of Cardiovascular diseases Classification, Etiology, Clinical features, Diagnosis & Management of Diseases

Course Outcomes:

- This course will cover common Cardiovascular Diseases, their related pathology and microbiology.
- Along with outline of clinical presentation and management of these conditions it also includes Medical and Surgical intervention**s**

Unit 1   **(10 hrs.)**

- **Valvular heart disease:** Acquired Valvular heart disease, Rheumatic fever and Rheumatic heart disease: Aortic stenosis, Aortic regurgitation, Mitral valve disease, Mitral stenosis, Mitral Regulation, Combined valvular heart disease, Tricuspid valve disease, Infective Endocarditis.
- **Coronary artery disease:** Pathophysiology and clinical recognition of Angina Pectoris, Pathophysiology of Coronary Artery Disease, Myocardial Infarction, Treatment for Coronary Artery Disease.

Unit 2   **(15 hrs.)**

- **Hypertension:** Etiology of Hypertension, Systemic hypertension, Essential and secondary Hypertension, Treatment for hypertension, DASH diet, Pulmonary Hypertension, Pulmonary thrombo-embolism
- **Heart failure:** Types of Heart failure- Left, Right, Biventricular, Acute Decompensated Heart Failure, Pathophysiology of Heart failure, Causes, Signs and symptoms, Medical management, surgical treatment.
- **Myocardial diseases:** Dilated cardiomyopathy, Hypertrophic cardiomyopathy, Restrictive cardiomyopathy, Myocarditis.

Unit 3   **(15 hrs.)**
- **Congenital heart diseases:** Acyanotic heart disease -Atrial septal defect (ASD),Ventricular septal defect (VSD), Patent ductus arteriosus (PDA), Coarctation of Aorta (coa),Cyanotic congenital heart disease - Tetralogy of Fallot (TOF), Double Outlet Right Ventricle(DORV), Pulmonary Atresia, Transposition of Great Arteries (TGA), Total Anomalous Pulmonary, Venous Connection (TAPVC).
- **Pericardial diseases:** Pericardial effusion, Constrictive pericarditis, Cardiac tamponade, Pericardiocentesis.

Unit 4   **(05 hrs.)**
- **Peripheral vascular disease:** Atherosclerotic peripheral vascular disease, Aortic aneurysms, Aortic dissection, Takayasu's arteritis
- **Cardiac arrest:** Classification, 6 H's and 6 T's, Signs and Symptoms, Diagnosis, Treatment
- **COPD:** Causes, Stages of COPD (Stage 1-4),Signs and Symptoms, Diagnosis, Treatment: Medication, Dietary changes, Lifestyle changes.

Reference book
- Ross and Wilson Anatomy & Physiology in Health and Illness, 12th Edition by Anne Waugh and Allison Grant

- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora& Bryan Derrickson

- Essentials of Medical Physiology, Sixth Edition by K Sembulingam and Prema Sembulingam
- Physical Examination of the Heart and Circulation, Fourth Edition by Joseph K. Perloff

Medical Instrumentation relevant to Cardiac Care

Subject Code: BSCC 403   **L T P C**   **Duration: 30 (Hrs.)**
                                                      2 0 0 2

Course Objective:
- To introduce Biomedical applications of different transducers used.
- To introduce the student to the various sensing and measurement devices of electrical origin.
- To provide awareness of electrical safety of medical equipment.
- To provide the latest ideas on devices of non-electrical devices.
- To bring out the important and modern methods of imaging techniques.
- To provide latest knowledge of medical assistance / techniques and therapeutic equipment.

Course Outcomes:

- The course is designed to make the student acquire an adequate knowledge of the physiological systems of the   human body and relate them to the parameters that have clinical importance.
- The fundamental principles of equipment that are actually in use at the present day are introduced.
- The healthcare industry or they will be the best helping hand for biomedical engineers.

Unit 1   **(05 hrs.)**
- **Introduction to medical physics:** Basics, Indications, Outcome, Machines related to Medical Physics.

Unit 2   **(10 hrs.)**
- **Electro–physiological measurements:**   Electrodes – Limb electrodes, floating electrodes, pregelled disposable electrodes, Microneedle and surface electrodes, ECG: Lead systems and recording methods, Typical waveforms, Electrical safety in medical environment: shock hazards, leakage current, Instruments for checking safety parameters of biomedical equipment, Transducers: selection criteria, Piezoelectric ultrasonic transducers.

Unit 3   **(10 hrs.)**

- **Non-electrical parameter measurements:** Measurement of blood pressure, Cardiac output, Stethoscope: Heart rate, Heart sound, ACT, Pulmonary function measurements – Spirometer, Photoplethysmography, Body Plethysmography, Blood Gas analyzers: ph of blood, measurement of blood pco2, po2, finger-tip oximeter - ESR, GSR measurements.

Unit 4   **(05 hrs.)**
- **Assisting and therapeutic equipments:** Types of Pacemakers, Types of Defibrillators, Ventilators-Types of Ventilators
- **Medical imaging:** C-Arm, Coronary Computer tomography & MRI, TLD, Radiographic and fluoroscopic techniques: Echocardiography: TTE, TEE, Stress Echo, Coronary Angiography, PTCA

Reference books

- R. S. Khandpur, 'handBook Of Biomedical Instrumentation', Tata Mcgraw Hill Publishing Co Ltd.,2003.
- Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, 'bio-Medical Instrumentation And Measurements', Ii Edition, Pearson Education, 2002
- M. Arumugam, 'Biomedical Instrumentation', Anuradha Agencies, 2003.
- L.A. Geddes and L.E. Baker, 'Principles of Applied Biomedical Instrumentation', John Wiley & Sons, 1975.
- J. Webster, 'Medical Instrumentation', John Wiley & Sons, 1995.
- C. Raja Rao and S.K. Guha, 'Principles of Medical Electronics and Bio-medicalInstrumentation', Universities press (India) Ltd, Orient Longman ltd, 2000.

Course code- BSCC 120 CP: CCT Directed Clinical Education – II

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

(Total-240 hrs)

<mark>Medical Instrumentation relevant to Cardiac care Practical</mark>

Subject Code: BCC 405 P   **L T P C**   **Duration: 60 (Hrs.)**
                              0 0 4 2

Course Objective:
- To introduce Biomedical applications of different transducers used.
- To introduce the student to the various sensing and measurement devices of electrical origin.
- To provide awareness of electrical safety of medical equipment.
- To provide the latest ideas on devices of non-electrical devices.
- To bring out the important and modern methods of imaging techniques.
- To provide latest knowledge of medical assistance / techniques and therapeutic equipment.

Course Outcomes:

- The course is designed to make the student acquire an adequate knowledge of the physiological systems of the human body and relate them to the parameters that have clinical importance.
- The fundamental principles of equipment that are actually in use at the present day are introduced.
- The healthcare industry or they will be the best helping hand for biomedical engineers.

<mark>Experiments</mark>

1. ECG Machine

2. Stress Test Machine

3. Patient monitor

4. Central Monitoring System

5. Sphygmomanometer

6. Pulse Oximeter

7. Stethoscope

8. Defibrillators

9. Pressure transducers

10. Techniques of monitoring radiation exposure

Reference books

- R. S. Khandpur, 'handBook Of Biomedical Instrumentation', Tata Mcgraw Hill Publishing Co Ltd.,2003.
- Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, 'bio-Medical Instrumentation And Measurements', Ii Edition, Pearson Education, 2002
- M. Arumugam, 'Biomedical Instrumentation', Anuradha Agencies, 2003.

- L.A. Geddes and L.E. Baker, 'Principles of Applied Biomedical Instrumentation', John Wiley & Sons, 1975.
- J. Webster, 'Medical Instrumentation', John Wiley & Sons, 1995.
- C. Raja Rao and S.K. Guha, 'Principles of Medical Electronics and Bio-medicalInstrumentation', Universities press (India) Ltd, Orient Longman ltd, 2000.

Human Rights & Professional Values/ Pursuit of Inner Self Excellence (POIS)

Subject Code: BSCC 406   **L T P C**   **Duration: 45 (Hrs.)**
                                                        3   0   0   3

Course Objective:
- To understand interaction between society and educational institutions.
- To sensitize the citizens so that the norms and values of human rights and duties of education programmes are realized.
- To encourage research activities.
- To encourage research studies concerning the relationship between Human Rights and Duties Education.

Course Outcomes:

- This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice.
- It will include awareness of civil society organizations and movements promoting human rights.
- This will make the students realize the difference between the values of human rights and their duties

Unit 1   **(05 hrs.)**
- **Background** - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights

Unit 2   **(15 hrs.)**
- **Human rights at various level**- Human Rights at Global Level UNO
- **Instruments:** U.N. Commission for Human Rights, European Convention on Human Rights.
- **Human rights in India** - Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman

Unit 3   **(15 hrs.)**
- **Human Rights Violations** -Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.
- **Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality
- **Personal values**- ethical or moral values, Attitude and behavior- professional behavior, treating people Equally

Unit 4   **(10hrs.)**
- **Code of conduc**t- professional accountability and responsibility, misconduct, Cultural issues in the Healthcare environment

Reference Books:

- Jagannath Mohanty Teaching of Humans Rights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
- Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998.
- Sivagami Paramasivam Human Rights Salem 2008
- Hingorani R.C.: Human Rights in India: Oxford and IBH New Delhi.

Biostatistics and Research Methodology

Subject Code: BCCT 1-407   **L T P C**   **Duration: 45 (Hrs.)**
                        3 0 0 3

Course Objective:

- To enable students to present, analyze and interpret data.
- To enable students to use concepts of probability in business situations.
- To enable students to make inferences from samples drawn from large datasets.
- To enable students to apply univariate and multivariate statistical techniques.

Course Outcomes:

- To understand the importance & Methodology for research.
- To learn in detail about sampling, probability and sampling distribution, significance tests correlation an regression, sample size determination, study design and multivariate analysis.

Unit 1   **(15 hrs.)**
- **Introduction:** Statistics, Biostatistics, Frequency distribution Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples
- **Measures of dispersion:** Dispersion, Range, standard deviation
- **Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation

Unit 2   **(15 hrs.)**
- **Regression:** Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression–
- **Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples Parametric test: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

Unit 3   **(05 hrs.)**
- **Non Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

- **Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design

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Technique, plagiarism

Unit 4   **(10 hrs.)**

- **Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

- **Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Reference Books:

- Mausner&bahn : Epidemiology-An Introductory text, 2nd Ed.,W.B.Saunders Co.
- Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

<mark>**Advanced Electrocardiography**</mark>

Subject Code: BCPS1-501   **L   T   P   C**   **Duration: 30 (Hrs.)**
                                           2   0   0   2

Course Objective:

- To enable students, understand various arrhythmias.
- To demonstrate patient positioning and preparation.
- To teach students about maintenance of the ECG machine, wires and electrodes.

Course Outcome

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography.
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Unit 1   **(05 hrs.)**
- **Anatomy of the conduction system & basics of electrophysiology:** SA node, AV node, Inter nodal and Inter-atrial conduction, Bundle branches, History, Equipment used, Procedure, Resting interval measurements, Management of Arrhythmias by EP study.

Unit 2   **(10 hrs.)**
- **Genesis of cardiac arrhythmias and management:** Various Mechanisms of Arrhythmogenesis & disorders of impulse formation: Artifacts, Electrical interference, Somatic tremor, Wandering baseline, Antiarrhythmic agents class I, class II, class III, class IV, Implantable electric devices for treatment of cardiac arrhythmias, Ablation theory for cardiac arrhythmias: Basic
- **ECG in ischemic heart disease:** Coronary events and ECG, ECG changes in IHD and Myocardial Infarction, Investigations: Stress   test- Indications, Contraindications, Pre-test probability, Exercise Protocols, Interpretation of reports.

Unit 3   **(10 hrs.)**
- **Disorders of impulse conduction:** Reentry mechanism, Tachycardia caused by reentry, Electrical remodeling of atria, Sinus reentry, Atrial reentry, AV node reentry, Pre-excitation syndrome, Ventricular tachycardia caused by reentry, PACEMAKERS: Types of Pacemakers, Components of Pacemaker, Single and Double Timing cycles, Pacemaker Troubleshooting

Unit 4   **(05 hrs.)**

- **Cardiac pacing & radiofrequency ablation therapy:** Indications, Temporary and Permanent Pacing, NBG codes, Types of Pacing, Complications, Common sites **o**f Ablation, Management of A. Flutter, V. Tach, A. Fib, AVNRT

Reference books

- ECG Made Easy –Atul Luthra
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.
- Hampton J. 2003, The ECG made Easy (6th ed.) Churchill Livingstone, Edinburgh
- An Introduction to Electrocardiography: Schamroth Colin
- Clinical Electrocardiography: Goldberger. A
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.

Advanced Electrocardiography-Practical

Subject Code: BCCTS1-505   **L T P C**   **Duration: 60 (Hrs.)**
                                   0   0 4 2

Course Objective:

- To enable students, understand various arrhythmias.
- To demonstrate patient positioning and preparation.
- To teach students about maintenance of the ECG machine, wires and electrodes.

Course Outcome

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography.
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Experiments

- Learn about 12-lead ECG
- Learn about various software's associated with ECG.
- Learn various conditions indicated for Electrocardiography

Reference books

- ECG Made Easy –Atul Luthra
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.

- Hampton J. 2003, The ECG made Easy (6th ed.) Churchill Livingstone, Edinburgh
- An Introduction to Electrocardiography: Schamroth Colin
- Clinical Electrocardiography: Goldberger. A
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.

Advanced Echocardiography

Subject Code: BCCTS1-502   **L   T   P   C**   **Duration: 30 (Hrs.)**
                                              2   0   0   2

Course Objective:

- To provide a brief introduction to Echocardiography, its techniques and types of Echocardiography.
- To provide practically and clinically useful application of Echocardiography.
- To explain echo techniques available and to put echo into a clinical perspective.

Course Outcomes:

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography**.**
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Unit 1   **(5 hrs.)**
- **Heart failure, myocardium and pericardium:** heart failure, assessment of lv systolic function, coronary artery disease, cardiomyopathies and myocarditis, diastolic function, right heart and lungs, long-axis function, pericardial disease, device therapy for heart failure – cardiac resynchronization therapy.

Unit 2   **(10 hrs.)**
- **Transesophageal echocardiography:** standard views used in toe, indications for toe, advantages and disadvantages of toe, patient preparation and care during toe, uses of toe, contraindications to toe, complications of toe,
- **Cardiac masses, infection and congenital abnormalities:** cardiac masses - tumors (primary or secondary), thrombus, infected material (vegetation   or   abscess),   congenital   abnormalities-shunts: asd, vsd, pfo, coarctation of the aorta, congenital valvular abnormalities- ebstein's anomaly, pulmonary stenosis, bicuspid aortic valve.

Unit 3   **(10 hrs.)**
- **Special situations and conditions:** Pregnancy, Rhythm disturbances: A.Fib, V. Fib, Syncope,

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Palpitations, LVH, Stroke, TIA and Thromboembolism, Breathlessness and Peripheral edema.
- **Echo abnormalities in some systemic diseases and conditions:** HIV infection and AIDS, Chagas' disease, Lyme disease, Rheumatic heart disease, Obesity.

Unit 4 (05 hrs.)
- **Recent advances in echocardiography:** 3D Echo, 4D Echo, Tissue Doppler Imaging.

Reference Book:

- **E**cho Made Easy: Sam Kaddoura Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.
- Feigen Baum's Echocardiography, Tajik Jamil for Echocardiography.

Advanced Echocardiography Practical

Subject Code:BCCTS1-506   **L T P C**   **Duration: 60 (Hrs.)**

                              0   0 4 2

Course Objective:

- To provide a brief introduction to Echocardiography, its techniques and types of Echocardiography.
- To provide practically and clinically useful application of Echocardiography.
- To explain echo techniques available and to put echo into a clinical perspective.

Course Outcomes:

- To develop an understanding regarding Echocardiography.
- To train students to perform Echocardiography examinations by explaining the position of transducers.
- To make students aware of recent advances in Echocardiography**.**
- To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing **individually.**

Experiments

1. Learn about advanced Echo settings.
2. Learn about qualitative reporting systems along with various software's associated with Echo reporting.
3. Learn various conditions indicated for Echocardiography

Recommended Text Books:

- **E**cho Made Easy: Sam Kaddoura Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.

● Feigen Baum's Echocardiography, Tajik Jamil for Echocardiography.

<mark>**Invasive Cardiology**</mark>

Subject Code: BCCTS1-503   **L T P C**   **Duration: 45 (Hrs.)**
                                        3 0 0 3

Course Objective:

- To enable students, understand new techniques for procedures in and around the heart emerge that againNeed expert knowledge and manual dexterity**.**

- To understand such interventions which include diagnostic and therapeutic electrophysiology; implantationOr exchange of complex pacemaker systems or percutaneous cardioverter-defibrillator-pacers; Percutaneous valve repairs or replacements etc**.**

Course Outcomes: To enable students to not only be a helping hand to those just starting out in the specialty but also to serve as a reference for those who have been working in Invasive field for some time

Unit 1   **(15 hrs.)**
- **Contrast media:** basics, definition of hydrophilicity, osmolarity, and viscosity, contrast agents used in the ccl, uses, complications, contrast medium reactions: mild, moderate, severe, allergies: anaphylactic and anaphylactoid reaction, contrast-induced nephropathy (cin)
- **Hemodynamics:** introduction to hemodynamics, pressure measurement system, sources of error and artifacts: fluid artifacts, electronic and electrical artifacts, human error: leveling and balancing, slope calibration, hemodynamic waveforms, gradient, valve area calculations, cardiac output formulas- fick, ejection fraction.

Unit 2   **(05 hrs.)**
- **Ivus:** history, angiography vs. Ivus, ivus systems, diagnostic applications of ivus, complications of ivus, optical coherence tomography (oct)
- **Functional assessment of coronary disease:** intravascular pressure measurement: coronary pressures and fractional flow reserve

Unit 3   **(15 hrs.)**
- **Ptca:** history, indications, materials used, types of angioplasty balloons (otw, soe, fixed-wire
- Balloons, perfusion balloons, compliant and non-compliant balloons, stent implantation, contraindications, complications.

- **Ic hardwares: stents:** composition, types, guidewires: composition, types, catheters: diagnostic
- And guiding.
- **Iabp and other cardiac assist devices:** iabp- physiologic principles of counter pulsation, indications, contraindications, insertion, timing: timing errors, troubleshooting, weaning and balloon removal, complications.
- **Basics of percutaneous ventricular assist devices:** tandem heart, impella, percutaneous coronary bypass

Unit 4   **(10 hrs.)**

- **Peripheral carotid angiography:** introduction, cerebrovascular anatomy and pathology, diagnosis and patient selection, patient preparation, diagnostic procedure, post procedure care.
- **Cardiac pharmacology:**local anesthetics, analgesics and sedatives: opioids, morphine, fentanyl, diazepam, midazolam, lorazepam, vasodilators: nitroglycerine, sodium nitroprusside, beta receptor blockers: metoprolol, propranolol, esmolol, labetalol, calcium channel blockers: diltiazem, verapamil, nicardipine, anticoagulation agents: platelet aggregation inhibitors, aspirin, clopidogrel, glycoprotein iib/iiia inhibitors, tirofiban, heparin, warfarin, thrombolytics: streptokinase, urokinase, anistreplase, rtpa, reteplase, tenecteplase.

Reference books
- The Interventional Cardiac Catheterization Handbook, 3rd Edition By Morton J. Kern
- Invasive Cardiology**, 3rd Edition by Sandy Watson**

Community Orientation & Clinical Visit(Including related practical's to the parent course) III Practical

Subject Code: BCCTS1-504   **L T P C**   **Duration: 120 (Hrs.)**
                                           0 0 8 4

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist.

Students are tested on intermediate technical skills.

601

Basics of Clinical Skill Learning

Subject Code: BCCTS1-507   **L T P C**   **Duration: 45 (Hrs.)**

                                       3 0 0 3

Course Objective:

- To Understand the basic ideas on how to check for Vital Signs of the Patient
- This course the Student will learn how to handle the patients and their positioning
- They will also learn on the Basics of Nasal-Gastric Tube
- The Students will learn on Administration of IV, IV and Medication
- Also they will know about Cleanliness in the Asepsis

Course Outcomes:

- After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines
- The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients

Unit 1   **(15 hrs.)**
- **Measuring vital signs:** temperature: axillaries temperature, pulse: sites of pulse, measurement, respiratory, blood pressure, pain: pain scale
- **Physical examination:** observation, auscultation(chest), palpation, percussion, history taking

Unit 2   **(10 hrs.)**
- **Feeding: enteral feeding, ng tube:** measurement, procedure, care, and removal of nasal-gastric tube, nasal-gastric tube feeding, and parenteral nutrition.

Unit 3   **(10 hrs.)**
- **Administrations:** oral, intravenous, intramuscular, subcutaneous, recapping of syringe, loading of drugs, calculation of drugs, venipuncture, iv infusion, cannula, attachment of iv infusion set, fluid collection, heparin lock, maintenance of iv set, performing nebulizer therapy, inhaler, oxygen therapy (nasal, prongs, nasal catheter, venturi mask, face mask).

Unit 4   **(10 hrs.)**
- **Asepsis:** hand wash techniques,(medical, surgical) universal precaution, protecting equipments: using sterile gloves, opening a sterile package and establishing a sterile field, sterile dressing changes, surgical attire, wound dressing, suture removal, cleaning and application of sterile dressing, wearing and removal

of personal protective equipment.

- **Mobility and support:** moving and positioning, range of motion exercises (active & passive) assisting for transfer, application of restraints.

Reference Book:

- Jansen van Vuuren, M. V. (2005). A framework for a skills laboratory curriculum in an undergraduate medical programme in South Africa (Doctoral dissertation, University of the Free State).

Hospital Operation Management

Subject Code: BCCTS1-508   **L T P C**   **Duration: 45 (Hrs.)**
                                 3 0 0 3

Course Objective:

- To promote scientific management of hospitals and advancement of health care systems so as to make it rational, responsive and cost efficient.
- To promote the development of high quality hospital care in the community and the country.
- It has to provide a satisfactory environment to the patient and also to the doctors for clinical research.

Course Outcomes:

- Understand and apply resource management concepts (personnel, finance, and material resources) and the processes and strategies needed in specific hospital sectors.
- Communicate effectively and develop their leadership and teambuilding abilities.
- Apply modern change management and innovation management concepts to optimize structures.
- Analyze existing hospital service policies and enhance their alignment within the local and national context

Unit 1   **(15 hrs.)**
- **Medico-legal cases:** introduction, laws associated with medico-legal cases, three core contents in medico-legal cases w.r.t doctors, patient & profession,
- **Considerations of ethics:** consent, confidentiality, mental health, end of life and organ transportation, research & clinical trials

Unit 2   **(10 hrs.)**
- **Hospital information system(his):** hospital information system management, software applications in registration, billing, investigations, reporting, medical records management, security and ethical challenges.

Unit 3   **(10 hrs.)**
- **Equipment operations management:** hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, amcs.

Unit 4   **(10 hrs.)**
- **Role of medical   records in health   care management:** computers for medical records, developments of computerized medical record information processing system(emr's), computer stored

(vs) manual hand written record, advantages of emr (vs) manual

Reference Book

- Hospital Operations: Principles of High Efficiency Health Care William S. Lovejoy
- Handbook of Healthcare Operations Management **Brian T. Denton**

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Cardiac Catheterization

Subject Code: BCCTS1-601   **L   T   P   C**   **Duration: 30 (Hrs.)**
                                       2   0   0   2

Course Objective:
- To provide the critical information to students when beginning with interventional cardiology.
- To provide an extension of techniques and methods described for diagnostic catheterization and specially related techniques.

Course Outcomes:
- The students will gain knowledge about chances of a successful procedure.
- To enable students, understand about benefit/risk to the patient if the procedure is successful/ unsuccessful
- The occurrence and management of various complications.

Unit 1   **(10 hrs.)**
- Asepsis in the cardiovascular catheterization laboratory
- Diagnostic catheterization

Unit 2   **(10 hrs.)**
- **Atherectomy and thrombectomy:** atherectomy devices- directional coronary atherectomy, rotational atherectomy, components, procedure, complications, thrombectomy devices- angiojet, manual aspiration devices
- **Renal artery intervention**

Unit 3   **(05 hrs.)**
- **Foreign body retrieval:** various instruments- amplatz goose neck snare, curry
- Intravascular retriever, dotter intravascular retriever, vascular retrieval forceps, welter retrieval loop, biopsy forceps

Unit 4   **(05 hrs.)**
- **Emergencies in the cardiac catheterization laboratory:** complications encountered in ccl, acls and bls algorithm

Reference books or related websites:
- The Interventional Cardiac Catheterization Handbook, 3rd Edition By Morton J. Kern

Cardiac Catheterization Practical

Subject Code:BCCTS1-604   **L   T   P   C**   **Duration: 60 (Hrs.)**
                                      0   0   4   2

Course Objective:

- To provide the critical information to students when beginning with interventional cardiology.
- To provide an extension of techniques and methods described for diagnostic catheterization and specially related techniques.

Course Outcomes:

- The students will gain knowledge about chances of a successful procedure.
- To enable students, understand about benefit/risk to the patient if the procedure is successful/ unsuccessful
- The occurrence and management of various complications.

Experiments

1. Sterilization techniques
2. Hardwares used in Cardiac Catheterization
3. Procedures involved in Cardiac Catheterization

Reference books

- The Interventional Cardiac Catheterization Handbook, 3rd Edition By Morton J. Kern

Pediatric Interventions

Subject Code: BCCTS1-602   **L T P C**   **Duration: 30 (Hrs.)**
                                                    2   0   0 2

Course Objective:

- To provide the critical information to students when beginning with Pediatric cardiology interventions.

- To approach the diagnostic problem presented by an infant or child with a cardiac finding.

Course Outcomes:

- The students will gain knowledge through proper assessment and integration of the history, physical examination, electrocardiogram, and chest X-ray, the type of problem can be diagnosed correctly in many patients, and the severity and hemodynamics correctly estimated.

- The occurrence and management of various complications in Pediatric cardiology interventions.

Unit 1   **(10 hrs.)**

- **Tools to diagnose cardiac conditions in children:** history- general principles of the cardiovascular history, chief complaint and/or presenting sign, physical examination- vital signs, cardiac examination, laboratory examinations

Unit 2   **(05 hrs.)**

- **Cardiac defect closure device:** device closure procedures in patent foramen ovale (pfo), atrial septal defect (asd), ventricular septal defect (vsd), patent ductus arteriosus (pda), left atrial appendage (laa).

Unit 3   **(10 hrs.)**

- **Percutaneous valve commissurotomy, repair, and replacement:** cardiac valves from the left to the right: mitral, aortic, pulmonic & tricuspid valves, their pathologies: ms, mr, as, ps, ts and treatment.

- **Pediatric interventional cardiology:** introduction, general anesthesia versus sedation and analgesia, diagnostic procedures, interventional procedures, device placement.

Unit 4   **(05 hrs.)**

- Chamber localization & cardiac malposition

- Recent advances in pediatric interventions

Reference books

- Invasive Cardiology, 3ʳᵈ Edition by Sandy Watson.
- Pediatric Cardiology the Essential Pocket Guide, 3ʳᵈ Edition by Walter H. Johnson, Jr., MD
- The Interventional Cardiac Catheterization Handbook, 3ʳᵈ Edition By Morton J. Kern

<mark>**Pediatric Interventions Practical**</mark>

Subject Code: BCCTS1-605   **L T P C**   **Duration: 60 (Hrs.)**
                                      0   0   4 2

Course Objective:

- To provide the critical information to students when beginning with Pediatric cardiology interventions.

- To approach the diagnostic problem presented by an infant or child with a cardiac finding.

Course Outcomes:

- The students will gain knowledge through proper assessment and integration of the history, physical examination, electrocardiogram, and chest X-ray, the type of problem can be diagnosed correctly in many patients, and the severity and hemodynamics correctly estimated.

- The occurrence and management of various complications in Pediatric cardiology interventions

<mark>Experiments</mark>

1. Diagnosis of Cardiac conditions in children
2. Cardiac Defect Closure Devices
3. Valve repair and replacement procedures
4. Drugs used in Pediatric Interventions

Reference books

- Invasive Cardiology, 3ʳᵈ Edition by Sandy Watson.
- Pediatric Cardiology the Essential Pocket Guide, 3ʳᵈ Edition by Walter H. Johnson, Jr., MD
- The Interventional Cardiac Catheterization Handbook, 3ʳᵈ Edition By Morton J. Kern

Course code- BSCC132 CP: CCT Directed Clinical Education – IV

Students will gain additional skills in diagnosis in pediatric cases and pediatric interventional procedures. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical diagnostic and therapeutic skills. (Total – 450 hrs).

INTERNSHIP

Guidelines:
- The internship shall commence after the student has completed and passed all subjects up to VI semesters.
- The internship is compulsory.
- The duration of the internship shall be one year.
- The degree of Bachelor in Allied Health Sciences shall be awarded after the satisfactory completion of the internship.

Evaluation of Internees:

Formative Evaluation:

Day to day assessment of the internees during their internship postings should be done by the Head of the Department/Faculty assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records /Log Book by all internees. This will not only provide demonstrable evidence of the processes of training but more importantly of the internee's own acquisition of competence as related to performance.

Summative Evaluation:

It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issue a certificate of satisfactory completion of training, following which the university shall award the degree or declare him/her eligible for it.

To implement the project work uniformly for all the specialties in view of the curriculum and training to be acceptable internationally and the students to get opportunity for higher studies and employment.

Internship Programme:

05 days for orientation programme 300 days in Cardiology Department 30 days in Cardiac ICU/General ICUs 15 days for Record Keeping/CSSD department 15 days for Casualty/Visit to other hospitals

Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.

I   Clinical Teaching: Demonstrate beginning competency in technical skills.

II.   Independent Work by Student guided by faculty

a.   Develop effective communication skills (verbally and through charting) with patients, team members, and family

b. Identify relevant data for communication in pre and post conferences

c.   Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.

c.   Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.

d. Identify the need for help when appropriate to the situation. Delegates level specific skills to Appropriate team members.

III.   Hands on practical work by students

a.   Navigate and document clear and concise responses to care in the electronic health record for patient, where appropriate for clinical setting

b. Protect confidentiality of electronic health records data, information, and knowledge of technology in an ethical manner

IV.   Independent work by student

a.   Maintain a positive attitude and interact with interprofessional team members,

Faculty, and fellow students in a positive, professional manner. Accept constructive feedback

and develop a plan of action for improvement.

b. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive at Clinical experiences at assigned times. Maintain professional behavior and

appearance.

c. Accept individual responsibility and accountability for nursing interventions,

outcomes, and other actions. Engage in self-evaluation & assume responsibility for Learning.

*Clinical evaluation tool guidelines for full descriptions of grades 1-4.
4-exceeds expectations (range of marks –40-50 marks) 3-meets expectations (range of marks – 30-40 marks) 2-below expectations (range of marks –25-30 marks) 1-does not meet expectations (range of marks –no marks)

Eligibility Criteria

1. Bachelor's degree of minimum 3 years duration from UGC/AICTE recognized institutions

2. Obtained at least 50% (45% in case of candidate belonging to reserved category) at the qualifying examination

3. Minimum 1 year work experience is required in any government or private limited company.

Description of Course

1. Executive MBA is 3 years programme.

2. Classes will be conducted in Weekend and in offline mode

3. In Executive MBA the subjects of MBA 2-Years programme have been expanded into 3 Years. Credits, Subjects and Syllabus of both the programmes are similar.

4. Summer internship (6 credits) has been removed from Executive MBA . The weekend classes will be taken during that period.

5. Students will be offered Dual and Super specialisation during fourth and fifth Semester.

6. For Dual specialisation, student will study 2 subjects from each specialisation during fourth and fifth semester each.

7. For super specialisation, student will study 4 subjects from the concerned specialisation during fourth and fifth semester each.

Proposed Schedule for first two semesters - (Weekly 16 Hours)

Saturday	9:00 AM to 5:00PM	(8 Hours)
Sunday	9:00 AM to 5:00 PM	(8 Hours)

Study Scheme of Executive MBA

SEMESTER 1st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MBADS1-121	CSR and Business Ethics	4	-	-	40	60	100	4
MBADS1-125	Managerial Economics and Policy	4	-	-	40	60	100	4
MBADS1-123	Financial Statements Analysis and Reporting	4	-	-	40	60	100	4
MBADS1-124	Business Statistics and Analytics for Decision Making	4	-	-	40	60	100	4
MBADS1-127	Business Communication	3	-	-	40	60	100	3
Total		**19**	**0**	**0**	**200**	**300**	**500**	**19**
SEMESTER 2nd								
MBADS1-122	Organization Behaviour	4	-	-	40	60	100	4
MBADS1-126	Marketing Management	4	-	-	40	60	100	4
MBADS1-221	Legal and Business Environment	4	-	-	40	60	100	4
MBADS1-223	Corporate Finance	4	-	-	40	60	100	4
MBADS1-128	Computer Application in Business	3	-	-	40	60	100	3
Total		**19**	**0**	**0**	**200**	**300**	**500**	**19**
SEMESTER 3rd								
MBADS1-226	Entrepreneurship	4	-	-	40	60	100	4
MBADS1-222	Business Research Methods	4	-	-	40	60	100	4
MBADS1-224	Human Resource Management	4	-	-	40	60	100	4
MBADS1-225	Operations Management	4	-	-	40	60	100	4
MBADS1-227	Business Statistics Research Lab	-	-	4	60	40	100	2
Total		**16**	**-**	**4**	**220**	**280**	**500**	**18**
SEMESTER 4th (Super Specialisation)								
	Specialisation Subject 1	4	-	-	40	60	100	4
	Specialisation Subject 2	4	-	-	40	60	100	4
	Specialisation Subject 3	4	-	-	40	60	100	4
	Specialisation Subject 4	4	-	-	40	60	100	4
Total		**16**	**-**	**-**	**160**	**240**	**400**	**16**

SEMESTER 5th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
	Specialisation Subject 1	4	-	-	40	60	100	4
	Specialisation Subject 2	4	-	-	40	60	100	4
	Specialisation Subject 3	4	-	-	40	60	100	4
	Specialisation Subject 4	4	-	-	40	60	100	4
Total		**16**	**-**	**-**	**160**	**240**	**400**	**16**
SEMESTER 6th								
MBADS1-321	Project Management	4	-	-	40	**60**	100	**4**
MBADS1-421	Strategic Management	4	-	-	40	60	100	4
MBADS1-422	Dissertation	-	-	-	60	40	100	8
Total		**8**	**-**	**-**	**140**	**160**	**300**	**16**

Total Credits

Semester	Marks	Credits
1st	500	19
2nd	500	19
3rd	500	18
4th	400	16
5th	400	16
6th	300	16
Total	**2600**	**104**

SEMESTER - I

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CSR and BUSINESS ETHICS

Subject Code: MBADS1-121   **L T P C**   **Duration: 60 Hrs**
                              4 0 0 4

Course Objective
The main aim of this course is:
1. To Discuss the various concepts of Corporate Social Responsibility (CSR).
2. To understand the importance of sustainability and social responsibility with context business and how they integrate into the vision and planning of the firm.
3. To understand the changing role of Business with context to the society.
Course Outcomes
After the completion of this course, students will be able to
1. Understand about Corporate Social Responsibility, Business Ethics, Models and its strategies.
2. Evaluate corporate governance, ethical culture and its practices across various business areas.
3. Comprehend sustainability and its relationship with CSR and Business Ethics.
4. Apply the reporting system of National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business International Standards.

UNIT-I (15 Hrs)

Introduction to Corporate Social Responsibility (CSR): Meaning, Definition & Objectives of CSR, Chronological evolution of CSR in India; Need of CSR, Models of CSR in India, Carroll's model; Drivers of CSR; Major codes on CSR; Initiatives in India, Corporate citizenship-Business practices-Strategies for CSR-Challenges and implementation

Sustainability: Meaning and Scope, Corporate Social Responsibility and Corporate Sustainability-Sustainability Terminologies and Meanings-Why is Sustainability an Imperative

UNIT-II (12 Hrs)

Evolution of Corporate Governance-Governance practices and regulation-Structure and Development of boards-Role of capital market and government-Governance Ratings-Future of governance

Corporate Sustainability Reporting Frameworks, Global Reporting Initiative Guidelines, National Voluntary Guidelines on Social, Environmental and Economic

UNIT-III (15 Hrs)

Business Ethics: Characteristics, Principles, Types, Importance, Factors highlighting the importance of Business Ethics, Myths about Business Ethics. Ethical Values, Theories of Ethics, Absolutism verses Relativism, Teleological approach, the Deontological approach, Kohlberg's six stages of moral development (CMD), Ethics v/s Ethos, Indian v/s Western Management, Globalisation and Business Ethics. Emerging issues of Business Ethics

UNIT-IV (18 Hrs).

Managing Ethical Dilemma: Characteristics, Ethical Decision Making, Ethical Reasoning, the dilemma resolution process; Ethical dilemmas in different business areas: Finance, Marketing HRM and International Business.

Ethical Culture in Organization: Developing Codes of Ethics and Conduct, Ethical and Value Based Leadership. Role of scriptures in understanding ethics, Indian wisdom & Indian Approaches towards Business Ethics

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Recommended Books

1. C.V. Baxi and Ajit Prasad, 'Corporate Social Responsibility: Concepts and Cases: The Indian Experience', Excel Books India, New Delhi, *Latest Edition*

2. Mike Blowfield and Alan Murray, 'Corporate Responsibility', Oxford University Press, *Latest Edition*

3. J.P. Sharma, Corporate Governance, Business Ethics & CSR, Ane Books Pvt Ltd, New Delhi. *Latest Edition*

MANAGERIAL ECONOMICS AND POLICY

Subject Code: MBADS1-125   **L T P C**   **Duration: 60 Hrs**
                                  4 0 0 4

Course Objectives
The main aim of this course is:
1. To enable students to understand various economic factors that influence business in India so and analyze associated opportunities, risks and challenges for managerial decisions.
2. Learn about Managerial Economics & its relation with other disciplines, and understand about Demand Analysis, Theory of Production, Theory of Cost and Market structure.
3. To teach students about basic tools of macroeconomics and apply them to real world economic policy.
4. To make students understand how monetary policy and fiscal policy can be used to influence short-run macroeconomic conditions.

Course Outcomes
After the completion of this course students will be able to:
1. Analyze the demand and supply conditions and assess the position of a company
2. Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets
3. Demonstrate the basic understanding of the economic implications of changes in government fiscal or monetary policy.
4. Calculate equilibrium national income levels and use various multipliers and convert nominal values to real values.

Unit-I (15 Hrs)
Introduction: Meaning, Nature, Scope & Relationship with other disciplines, Role of managerial economics in decision Making, Opportunity Cost Principle

Marginal Analysis: Law of diminishing marginal utility, Law of equi-marginal utility

Indifference Curve Analysis: Meaning Assumptions Properties, Consumer Equilibrium.

Unit-II (15 Hrs)
Demand Analysis: Law of Demand: Meaning, Determinants, Exceptions, Bandwagon and Snob effects, Demand function, Application of demand analysis in managerial decision making.

Elasticity of Demand: Meaning, Types & Degree of elasticity of demand, Methods of measuring price elasticity of demand, Factors determining the elasticity of demand, Demand Forecasting: Importance, Scope, Techniques of forecasting.

Theory of Production: Production function, Short run and Long run production analysis, Isoquants, Optimal combination of inputs, Application in managerial decision making.

Unit-III (15 Hrs)
Theory of Cost: Cost Analysis: Cost Concepts and Determinants of cost, Traditional and Modern Theory of Cost: Long run and Short run, Economy of scale, Revenue Curve

Market Structure: Price Output Decision under Perfect Competition, Monopoly, Monopolistic and Oligopoly Competition, Application in Managerial Decision Making. Behaviour of Firms and Game Theory: Nash Equilibrium, Prisoner"s Dilemma.

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Unit-IV (15 Hrs)

Macro Economics: Concept of National Income: Conceptual Framework, Measure of National Income, Methods of Measurements, Phillips Curve, Classical Keynesian Theory, Investment Multiplier and Foreign Trade Multiplier.

Business Cycle: Features and Phases, Effects and Control.

Inflation: Meaning, Types, Theories – Demand and Cost Push Inflation, Causes, Effects and Cures of Inflation through Price. Deflation

Macro-Economic Policy: Aspects of Monetary Management; Monetary Policy, Growth and Stabilization Effects of Monetary Policy Operations. Fiscal Policy - Nature and Components of Fiscal Policy; Fiscal Deficit and its Management.

Recommended Books

1. Peterson and Lewis, 'Managerial Economic', Prentice Hall of India
2. Froeb, 'Managerial Economics', Cengage Learning
3. Geetika, 'Managerial Economics', Tata McGraw Hills
4. K.K .Dewett, ' Modern Economic Theory', S. Chand Publication
5. D.M.Mithani, 'Managerial Economics Theory and Applications', Himalaya Publication
   D.N.Dwivedi, 'Managerial Economic', Vikas Publications

FINANCIAL STATEMENT ANALYSIS AND REPORTING

Subject code – MBADS1-123 **L T P C** **Duration – 60 Hrs**
4 0 0 4

Course Objectives

The main aim of this course is:

1. To acquaint the students regarding various accounting concepts and its application in managerial decision making.
2. To understand financial statements of cashflow and balance sheets.
3. To understand the appropriate accounting tools and techniques of financial accounting and management accounting for preparing and analyzing financial statements.
4. To make students understand about the financial reporting.

Course Outcomes

After the completion of this course students will be able to:

1. Identify and utilise value-relevant information contained within financial statement.
2. Explain the relationship between strategic business analysis, accounting analysis and financial analysis
3. Understand the impact of financial reporting choices on the usefulness of reported earnings to predict future performance.
4. Conduct applied business research (including locating, critically interpreting and evaluating firm-specific financial information)

UNIT–I (20 Hrs)

Accounting - Accounting as an Information System, Concepts, Convention and Principles of Accounting, Role of Accountant in an Organization, Branches of Accounting: Financial, Cost and Management Accounting and Their Inter-Relationships, Introduction of Accounting Standards.

Financial Statements - Need of Financial Statement, Nature, Objectives, Uses and Limitations of Financial Statement, Stakeholders of Financial Statements

UNIT–II (15 Hrs)

Readings of Financial Statements: Income Statement, Balance Sheet, Statement of Retained Earnings, Fund Flow Statement, Cash Flow Statement,

Cost Analysis: Marginal Costing, Break Even Analysis, Standard Costing, Variance Analysis, Introduction to Budgets and its Types.

UNIT-III (13 Hrs)

Analysis of Financial Statements with Managerial Perspective

Techniques of Financial Statement Analysis: Common Size Statements, Comparative Statements, Trend Analysis and Ratio Analysis (Liquidity, Leverage, Solvency, Turnover Ratio, Market Ratio and Profitability Ratio), Du Pont Analysis.

Analysis of Firm Performance: Time Series Analysis and Cross-Sectional Analysis,

UNIT-IV (12 Hrs)

Financial Reporting System - Content of Annual Reports, Quality of Financial Reporting, Consolidated Financial Statements, Indian Financial Reporting System, Ethical Issues in Financial Reporting (Window Dressing, Quality of Earnings, Financial Scams etc.)

Short Project

Students have to submit a mandatory project in group. The project will be equivalent to two regular assignments. (Maximum Three students can be part of one group). Students have to do financial analysis of two or more companies on the basis of their annual reports. A comparative study of Indian and Foreign companies is preferred)

Recommended Books

1. Narayanaswamy, R., 'Financial Accounting – A Managerial Perspective', 5th Edn.,Prentice Hall of India. *Latest Edition*
2. Gerald White, Ashwinder paul Sondhi and Dov Fried, 'The Analysis and Use of Financial Statements', Wiley India Edn., *Latest Edition*
3. Gokul Sinha, 'Financial Statement analysis', Prentice Hall of India, New Delhi, *Latest Edition*
4. John J. Wild, K. R. Subramanyam and Robert F. Halsey, 'Financial Statement Analysis', Tata McGraw Hill Publishing company Ltd. New Delhi, *Latest Edition*
5. Stephen H Penman, 'Financial Statement Analysis and Security Valuation', Tata McGraw Hill Publishing Company Ltd. New Delhi, *Latest Edition*

BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING

Subject Code – MBADS1-124   **L T P C**   **Duration – 60 Hrs**
4 0 0 4

Course Objectives

The main aim of this course is:

1. To understand the statistical methods which are applied in all functional areas of business: accounting, finance, management and marketing.
2. To enable students to understand the role and importance of Statistics in improving managerial decisions.
3. To make understanding of various research tools and techniques.

Course Outcomes

After completion of this course, students will be able to:

1. Understand the key terminology, concepts tools and techniques used in various business statistical analysis
2. Apply theory of probability, rules of probability and probability distributions for solbving business problems
3. Apply techniques like regression for business forecasting
4. Demonstrate time series techniques to understand the market and economic behavior for making business decision

UNIT-I (20 Hrs)

Statistics: An Overview-Concept, Significance and Limitations, Importance and Scope of Statistics in Decision Making in Business Management.

Measure of Central Tendency: Objectives of Averaging. Requisites of Measure of Central Tendency, Mathematical Averages – Arithmetic Mean, Geometric Mean, Harmonic Mean, **Averages of Position** -Median and Mode, Partition Values- Quartiles, Deciles and Percentiles, Relationship Between Mean, Median and Mode.

Measure of Dispersion: Classification of Measure of Dispersion; Range and Inter Quartile Range, Deviation, Variance and Standard Deviation, Chebyshev's Theorem, Coefficient of Variation, Skewness and Kurtosis

UNIT-II (15 Hrs)

Correlation: Significance, Types, Methods of Correlation Analysis: Scatter Diagrams, Karl Pearson's Correlation Coefficient, Rank Correlation Coefficient, Properties of various types of Correlation

Regression: Concept of Regression and The Difference between Correlation and Regression, Lines and Equations of Regression.

UNIT-III (10 Hrs)

Time Series Analysis: Components of a Time Series, Determination of Secular Trend and Seasonal Variations in Business Data, Least Squares Method as a Tool for Forecasting.

Index Numbers: Different Methods of Constructing Price and Quantity Index Numbers. Fixed Base and Chain Base Index Numbers, Problems of Reversibility in Index Numbers

UNIT-IV (15 Hrs)

Probability: Definition, Types of Probability, Classical Approach, Relative Frequency and Subjective Approach to Probability, Theorems of Probability, Addition and Multiplication Laws, Bays Theorem and its Application. Probability Distributions

Recommended Books

1. Levin & Rubin,' Statistics for Management', <u>Prentice Hall</u>
2. Beri, 'Business Statistics', <u>Tata Mc Graw Hill</u>
3. Croucher, 'Statistics: Making Business Decisions', <u>Tata McGraw Hill</u>
4. Gupta & Gupta, 'An Introduction to Statistical Methods', <u>Vikas Publications</u>
5. S P Gupta, 'Statistical Methods', <u>Sultan Chand</u>

C.R. Reddy, 'Quantitative Techniques for Management Decisions', <u>Himalaya Publishing</u>

Subject Code: MBADS1-127   **L T P C**   **Duration: 45 Hrs**
                                      3 0 0 3

Course objectives

The main aim of this course is:

1. To provide students a comprehensive view of communication, its scope and importance in business as well as the role of communication in establishing a favourable image of the organization.

2. To develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations.

3. To make student understand the fundamentals of communication as well as oral, written and non-verbal communication skills.

Course Outcomes

After the completion of this course, students will be able to:

1. Know the dynamics of communication in the business world and Practice the different tools of communication

2. Speak effectively suited to the specific situation

3. Demonstrate a good understanding of effective business writing and effective business communications.

4. Acquire the skills of report writing and modern forms of communication such as email and usage of internet.

UNIT- I (12 Hrs)

Introduction to Communication: Meaning, Process, Importance of Communication in Business, Types of Information, Formal and Informal Communication, Internal and External Communication. Approaches to Effective Communication, Essentials of Effective Business Communication (7Cs model)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Learning How to Think and Read, Developing Effective Reading Habits, Reading Tactics and Strategies: Training Eye and Training Mind (SQ3R), Building Vocabulary.

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening

UNIT –II (10 Hrs)

Developing Writing Skills: Basics, Advantages and Disadvantages, Covering letter, Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments, Business Proposals, Emails etc.

Report Writing: Structure, Types, Formats, Drafting of Various Types of Report. Writing

Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion Letters, Resignation Letters, Newsletters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release

UNIT- III (10 Hrs)

Developing Speaking Skills: Advantages and Disadvantages, Conversation as Communication, Art of Public Speaking, Just a Minute Presentation, How To Make Effective Presentations, Four P's of Presentation, Structuring, Rehearsing and Delivery Methods.
Workshop-Jam Feedback, Overcoming Stage Fright and Overcoming Glossophobia
Presentation–1 (Planning & Preparing)   Presentation–2 (Visual Aids)
Presentation–3 (Delivery)

UNIT –IV (13 Hrs)

Group Discussion: Nature, Uses and Importance, Guidelines for GD Presentations
Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume.
Interview Skills: Preparation Techniques, FAQsabout How to Face an Interview Board, Proper Body Posture, Projecting a Positive Image, Steps to Succeed In Interviews, Practice Mock Interview in Classrooms.
The Case Method of Learning: Dimensions of a Case, Case Discussion, Usefulness of The Case Method, Training of Managers, Use The Case Method.
Report Writing: Structure, Types, Formats, Preparations and Presentation. **Feedback**

Recommended Books
1. Lesikar, Petit &Flately, 'Lesikar's Basic Business Communication', Tata McGraw Hill
2. Raman Meenakshi'Prakash Singh, Business Communication', Oxford University Press.
3. Rizvi Ashraf,' Effective Technical Communication', Tata McGraw Hill
4. Krizan, Buddy, 'Merrier, Effective Business Communication', Cengage Learning
5. Diwan& Aggarwal, 'Business Communication', Excel
6. Devaraj, 'Executive Communication', Tata McGraw Hill
7. Ober, 'Effective Bossiness Communication', Cengage Learning

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SEMESTER - II

<div style="background:#f5a800">**ORGANIZATION BEHAVIOR**</div>

Subject Code: MBADS1-122   **L T P C**   **Duration: 60 Hrs**
                                    4 0 0 4

Course Objectives

The main aim of this course is:

1. To provide an understanding of basic concepts, theories and techniques in the organizational
   behaviour.
2. To understand the concept of motivation and its theories, job satisfaction and various leadership styles.
3. To provide an understanding of basic concepts, theories and techniques in the field of foundation of group behavior, group decision making and conflict management.
4. To understand human behaviour with its relevance to organizational functions.

Course Outcomes:

After the completion of this course students will be able to:

1. Understand the basic concepts of the organization behavior and personality
2. Motivate its employees, enhance job satisfaction among peers and demonstrate leadership styles
3. Perform in teams by demonstrating group behavior, and manage conflict in groups
4. Able to control negotiation, power and politics in organization environment for sustainable performance.

UNIT-I (15 Hrs)

Organizational Behavior: Concepts, Theories and organization aspects of OB, Contributing Disciplines to OB, Challenges and opportunities for OB. Foundations of Individual Behavior: Biographical Characteristics, Learning, Theories of Learning, Ability, Attitudes, Attitude Change, Values & Believes, Prejudices
Personality: Determinants of Personality, Perception, Attribution Theory, Person's Perception.

UNIT-II (12 Hrs)

Motivation: Definition & Process, Early Theories of Motivation, Contemporary Theories of Motivation, Nature and process of Motivation, Application of Motivation Concept.
Job Satisfaction: Nature & Significance of Job satisfaction
Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership in Indian Culture; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model.

UNIT-III (20 Hrs)

Foundations of Group Behavior: Nature & Concept of Group Formation, Group properties: Roles, Norms, Status, Size and Cohesiveness, Stages of Group Formation, Theories of Group Formation. Teams, Work Teams, Difference between Group & Team.
Group Decision Making: Decision Making Process; Decision Making Styles; Advantages & Disadvantages of Decision Making; Techniques of Decision Making; Consensus Decision Making in Groups.
Conflict Management: Definition of Conflict, Transitions in Conflict thought; Functional Vs Dysfunctional Conflict; Conflict Process; Individual, Group Level Conflict and Organization level Conflict; Managing Organizational Conflict

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UNIT-IV (13 Hrs)

Negotiations - Meaning & Definition, Negotiations Process; Issues in Negotiations

Organizational Change & Development: Understanding Organization, Managing Organization Culture and Technology, Organizational Change: Change Agents, Change Models, Resistance to Change. **Managing Power and Politics in Organization:** Nature & Concepts, Sources & Types of Power, Techniques of Politics.

Recommended Books

1. Robbins, 'Organization Behaviour', <u>Pearson Education,</u> *Latest Edition*
2. Luthans ,'Organization Behaviour', <u>Tata McGraw Hill,</u> *Latest Edition*
3. Hersey, 'Management of Organizational Behaviour', <u>Prentice Hall India,</u> *Latest Edition*
4. Aswathappa, 'Organization Behaviour', <u>Himalaya Publications,</u> *Latest Edition*
5. L.M. Prasad, 'OrganisationBehaviour', <u>Sultan Chand& Sons,</u> *Latest Edition*

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MARKETING MANAGEMENT
</div>

Subject Code: MBADS1-126   **L T P C**   **Duration: 60 Hrs**
                                      4 0 0 4

Course Objectives

The main aim of this course is:

1. To make students understand concepts, philosophies, processes and techniques of managing the marketing operations of a firm in turbulent business environment.
2. To provide better understanding of the complexities associated with marketing functions, strategies and provides students with the opportunity to apply the key concepts to practical business situations.
3. To understand the concept of Marketing, Marketing Information System and Marketing Mix
4. To learn about Consumer Behaviour and Buying behaviour

Course Outcomes

After the completion of this course students will be able to:

1. Understand the role of marketing in the various business environment
2. Apply the strategic marketing in key business issues like pricing, planning
3. Find the appropriate use of latest IT based and environment friendly techniques to enhance the brand communication and product promotion
4. Demonstrate the use of marketing tools and techniques in global business scenario.

UNIT-I (15 Hrs)

Understanding Marketing and Consumers: Definition, Importance, Scope, Various Marketing **Concepts**, Marketing Mix, Marketing vs Selling, Effect of Liberalization and Globalization, Analyzing Marketing Environment: Micro, Macro

Corporate Strategic Planning: Defining Role Marketing Strategies, Marketing Planning Process. **Marketing Information System**: Concept and Components

Consumer Behaviour: Understanding Consumer Behaviour, Factors Influencing Consumer Buying Behaviour, Business Buying Process, Understanding Business Buyer Behaviour

UNIT-II (15 Hrs)

Creating and Managing Product: Market Segmentation & Targeting, Differentiation & Positioning, Competitors Analysis

Product Decisions: Product Mix, Packaging and Labelling Decisions, Branding & Brand Equity, Services Marketing, New Product Development, Consumer Adoption Process, Product Life Cycle and Strategies

Pricing Decisions: Objectives, Factors Affecting Pricing Decisions, Pricing Methods, Price Changes, Pricing Strategies

UNIT-III (18 Hrs)

Delivering and Promoting Product - Supply Chain Decisions: Nature, Types, Channel Design and Channel Management Decisions, Retailing, Wholesaling, Managing Logistics and Supply Chain.

Promotion Decisions: Communication Process, Promotion Mix, Advertising, Sales Promotion, Public Relations, Direct Selling and Online Marketing.

Personal Selling: Personal Selling Process, Managing the Sales Force, Designing Quota & Territories, Evaluating Performance.

UNIT-IV (12 Hrs)

Emerging Trends in Marketing: Green Marketing, Event Marketing, Network Marketing, Direct Marketing, Social Marketing, Buzz Marketing/ Viral Marketing, Rural Marketing, Customer Relationship Management (CRM), **E-Commerce**: Marketing in Digital Age

Relevant Case Studies should be discussed in class.

Recommended Books

1. Ramaswamy & Namakumari, 'Marketing Management., McMillan
2. Etzel, Walker, Stanton, and Pandit, 'Marketing Management', Tata McGrawHill,
3. Kurtz & Boone, 'Principles of Marketing', Cengage Learning
4. Kotler & Koshy, 'Marketing Management', Pearsons Education
5. Kotler & Armstrong, 'Principles of Marketing', Prentice Hall
6. Biplab S. Bose, 'Marketing Management', Himalaya Publications

<div align="center">**LEGAL AND BUSINESS ENVIRONMENT**</div>

Subject Code – MBADS1-221   **L T P C**   **Duration: 60 Hrs**
<div align="center">**4 0 0 4**</div>

Course Objectives

The aim of this subject is:

1. To study Law of Contract, Sale of Goods Act and Negotiable Instrument for legally smooth functioning of a business.
2. To highlight about Company Law as well as constitutional framework of taxation.
3. To provide insights about Business Environment, Complexity and Diversity of current business environment in the 21st century
4. To provide a deeper understanding of the environmental factors influencing Indian business organizations.

Course Outcomes

After successful completion of this course, students will be able to:

1. Understand the impact of legal environment in a business context and demonstrate knowledge of and need for sustainable development
2. Analyze the various facets of basic case laws of each Act from a legal and managerial perspective
3. Apply the legal provision of Acts in common business situations.
4. Scanning internal and external environment for the sustainability of business

<div align="center">**Unit I (15 Hrs.)**</div>

Law of Contract: Definition, offer and Acceptance, Consideration, Capacity of parties, Free Consent, Legality of Object, Performance and Discharge of Contract and Remedies for Breach of Contract. **Sale of Goods Act**: Meaning - Formation of contract, condition and warranties. Difference between Transfer of Property and Possession, Right of an Unpaid Seller, **Negotiable Instrument**: Types of negotiable **Law of Insurance**: Fundamentals Elements of Insurance.

<div align="center">**Unit II (15 Hrs.)**</div>

Company Law Incorporation of companies Memorandum of Association and Articles of Association Membership of a company Prospectus, Issue of capital, Loans, investments, deposits and charges, Meetings, Accounts and Auditors, Amalgamation, reconstructions, arrangements and compromises Provision with respect to appointment and removal of Director, Meeting, Winding up by court. **Taxation:** Constitutional framework of taxation. Direct and indirect taxes. Basic features of Central excise, GST.

<div align="center">**Unit –III (15 Hrs.)**</div>

Business Environment - Definition, components and overview of Business Environment, Need to scan the business environment and techniques of scanning the business environment. **Political Environment**: Three political institutions: Legislature, Executive and Judiciary. Brief note on Fundamental rights and Directive Principles of state policy, **Legal Environment**: Company Regulatory Legislations in India, FEMA, Latest**.** EXIM policy. Competition Law, Consumer Protection Act 1986, Right to Information Act 2005

<div align="center">**Unit –IV (15 Hrs.)**</div>

Public Sector in India: Concepts, Philosophy and Objectives, Performance, Problems and Constraints. Disinvestment and Privatization, Joint sector and Cooperative sector in India. **Social Environment**: Corporate Social Responsibility, Cross-Cultural Business Environment, **Technological Environment**: Impact of Technology on Business,

Technological Policy, Intellectual Property Rights, Import of Technology, Problems in Technology Transfer.

International Environment: Emergence of Globalization. Control of Foreign Direct Investment, Benefits and Problems from MNCs. WTO, its role and functions, Implications for India. Trading Blocks, Foreign Trade, Dumping and Anti-Dumping measures.

Relevant Case Studies should be discussed in class.

Recommended Books
1. Dr Francis Cherunilam, Business Environment Text & Cases, Himalaya Publishing
2. Paul Justice, Business Environment- Text and Cases, TATA McGraw Hill.
3. Aswathappa, Essential of Business Environment, Himalaya Publishing
4. Aggarwal &Diwan, Business Environment, Excel Books
5. Majumdar A. K. and Kapoor G. K. 'Company Law' Taxmann Publishers
6. Bansal C. L. 'Business Laws' Taxmann Publishers
7. Singhania V. K. and Singhania K. 'Direct Tax Laws and Practice' Taxmann Publishers.
8. Chawla, Garg and Sarin 'Mercantile Law' Kalyani Publishers.

CORPORATE FINANCE

Subject Code: MBADS1-223   **L T P C**   **Duration: 60 Hrs**
                                  4 0 0 4

Course Objectives

The main aim of this course is:

1. To provide an understanding of the functions and role of corporate financial management, covering the sourcing of finances and their issues in investment and operations.
2. To provide analytical knowledge of risk and return in portfolio.
3. To understand leverages, ROI and ROE concepts, simplifying the capital structure theories and dividend policies with illustrations.
4. To get interactive knowledge of Inventory management and receivable management, Estimation and forecasting of working capital requirements of company, functional knowledge of financing short term assets with illustrations and Case studies.

Course Outcomes

After completion of this course, students will be able to:

1. Demonstrate the applicability of the concept of financial management and investment decisions in the working of business
2. Assess the investment decisions and financing of companies by applying various financial management tools.
3. Comprehend various theories of capital structure and divided policies and their applications in business decisions
4. Apply Working Capital policies to manage cash and Inventory in the business

UNIT-I (20 Hrs)

Introduction: Nature, Scope and Objectives of Financial Management, Profit Maximization Vs Wealth Maximization, Role of Financial Manager, Agency Problem, Interface between Finance and other Business Functions, Financial Planning: Objectives, Factors affecting Financial Planning

Risk and Return: Risk and Return Concepts, Types of Risks, Relationship between Risk and Return Model - CAPM, Arbitrage Pricing Theory

Investment Decision: Nature and Significance of Investment Decision, Time Value of Money: Future Value of a Single Cash Flow, Annuity, Present Value of a Single Cash Flow, Annuity, Present Value of an Uneven Cash Flow

Capital Budgeting: Process and Techniques, Discounted and Non-Discounted Methods (Pay Back, ARR, NPV, IRR, Benefit Cost Ratio), Capital Rationing, Certainty Equivalent Factor

UNIT-II (15 Hrs)

Financing Decision: Cost of Capital, Computation of Cost of Equity, Debentures, Preference Shares and Retained Earnings, Weighted Average Cost Capital and Implications

Capital Structure – Introduction, Factors Affecting Capital Structure, Capital Structure Theories: Net Income Approach, Net Operating Income Approach, Traditional Approach, Modigliani-Miller Model (MM) ,Criticisms of MM Models**,** Determinants of Capital Structures, EBIT - EPS Analysis

UNIT-III (10 Hrs)

Leverage: Introduction, Operating Leverage, Financial Leverage and Combined Leverage, Application of Leverage

Dividend Decisions: Meaning and Significance of Dividend, Dividend Models: Traditional Model, Walter Model, Gordon Model, Miller-Modigliani Position, Determinants of Dividend, Bonus Shares, Stock Splits, Dividend Capitalization Approach

UNIT-IV (15 Hrs)

Working Capital Decision: Meaning, Nature and Scope of Working Capital - Component of Working Capital –Factors affecting Working Capital, Working Capital Strategies, Cash Management, Inventory Management

Sources of Funds: Equity share, Preference shares, Debentures, Bonds, Warrants, Venture capital, Convertible Bonds/Debentures etc.

 Recommended Books

1. Brigham, 'Financial Management : Text & Cases', Cengage Learning
2. Brealy&Myres, Principles of Corporate Finance', Tata McGraw Hill
3. John J.,' Financial Decision Making: Concept, Problem & Cases', Prentice Hall
4. I.M. Pandey, 'Financial Management', Vikas Publishers
5. Khan & Jain, 'Financial Management', Tata McGraw Hill

COMPUTER APPLICATIONS IN BUSINESS

Subject Code: MBADS1-128　　　　**L T P C**　　　　**Duration: 45 Hrs**
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Course Objectives
The main aim of this course is:
1. To provide an insight into basic features of computer systems and their applications in Managerial Decision Making.
2. To provide technical framework to students for understanding the emerging world in e-Business.

Course Outcomes
After the completion of this course students will be able to:
1. Understand the concepts of computer and various software related to it.
2. Use of MS Office (Excel, Access & Power point) in different type of analysis and projection of reports related to the business management.
3. Apply various tools of E-security for the privacy of business information
4. Understand the concepts of Data Warehousing and Data Mining

UNIT-I (12 Hrs)
Introduction to Computers: Types of Computers, Storage Devices and Memories, Input/Output, Devices. Introduction to Software, Types of software – Software, its Nature and Qualities, Representation of data in computer memory (Binary, Octal and Hexadecimal system)

Operating System: Introduction, Different Types of Operating Systems, features and Applications.

UNIT-II (12 Hrs)
Internet: Introduction to internet and its applications, Intranet and Extranet, World Wide Web, URL, IP addressing and Domain Naming System, Internet Applications Search Engines

E – Business: E-Business framework, Infrastructure for E-Business, Electronic Data Interchange. Indian e-Commerce Scenario; IT Act; Indian Convergence Bill; Cyber Appellate and PKI. Electronic Payment Systems. Electronic Wallets; Payment Gateways

UNIT-III (11 Hrs)
Computer Networks and E-Security: Basic Concept, Advantages, classification, topologies, Security and Privacy Issues related to E-Commerce, Cryptography, Ethical Hacking, Cyber Crime, Digital Signatures, Point of Sales.

UNIT-IV (10 Hrs)
Data Warehousing: Introduction, Data Warehousing, Advantages and Disadvantages of Data Warehousing, Data Warehouse, Data Mart, Aspects of Data Mart, Online Analytical Processing, Characteristics of OLAP, OLAP Tools.

Data Mining: Introduction, Definition of Data Mining, Data mining parameters, How Data Mining works? Kinds of Data which can be mined, Functionalities of Data Mining, Classification on Data Mining system, Various risks in Data Mining, Advantages and disadvantages of Data Mining

Recommended Books
1. Rainer and Potter, 'Introduction to Information Technology', John Wiley and Sons.
2. Joseph Brady & Ellen F Monk,' Problem Solving Cases in Microsoft', Excel Thomson Learning.
3. McLaren & McLaren: Data Warehousing and Data Mining, Tata McGraw-Hill, New Delhi

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4. Richard T Watson: Data Management Data Bases and Organisations, John Wiley & Sons, Inc
5. Deepak Bharihoke, 'Fundamentals of Information Technology', Excel Books
6. Sahil Raj, 'Business Analytics', Cengage Publications

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SEMESTER - III

Subject Code: MBADS1-226   **L T P C**   **Duration: 60 Hrs**
                                  4 0 0 4

Course Objectives:

The aim of this course is:

1. To develop the entrepreneurial intent among students
2. To build the necessary competencies and motivation for a career in Entrepreneurship.

Course Outcomes:

After completing this course, the students will be able to:

1. Know the parameters to assess opportunities and constraints for new business ideas.
2. Analyzing problems through scanning environment and business scenario for finding innovative solution
3. Understand various funding opportunities available for start-up and new ventures
4. Develop leadership qualities across genders for economic and societal uplifting

UNIT-I (15 Hrs)

Foundations of Entrepreneurship: Concept, Need, Definition & Role of Entrepreneurship, Definition, Characteristics & Scope of Entrepreneur, Role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach, Reasons for The Failure of Entrepreneurial Ventures Role of Venture Capital, Angel Investors in Developing Entrepreneurship

Forms of Business Organizations: Sole Proprietorship, Partnership Firms and Private Companies, Public and Govt. Companies

UNIT-II (12 Hrs)

Women Entrepreneurs: Meaning, Role, Problems & Reasons for Less Women Entrepreneurs. Various Institutes & Govt Schemes To Help & Uplift Women Entrepreneurs. Case Studies for Successful Women Entrepreneurs

Social Entrepreneurship: Definition, Characteristics of Social Entrepreneurship, Role of Social entrepreneurs in solving social and entrepreneurial problems, Challenges and Opportunities for Social Entrepreneurship, CSR and Social Entrepreneurship

UNIT-III (18 Hrs)

Business Opportunity Identification: Business ideas, Methods of Generating Ideas, and Opportunity Recognition

Feasibility Study: Environmental Scanning, Competitor and Industry Analysis; Market Feasibility, Technical/Operational Feasibility, Financial Feasibility

Preparing a Business Plan: Meaning and significance of a business plan, components of a business plan, Drawing business plan; Preparing Project Report; Presenting Business Plan to investors.

UNIT-IV (15 Hrs)

MSME- Small& Medium Enterprises - Small & Medium Industry: Meaning and Importance -Definition of SME – Role & importance in India Economy, MSME Act

Institutional support to Entrepreneurship: Role of Central Government and State Government in Promoting Entrepreneurship, Role of Directorate of Industries, District Industries, Centers (DICs), Industrial Development Corporation (IDC), State Financial

corporation (SFCs), Commercial Banks. Small Scale Industries Development Corporations (SSIDCs), National Small Industries Corporation (NSIC), SIDBI

Recommended Books

1. Vasant Desai, 'Management of Small-Scale Industries', Himalaya Publishing
2. Angadi, Cheema, Das, 'Entrepreneurship, Growth, and Economic Integration', Himalaya Publication
3. Rizwana and Janakiran, 'Entrepreneurship Development', Excel Books
4. Murthy, 'Small Scale Industry and Entrepreneurial Development', Himalaya Publishing
5. Satish Taneja, Entrepreneur Development ", New Venture Creation.
6. Robert D.Hisrich, Michael P.Peters, " Entrepreneurship Development, Tata McGraw Hill

BUSINESS RESEARCH METHODS

Subject Code – MBADS1-222   **L T P C**   **Duration – 60 Hours**
4 0 0 4

Course Objectives

The main aim of this subject is:

1. To understand the process of formulating research problem, significance of review of literature and in-depth knowledge of various types of research designs
2. To explain various methods of data collection, Sampling, Scaling techniques and their practical implementation in Research.
3. To learn about the functional knowledge of Statistical tests (Correlation, Regression. t-test, Z- test, F- test, Chi – Square, ANOVA) in SPSS with examples
4. To understand about factor analysis and Cluster Analysis in Research projects.

Course Outcomes

After the completion of this course students will be able to

1. Develop an understanding about research problem, research design and their applications under different scenarios
2. Apply various kinds of experimental design, sampling and data collection techniques related to the underlying theoretical framework
3. Assess the reliability and validity of research techniques
4. Comprehend the hypothesis testing process and application of various statistical tools in research

UNIT–I (15 Hrs)

Introduction to Research: Meaning, Definition, Objective and Process, Qualitative Research, Quantitative Research, Research Ethics

Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental

Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem,

Literature Review: Identifying, Accessing and Managing Sources of Information and Scholarly Literature- Academic Writing and Referencing, Steps in Literature Review Development-Argumentation

Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.

UNIT–II (15 Hrs)

Sources of Data: Primary and Secondary, Validation of Data

Data Collection Methods: Survey, Questionnaire: Process of Questionnaire Design, Information Required , Interview Method, Questionnaire Format and Question Composition, Individual Question Content, Questions Order, Form and Layout, Pilot Testing the Questionnaire

Sampling Design & Techniques – Probability Sampling and Non Probability Sampling

Scaling Techniques: Meaning & Types

Reliability: Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability

Validity: Content Validity, Criterion Related Validity and Construct Validity

UNIT–III (15 Hrs)

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation

Analysis of Data: Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Multiple Regression.

Hypothesis: Introduction, Types, Formulation of Hypothesis, Type-I Error, Type –II Error

Testing of Hypothesis: Steps of Hypothesis Testing, T-test, Z- test, Chi Square, F-test, ANOVA

UNIT – IV (15 Hrs)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi Dimensional Scaling

Report Writing: Essentials of Report Writing, Report Format

Research Proposal: Purpose, Nature and Evaluation - Content and Format

Practical Considerations - Timelines, Budgets, Supervision Management, Presentation and Defence of proposals

Statistical Software: Application of Statistical Softwares like SPSS, MS Excel, Eviews in Data Analysis

Recommended Books

1. R.I Levin and D.S. Rubin, 'Statistics for Management', Pearson Education New Delhi, Seventh Edition

2. N.K. Malhotra, 'Marketing Research–An Applied Orientation', Pearson Education New Delhi, Fourth Edition

3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill New Delhi

4. Sadhu Singh, 'Research Methodology in Social Sciences',Himalaya Publishers

5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education New Delhi

6. C.R.Kothari, 'Research Methodology Methods & Techniques', New Age International Publishers, Second Edition.

HUMAN RESOURCE MANAGEMENT

Subject Code: MBADS1-224   `   **L T P C**   **Duration: 60 Hrs**
     4 0 0 4

Course Objectives

The man aim of this course is:

1. To understand meaning, roles and functions of Human Resource Management, meaning and process of HR Planning, Job Description, Job Specification, HRIS, Job Evaluation, Job Analysis, HRM and HRD

2. To understand the process of recruitment and selection, placement and induction, Training and Development, Career Planning, Coaching and Mentoring

3. To understand the meaning and concept of Performance Appraisal, Wage and salary administration, incentives and fringe benefits, promotion, transfer, separation, QWL, Health, safety, welfare, social security, job stress, counseling and monitoring, job satisfaction, morale and competency Mapping

Course Outcomes

After completion of this course, students will be able to:

1. Implement knowledge on Industrial relations, collective bargaining and participative management.

2. Handle various grievances.

3. Understand the need of quality circles.

4. Understand HR Audit

UNIT-I (20 Hrs)

Human Resources Management: Meaning, Scope, Objective, Functions, Roles and Importance. Interaction with other Functional Areas, HRM & HRD –A Comparative Analysis, Human Resource Management practices in India. Line and Staff Responsibility of HR Managers, HR as a Factor of Competitive Advantage,

Human Resource Planning: Concept, Process, Importance and Methods. Human Resource Information System (HRIS)

Job Analysis: Job Description, Job Specification. Job Evaluation – Concepts and Methods

UNIT-II (15 Hrs)

Recruitment & Selection: Concept, Process & Methods of Recruitment & Selections. Induction & Placement

Training & Development: Concept and Methods, Difference between Training & Development, Aligning Training to Business Needs, Training Need Analysis, Delivery Methodology, Evaluation, Capacity Building, Future of Training & Development.

Career Planning, Coaching & Mentoring

Internal Mobility: Promotion, Transfer, Demotion, Separation, Downsizing, Outplacement

UNIT-III (15 Hrs)

Performance Appraisal: Concept, Methods, Issues and Ethics in Performance Appraisal, Potential Appraisal.

Compensation Management: Wage & Salary Administration: Concept of Wage & Salary Administration, Elements & Methods of Wage & Salary, Incentive Plans, Bonus, ESOPs& Fringe Benefits.

Quality of Work Life (QWL): Concept, Development, Various Approaches and Techniques for improving QWL, Counselling and Monitoring, Morale and Productivity

UNIT IV (10 Hrs)

Industrial Relations: Concept, Importance and Difference between HR and IR.
Collective Bargaining: Meaning, Scope, Objectives, Issues and Strategies, Negotiations Skills and Strategies, Participative Management

Employee Grievances and Their Resolution: Model for Grievance Resolution Procedure, Fundamentals of Industrial Relations and Fundamentals of Labour Laws, Overcoming harassment at workplace

Recommended Books
1. Edwin B.Flippo, 'Personal Management,Tata',Mc Graw Hill
2. Bohlander, 'Snell &Vohra, Human Resource Management', Cengage Learning
3. Gary Dessler, 'Human Resource Management', McMillan
4. V.S.P.Rao,' Human Resource Management', Excel Books
5. C.B. Memoria, 'Personnel Management,'Himalaya Publications

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OPERATIONS MANAGEMENT

Subject Code: MBADS1-225 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objectives

The main aim of this course is:

1. To understand the concept, functions, transformation process model of operation management, product design and development.
2. To understand the uses of production planning and control, facility layout and productivity.
3. To understand the significant role of quality management and acceptance sampling in production management.

Course Outcomes

After the completion of this course students will be able to:

1. Understand the role of operations on achieving various competitive capabilities.
2. Improving productivity and meeting customer's competitive capabilities.
3. Conduct investigations of complex problems through analyzing of information to provide valid conclusions.
4. Apply latest techniques for solving various complex business problems

UNIT – I (18 Hrs)

Operations Management: Concept, Functions, Transformation Process Model: Inputs, Process and Outputs; Classification of Operations; Responsibilities of Operations Manager, Nature of International Operations Management, Difference between Manufacturing and Service Operations

Operations Strategy: Operations Strategy, Competitive Capabilities and Core Competencies, Linkage between Corporate, Business, and Operations Strategy, Components of Operations Strategy, Global Strategies and Role of Operations Strategy

UNIT – II (12 Hrs)

Facility Location – Importance, Factors in Location Analysis, Location Analysis Techniques. **Facility Layout Planning**: Introduction, Objectives of Layout, Classification of Facilities, Basis for Types of Layouts, Layout Planning

Process Selection- Project, Job, Batch, Mass and Process Types of Production Systems, Operations Management in Corporate Profitability and Competitiveness

UNIT – III (15 Hrs)

Optimization Techniques: Mathematical Formulations of LP Models for Product-Mix Problems; Graphical and Simplex Method of Solving LP Problems; Duality

Assignment Problems: Assignment problem: Solution using Hungarian Assignment Method. **Transportation Problems:** Transportation problem: Initial feasible solution using North-west Corner Rule; Least Cost Method; and Vogel's Approximation Method. Testing optimality using MODI method

UNIT – IV (15 Hrs)

Game Theory: Concept of Game; Two-Person Zero-Sum Game; Pure and Mixed Strategy Games; Saddle Point; Odds Method; Dominance Method and Graphical Method for Solving Mixed Strategy Game

Sequencing Problem: Johnsons Algorithm for N Jobs and Two Machines, n Jobs and Three Machines, Two Jobs and M Machines Problems

Recommended Books

1. Buffa & Sarin,' Modern Production/Operations Management', John Wiley, Latest edition
2. Chary, Production and Operations Management, Tata McGraw-Hill, Latest Edition
3. Krajewski&Ritzman, 'Operations Management', Pearson Education, Latest edition
4. Adam and Eben, 'Production & Operations', Prentice Hall, Latest edition
5. Anderson, David R., Dennis J. Sweeney and Thomas A., Williams, An Introduction to Management Science, South-Western.
6. Taha, Hamdy A, 'Operations Research – An Introduction', Prentice-Hall of India Private Ltd., New Delhi.
7. Hillier, Frederick S. and Gerald J. Lieberman, 'Introduction to Operations Research', McGraw Hill India (Pvt) Ltd.

BUSINESS STATISTICS RESEARCH LAB

Subject Code – MBADS1-227　　　**L T P C**　　　**Duration: 60 Hrs**
　　　　　　　　　　　　　　　　0 0 4 2

Course Objective

The main objective of this course is:

1. To give insights about Managing spreadsheets
2. To teach data analysis techniques to students
3. To give practical exposure of applying Financial Tools in Spreadsheets and Statistical Softwares

Course Outcomes

After completing this course, students will be able to

1. Apply Statistical analysis in Minor project and Major Projects
2. Implement Financial Analysis in their project work
3. Handle various MS excel functions in spreadsheets
4. Manage various spreadsheet functions

UNIT – I (15 Hrs)

Managing Spread Sheet: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting,

Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today, Time

Look Up Functions: Data Validation**,** Advanced Range Names, V-LookUp, H-LookUp

UNIT -II (15 Hrs)

Logical Function: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Randbetween, Roundup, Rounddown

Pivot Table: Introduction, Create Pivot Table, Layout of Pivot Tables, Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function,

UNIT – III (15 Hrs)

Data Analysis: What If Analysis, Goal Seek, Scenario Analysis

Introduction to Financial Analysis: PMT, NPV, IRR, Risk and Return, Volatility

UNIT- IV (15 Hrs)

Statistical Analysis Tools: Frequency Distribution, Graphs, Histograms, Descriptive Statistics, Normality of Data, Correlation and Regression Analysis, t-test, ANOVA, Forecasting, Chi Square, Factor Analysis.

Use of Bibliography Softwares

Note: Students have to prepare a research report on their interest area (Finance, HR, Marketing etc.) Students will have to apply all research report components like Introduction, Review of literature, Research Methodology, Statistical Techniques (Learn in Business Statistical Research Lab), Findings etc. in the report. The students will have to give presentation of 15-20 minute on the research report.

Recommended Books

1. Greg Harvey, 'Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, 'Excel 2019 All – In – One' BPB Publication
3. Manisha Nigam, 'Data Analysis with Excel' BPB Publication
4. Paul McFedries, 'Excel 2016- Formulas and Functions' Que Publication

Time Duration – 6 Months

Eligibility - 10+2 pass in any stream from recognized board with minimum 50 % marks

Course Objectives

- To impart knowledge regarding concepts of Financial Accounting through Tally which is an accounting package used for maintaining accounts.
- To help students to work with well-known accounting software i.e. Tally ERP.9.
- To make students capable to create company, enter accounting voucher entries including advance voucher entries, reconcile bank statement, do accrual adjustments, and also print financial statements, etc. in Tally ERP.9 software.
- To make students ready with required skill for employability in the job market by imparting theoretical programs as well as continuous practice.

Study Scheme

SEMESTER Ist		Contact Hrs.			Max Marks		Total	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
CTALSI-101	Fundamental of Financial Accounting	4	-	-	40	60	100	4
CTALSI-102	Fundamental Computerized Accounting System	4	-	-	40	60	100	4
CTALSI-103	Advanced Computerized Accounting System	4	-	-	40	60	100	4
CTALSI-104	Computerized Accounting Lab	0	0	4	60	40	100	2
	Total	**12**	**-**	**4**	**180**	**220**	**400**	**14**

FUNDAMENTALS OF FINANCIAL ACCOUNTING

Subject Code: CTALSI-101   **L T P C**   **Duration – 60 Hrs**
                                                                4 0 0 4

Course Objectives
The main aim of this course is:
1. To provide an understanding of the basic principles of accounting and their application in business.
2. To make the student familiar with generally accepted accounting principles of financial accounting.
3. To study applications of accounting principles in business organizations excluding corporate entitles.

Course Outcome
After competing this course, the students will be able to:
1. Define bookkeeping and elements of financial accounting
2. Understand the tools and techniques of financial accounting
3. Find various errors and issues in financial statements of business
4. Use accounting information for finding business solution of various types of organizations

UNIT-I (15 Hrs)

Introduction to Accounting: Meaning, Objectives, Basic Accounting Terms.
Accounting Principles: Meaning and Nature, Accounting Concepts, Bases of Accounting, Nature of Accounts, Origin of Transactions Source Documents and Vouchers Accounting Equations
Rules of Debit and Credit Recording of Transactions: Book of Original Entry-Journal, Ledger Posting from Journal and Ledger Balancing, Subsidiary Books

UNIT-II (15 Hrs)

Trial Balance: Meaning, Objectives and Preparations of Trial Balance, **Errors:** Types of Errors and Rectification of Errors,
Accounting for Depreciation: Meaning of Depreciation, Depletion and amortization, Objective and Methods of depreciation (Straight line, Diminishing Balance)

UNIT-III (15 Hrs)

Partnership Firm Accounting: Fundamentals, Admission, Retirement and Death of a partner (only an overview)**,** Accounting for Dissolution of Partnership Firm: Dissolution of Partnership Firm including Insolvency of partners (excluding sale to a limited company), Gradual realization of assets and piecemeal payment of liabilities

UNIT-IV (15 Hrs)

Hire Purchase Accounting: Calculation of Interest, Partial and Full Repossession, profit Computation (Stock & Debtors System only)**,** Accounting for Leases: Concept, Classification of leases (Simple practical problems)**,** Accounting for Branches (excluding foreign branches)
Accounting for Non-Profit Organizations: Receipts and Payment Account, Preparation of Income and Expenditure Accounts and Balance Sheet from Receipts and Payment

Recommended Books
1. Mukherjee & Hanif, 'Fundamentals of Accounting', Tata McGraw Hill
2. Khatri, 'Financial Accounting', Tata McGraw Hill
3. Libby, 'Financial Accounting', Tata McGraw Hill
4. S.N. Maheshwari, 'An Introduction to Accountancy', Vikas Publication
5. Guruprasad Murthy, 'Financial Accounting',Himalaya Publishing

FUNDAMENTAL COMPUTERIZED ACCOUNTING SYSTEM

Subject Code: CTALSI-102 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objectives
The main aim of this course is:
1. Demonstrate an understanding of accounting theory.
2. Apply accounting procedures using specialized computer accounting software.
3. Communicate effectively using standard accounting terminology.
4. Demonstrate an understanding of accounting reports and records.

Course Outcome
After competing this course, the students will be able to:
1. Learn the methods of maintaining records.
2. Distinguish between Single Entry and Double Entry.
3. Demonstrate an understanding of how to maintain a payroll register .This helps to understand how to maintain management related information, statutory forms and reports in the prescribed formats such as: Pay Slip, Payroll Statements, Attendance and Overtime Registers etc.
4. Learn to prepare Receipts & Payment Account, Income & Expenditure Account and Balance Sheet

UNIT- I (15 Hrs)

Office Automation: Accounts Basics-Understanding the Components of Computer, Classification of Software's - Challenges associated with accounting on computers and solutions there on –Software training to enhance employ ability -Growth of Tally. ERP

UNIT -II (15 Hrs)

Introduction to ERP9: Definition, Functions Salient Features of Tally. ERP 9 Company Creation, Ledger Creation with predefined Primary Groups, Predefined Sub Groups and New Sub Groups.

UNIT III (15 Hrs)

Business Bookkeeping: Accounting Concepts and Conventions -Double entry book-keeping Accounting Cycle: Journal, Ledger, Trial Balance, Final Accounts-Rectification of Errors –Suspense Account - Capital and Revenue Item - Final Accounts of Trading Concerns, Non-Trading concerns, Manufacturing Concerns, Service Organizations, Inventory Management-Analysis of Financial Statements with Ratio Analysis - Cash Flow Analysis and Funds Flow Analysis.

UNIT-IV (15 Hrs)

Inventory: Inventory Masters and Reports in Stock Summary and Statements of Inventory –Accounting Voucher Entries-Creation of additional voucher types, Simple classes in Accounting Vouchers, Inventory Voucher Entries-Using Various references in Bill wise Accounting for Trading and Non-Trading Accounts-Payment Performance of debtors, Bank Reconciliation Statement –Reporting and Printing-Office Documentation in MS Word 2007 and MS Excel 2007-GoogleDocs.

Suggestive Readings

1. ImplementingTally6.3–K.K. Nantheni
2. Tamil Naidu Vat & CST Tally. ERP 9-VishnuPriyaSingh
3. Comdex Tally. ERP 9 Course Kit with GST and MS Excel by Vikas Gupta
4. Tally.ERP9–Ashok K. Nandhini

ADVANCED COMPUTERIZED ACCOUNTING SYSTEM

Subject Code: CTALSI-103   **L T P C**   **Duration: 60 Hrs**

4 0 0 4

Course Objectives

The main aim of this course is:

1. Develop the skills necessary to do general ledger computer accounting for service, merchandising, nonprofit, and manufacturing businesses.
2. Complete exercises using accounts payable, accounts receivable, invoicing, payroll, inventory, and job cost systems.
3. Prepare financial statements and complete financial statement analysis.
4. Complete computer accounting projects that require designing service and merchandising businesses.

Course Outcome

After competing this course, the students will be able to:

1. To introduce the students to Basic of Accounts and the usage of Tally for accounting purpose.
2. To help students to work with well- known accounting software i.e., Tally ERP.9. Tally is an accounting package which is used for learning to maintain accounts.
3. Develop the students use the Tally software, that helps to prepare Accounting, Payroll, Billing, Sales and Profit Analysis, Auditing Banking Inventory, Taxation such as GST, VAT, TDS, TCS etc.
4. To create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and also print financial statements, etc. in Tally ERP.9 software.

UNIT-I (15 Hrs)

Financial Management - Easy Recording by use of voucher classes, automatic accounting allocation, additional accounting allocation predefined voucher classes and default ledger allocation for invoicing - Cost allocation - Forex Management - Interest Calculation - Projections (Scenario management) and Planning (Budgeting) - Financial MIS – Purchase Order Processing - Sales Order Processing - Allocation of Additional Cost - Batchwise Accounting - Transactions at zero value - Actual and Billed quantity - Multiple prices for single item - Bills of Material - Manufacture of finished goods with by product / Co product / Scrap - Job Work - Company Logo Printing - Point of Sales - Consignment.

UNIT- II (15 Hrs)

Introduction to Goods Service Tax (GST): Concept of GST – Rate of GST – GST in other countries – Categories of GST other concepts. Start Using Tally. ERP 9 For GST Compliance - Setting Up GST Rates – Updating Party GSTIN- Creating GST Ledgers – Creating Income and Expense Ledgers – Recording Sale and Printing Invoices- Recording Purchases – Recording Tax payment – Transferring Tax Creditors of VAT-Excise and service tax to GST- Other Scenarios.

UNIT-III (15 Hrs)

Fill online ITR (Income Tax Return) download and filling forms - Fill online VAT- CST Return - Excise Return & Forms - Online service tax return -TCS, TDS return - Tax deducted at source (TDS)&TCS - Value added tax (VAT) - Central state tax (CST) – Payroll features of Tally

UNIT-IV (15 Hrs)

Backup & Restore - Split a company, export & Import of data - E-Capabilities (E-mail a report from tally. E.R.P9) -Uploading the reports generated from tally.E.R.P. 9 - Tally ODBC, Inward connectivity - Security controls - Tally Audit Feature - Tally Vault

Suggestive Readings

1. ImplementingTally6.3–K.K. Nantheni
2. Tamil Naidu Vat & CST Tally. ERP 9-VishnuPriyaSingh
3. Comdex Tally. ERP 9 Course Kit with GST and MS Excel by Vikas Gupta
4. Tally.ERP9–Ashok K. Nandhini

COMPUTERIZED ACCOUNTING LAB

Subject Code: CTALSI-104   **L T P C**   **Duration: 60 Hrs**

0 0 4 2

Course Objectives

The main aim of this course is:

1. Use the basic concepts of operating a microcomputer.
2. Use an accounting software package to create an accounting system
3. Use a spreadsheet software package to predict financial outcomes
4. Design spreadsheets to solve problems in the areas of financial and managerial accounting.

Course Outcome

After competing this course, the students will be able to:

1. Utilize an application software to perform accounting tasks
2. Maintain records and prepare and analyze reports for a business entity.
3. Complete a comprehensive project that entails the major course competencies and outcomes
4. Identify and explain the components of general ledger software.

1) Create a Company with all relevant details including VAT options.

2) Create the ledgers under appropriate predefined groups.

3) From the Balances of a trader, Prepare Trading a/c, Profit and Loss a/c and Balance Sheet for the Year.

4) Create vouchers and view Day Book, Profit and loss a/c and Balance sheet for a concern including petty cash, non-fund items.

5) Create FINANCIAL VOUCHERS with various inventories giving quantity details and value per unit.

6) Enter the INVENTORY VOUCHERS involving

   (i)   Unit of measurement

   (ii)   Stock groups

   (iii)   Stock items

   (iv)   Stock Summary

7) MAINTAIN BILLWISE DETAILS.

   Create bill wise details for a creditor/debtor involving advance

8) Generate RATIO ANALYSIS statement.

   Enter the details comment on the various ratios statement generated upon financial transactions and analyses about the solvency position of the company.

9) Enter transactions involving various INTERESTPARAMETERS

10) Enter transactions involving foreign currencies for purchases and sales and calculate FOREIGNGAINS/LOSS

Suggestive Readings

1. Learning Tally. ERP 9–Vishnu Priya Singh

2. Straight to the Point-Tally. ERP 9 -Dinesh Maidasani

3. Official Guide to Financial Accounting Using: Tally. ERP9 With GST -2nd Edition

Recommended Hardware/Software Tools:

1. Tally ERP9 (Gold Edition Mode)

2. Window 7 or Above

Total Credits= 23

Semester - 1st		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**		
BCOMS3-101	Fundamentals of Management	4	-	-	40	60	100	4
BCOMS3-102	Business Mathematics	4	-	-	40	60	100	4
BCOMS3-103	Micro Economics	4	-	-	40	60	100	4
BCOMS3-104	Introduction to Airline Industry	4	-	-	40	60	100	4
BCOMS3-105	IT Application in Aviation	2	-	-	40	60	100	2
BCOMS3-106	Business Communication-I	2	-	-	40	60	100	2
BCOMS3-107	IT Applications in Aviation Lab	-	-	2	60	40	100	1
BCOMS3-108	Business Communication -I Lab	-	-	2	60	40	100	1
BCOMS3-109	Aviation Skill Development Lab - I	-	-	2	60	40	100	1
BMNCC0-003	Human Values and Professional Ethics	2	-	-	100		100	0
Total		-	-	-	**520**	**480**	**1000**	**23**

Total Credits= 22

Semester 2nd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext**		
BCOMS3-201	Basics of Supply Chain Management	4	-	-	40	60	100	4
BCOMS3-202	Fundamentals of Logistics	4	-	-	40	60	100	4
BCOMS3-203	Financial Accounting	4	-	-	40	60	100	4
BCOMS3-204	Aviation Security and Safety Management	4	-	-	40	60	100	4
BCOMS3-205	Business Communication - II	2	-	-	40	60	100	2
BCOMS3-206	Business Communication – II Lab	-	-	2	60	40	100	1
BCOMS3-207	Aviation Skill Development Lab-II	-	-	2	60	40	100	1
BCOMS3-208	Basic Spreadsheet Tools Lab	-	-	4	60	40	100	2
BMNCC0-041	Drug Abuse: Problem, Management and Prevention	2	0	0	100	-	100	0
Total		-	-	-	**480**	**420**	**900**	**22**

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

SEMESTER 1st

FUNDAMENTALS OF MANAGEMENT

Subject Code: BCOMS3-101   **L T P C**   **Duration: 60 Hrs.**
                                     4 0 0 4

Course Objectives
The aim of this course is:
1. To provide a broad and integrative introduction to the theories and practice of management.
2. To focus on the basic areas of the management process and functions from an organizational viewpoint.

Course Outcomes
After undergoing this subject, student will be able to:
1. Understand the practical implications of management.
2. The various functions necessary to be performed by management in planning and its implementation.
3. Understand the recruiting techniques in the organization.
4. Understand the working environment of Business and its effective management

UNIT-I (18 Hrs)

INTRODUCTION TO MANAGEMENT: Meaning, definition, concept, scope and principles of management; Evolution of management thought - Management theories- classical, behaviour, system, contingency and contemporary perspectives on management. Management art or science and management as profession. Process and levels of Management. Introduction to Functions (POSDCORB) of Management.

UNIT-II (12 Hrs)

PLANNING: Importance, objectives, process, policies and procedures, types of planning, Decision making - Process of decision making, Types of decision, Problems involved in decision making.

UNIT-III (15 Hrs)

ORGANIZING: Meaning, importance, principles of organizing, span of management, Patterns of organization – formal and informal organizations, Common organizational structures; departmentalization, Authority- delegation, centralization and decentralization, Responsibility – line and staff relationship.

UNIT-IV (15 Hrs)

STAFFING: Sources of recruitment, Selection process, Training, Directing, Controlling – Meaning and importance, Function, span of control, Process and types of Control, Motivation, Co-ordination – Need and types and techniques of co-ordination - Distinction between coordination and co-operation - Requisites for excellent co-ordination - Systems Approaches and co-ordination.

Recommended Text Books / Reference Books:

1. Robbins, S. P., & DeCenzo, A. D. Fundamentals of Management. New Delhi: Pearson Education.
2. Harold Koontz &HeinjWeihrich, (2015) Essentials of Management, 10th Edition, Tata McGraw-Hill Education, New Delhi.
3. T.Ramasamy, (2015) Principles of Management, Himalaya Publishing House, Mumbai.
4. L.M. Prasad, Principle and Practice of Management, Sultan Chand and Sons, 6th edition.
5. Gupta, Sharma and Bhalla; Principles of Business Management; Kalyani Publications; 1st edition.
6. P.C. Tripathi& P.N. Reddy, (2015) Principles of Management, 5th Edition, Tata McGraw-Hill Education, New Delhi.

BUSINESS MATHEMATICS

Subject Code: BCOMS3-102   **L T P C**   **Duration: 60 Hrs**
4 0 0 4

Course Objectives
The aim of this course is:
1. To understand and usage of mathematical and analytical applications required in subsequent business and economic courses.
2. To learning mathematical equations which can be used in day to day business transactions and covers the mathematical processes and techniques currently used in the fields of business and finance.
3. To reinforcement of mathematical computations.
4. To solving monetary problems in business and personal finance

Course Outcomes
After completing of this course, the students will be able to:
1. Appreciate business mathematics concepts that are encountered in the real world, .
2. Understand the underlying business concepts involved in mathematics to help another person gain insight into the situation.
3. Work with different theorems and matrices
4. To have a proper understanding of mathematical applications in Economics, Finance, Commerce and Management

UNIT- I (15 Hrs)
Matrices: Definition of Matrices, Equality of Matrices, Types of Matrices, Scalar Multiplications, Operation on Matrices, Transpose of Matrices, Symmetric and Skew Symmetric Matrices,
Determinants: Introduction, Minors & Cofactors, Adjoint of a Matrices, Inverse of Matrices,
Application of Matrices in Solving System of Linear Equations, Using Cramer's Rule and Matrices Inversion Method

UNIT-II (18 Hrs)
Binomial Theorem: Introduction, Problems Based on Binomial Theorem, General Term, Particular Terms, Middle Term, Applications of Binomial Theorem.
Logarithms: Definition, Fundamental Properties of Logarithms with Proofs, Base Changing Formula with Proof, Problem Solving without using Log Table, Application of Logarithms in Solving Problem Based on Compound Interest using Log Tables.

UNIT- III (15 Hrs)
Derivatives: Definition of Derivatives, Derivative from First Principle, Derivative of Sum, Difference, Product and Quotient of Two Functions, Chain Rule, Differentiation of One Function w. r. t. Another Function, Implicit Functions, Derivative of Second Order, Application of Derivatives- Maxima and Minima.

UNIT- IV (12 Hrs)
Indefinite Integrals: Definition, Integrals of Elementary Functions
Definite Integrals: Definitions, its Properties, Simple Problems of Applications of Definite Integrals

Recommended Books
1. Raghavachari M, 'Mathematics for Management', McGraw Hill Education
2. Cleaves, Cheryl, and Hobbs, Margie, 'Business Mathematics' 7th Edition, Prentice Hall
3. Charles D. Miller, Stanlay A. Saltzman, 'Business Mathematics',Pearson Education
4. Trivedi, 'Business Mathematics', 1st edition, Pearson Education
5. Sncheti and Kapoor, 'Business Mathematics', Sultan Chand and Sons
6. Khan, Shadab, 'A Text Book of Business Mathematics', Anmol Publications

MICRO ECONOMICS

Subject Code: BCOMS3-103　　　**L T P C**　　　**Duration: 60 Hrs**
　　　　　　　　　　　　　　　　　4 0 0 4

Course Objectives

The aim of this course is:

1. To cover the area of economics commonly defined as microeconomics which is concerned with the individual parts of the economy such as individual businesses or industries, individual consumers, and individual products.
2. To provide a thorough introduction to economic theory starting from the basic concepts of microeconomics, utility functions, production functions, demand and supply, effect of market forces.
3. To study whether the economy uses our limited resources to obtain the maximum satisfaction possible for society.

Course Outcomes

After completing this course, students will be able to:

1. Understand and explain the basic concept of economics.
2. Understand its managerial perspective including thereal insight of the consumer's economic behavior
3. Estimate the demand for the new product as well as changes in the existing products.
4. Know how markets that fail to use resources efficiently create unintended effects

UNIT-I (15 Hrs)

Micro Economics: Meaning, Nature, Scope and Limitations Role of managerial economics in decision Making.

Basic concepts: Marginal and Incremental Principles, Opportunity Cost, Equilibrium

Utility: Cardinal Utility Approach: Diminishing Marginal Utility; Ordinal Utility Approach, Indifference Curve, Properties, Consumer Equilibrium and Marginal Rate of Substitution.

UNIT-II (15 Hrs)

Demand: Meaning, Determinants, Law of Demand and its Exceptions.

Elasticity of Demand: Measurement, Degree of Elasticity. Price, Income and Cross Elasticity of Demand. **Indifference Curve Analysis**: Meaning, Assumptions, Properties, Consumer Equilibrium, Importance ofIndifference Analysis, Limitations of Indifference Theory.

Supply: Introductionto supply and supply curves

UNIT-III (12 Hrs)

Production Function: Meaning, Short-Run Production Function and Law of Variable Proportions, Long Run Production and Laws of Returns.

Cost of Production: Concept of Economic and Managerial Costs, Short Run and Long Run Cost Curves. Economies and Diseconomies of Scale

Revenue: Typesof Revenues and their Relationship.

UNIT-IV (18 Hrs)

Equilibrium of Firm and Industry: Perfect Competition, Monopoly and Discriminating Monopoly.

Monopolistic Competition: Characteristics, Individual and Group Equilibrium, Concept of Selling Cost. **Oligopoly:** Characteristics, Cornet's Model, Kinked Demand Curve, Concepts of Cartel and Price Leadership.

Distribution: Marginal Productivity and Modern Theory of Determination.

Recommended Books

1. D. Salvatore, 'Microeconomic Theory', Tata McGraw Hill
2. R H Dholkia and A.N. Oza, 'Microeconomics for Management Students', Oxford University Press
3. D Kreps, 'MicroEconomics for Managers', Viva Books Pvt. Ltd.
4. Koutsayiannis, 'Modern Microeconomics', Macmillan Publications

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5. D N Dwivedi, 'Managerial Economics', Vikas Publishing
6. L. Peterson and Jin, 'Managerial Economics', Pearson Education

INTRODUCTION TO AIRLINE INDUSTRY

Subject Code: BCOMS3-104   **L T P C**   **Duration: 60 Hrs**
                                                        4 0 0 4

Course Objectives
The aim of this course is:
1. To understand about the airline industry and its regulatory bodies.
2. To study the characteristics of Airline Industry.
3. To make student understand the organizational structure of the airline industry.
4. To aware regarding the security, navigation and traffic control.
5. Understanding the importance of safety and security.

Course Outcomes
After undergoing the subject, student will be able to:
1. The airline industry and its regulatory bodies.
2. Development of commercial airlines – Deregulation.
3. Airplanes, Manufacturers, Types of Aircraft.
4. Understanding of global world class aircraft manufactures and airport providers

UNIT-I (15 Hrs)

INTRODUCTION AIRLINE INDUSTRY: Scope – Types – Scheduled and Non Scheduled Flights – Air Cargo Transport – Economic and Social impact – Regulatory Bodies – Key Performance indicators

UNIT-II (15 Hrs)

CHARACTERISTICS AIRLINE PROFITABILITY: Main Industry - Characteristics of Passenger airlines – Service Industry – Characteristics

UNIT-III (15 Hrs)

ORGANISATIONAL STRUCTURE AIRLINE ALLIANCES : Development of commercial airlines – Deregulation – Impact of Deregulated Airline industry – Organizational Structure – Types of Airline Personnel – Flight crew and Cabin Crew – Training – Organizational Culture

UNIT-IV (15 Hrs)

AIRPORTS AND ITS SERVICES AIRPORTS : Personnel – Processing Passengers and Freight – Airport Security – Air Navigation Services – Air Traffic Control – Airplanes – Manufacturers – Types of Aircraft

Recommended Text Books / Reference Books
1 IATA Book on Airline Customer Service.

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IT APPLICATIONS IN AVIATION

Subject Code: BCOMS3-105   **L T P C**   **Duration: 30 Hrs.**
                                    2 0 0 2

Course Objectives:
The aim of this course is:
1. To gain and understanding of the core concepts and technologies which constitute Information Technology.
2. To be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

Course Outcomes:
After studying this course, the students will be able to
1. Understand the core concepts and technologies which constitute Information Technology.
2. Analyse the computer concepts and learn computer applications in taking the managerial decisions.
3. Aircraft Furnishings, Systems and Terminology and operational methods
4. Giving recent applications of the information systems within the airline industry and management

UNIT-I (8 Hrs)

Computer Fundamentals: Definition and Block diagram of a computer, Characteristics of Computers, Hardware Vs Software, Generations of languages - Machine Language, Assembly Language, High Level Language, Assembler, Compiler and Interpreter.
Computer Software: Types of Software, Application Software and System Software.
Input Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, and Optical Recognition Devices.
Output Devices: Monitors, Impact Printers, Non-Impact Printers, Plotter.

UNIT-II (8 Hrs)

Memories: Primary Memory, Secondary Memory and Storage Devices, Creating Directory, Sub Directory, and Renaming, Coping and Deleting the Directory.
File Manipulation: Creating a File, Deleting, Coping, Renaming File, Using Accessories such as Calculator, Paint Brush, CD player, etc.

UNIT-III (7 Hrs)

Word Processing Tool: Salient features of Word Processing, File, Edit, View, Insert, Format, Tools, Tables, Window, Help options and all of their features, Options and Sub Options etc.
Presentation Tool: Making Presentations, Inserting objects and Animations.

UNIT-IV (7 Hrs)

Spreadsheet Tool: Excel Worksheet, Data Entry, Editing, Cell Addressing Ranges, Commands, Menus, Copying & Moving cell content, Inserting and Deleting Rows and Columns, Column Formats, Cell Protection, Printing, Creating, Displaying and Printing Graphs, Statistical Functions.

Recommended Books
1. V. Rajaraman, 'Fundamentals of Computers', PHI.
2. Satish Jain, 'Information Technology Concepts', BPB Publications.
3. Turban, Mclean and Wetherbe, 'Information Technology for Management', John Wiley & Sons.
4. G. Courter, 'Mastering MS Office 2000 Professional', BPB Publication.
5. Steve Sagman, 'MS- Office 2000 for Windows', Addison Wesley

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BUSINESS COMMUNICATION-I

Subject Code: BCOMS3-106   **L   T   P   C**   **Duration: 30 Hrs**
                                        2   0   0   2

Course Objectives
The aim of this course is:
1. To develop the reading, listening, and writing and presentation skills of the undergraduate students.
2. The students should be able to act with confidence, should be clear about their own personality, character and future goals

Course Outcomes:
After studying this course, the students will be able to
1. Apply communication concepts and theories to address everyday dilemmas within dimensions (ethical, social, legal, technological, relational, and cultural).
2. Demonstrate oral, written, speaking and listening communication skills.
3. Understand developing and delivering effective presentations
4. Know to effective business writing

UNIT-I (8 Hrs)

Developing Writing Skills: Sentences Formation - Simple Compound and Complex Formation, Transformation of Sentence: Idioms, One Word Substitution. Active and Passive, Drafting, Editing, Paragraph Writing, Precise Making, Faxes, E-mails. Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume Report Writing: Types, Formats, Drafting of Various Types of Report. Importance of Non-Verbal Communication – Positive Gestures, Symbols and Signs, Physical Appearance & The art of Self-Presentation & Conduct, Review/Summarizing of Newspaper Articles, Features etc.

UNIT-II (6 Hrs)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Course How to Think and Read, and Developing Effective Reading Habits. Reading Strategies: Training Eye, Reading.

UNIT-III (7 Hrs)

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening and Difference Between Listening and Hearing.

UNIT-IV (9 Hrs)

Developing Speaking Skills: Its Advantages and Disadvantages, Conversation as Communication, Extempore, Speaking, Art of Public Speaking, Meetings Preparations, Group Communication through Committees, Conference, Seminar, Symposia, Ambiguity, Avoidance, Group Discussion-Guidelines, Uses and Importance.

Presentations: Four P's of Presentation, Structuring, Rehearsing and Delivery Methods, Effective Presentations. Interviews: Types, Preparation Techniques- Dressing Etiquettes, Body Language and Facial Expression, Cross questioning skills, projecting a positive image.

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Recommended Text Books / Reference Books

1. Lesikar, Petit, 'Business Communication', All India Traveler Bookseller.
2. Bovee, Thill and Chaturvedi, 'Business Communication', Pearson Education.
3. Lucent's 'General English', Lucent Publishing.
4. Pal, Rajendra & Korlahalli, 'Essentials of Business Communication', Sultan Chand & Sons.
5. Lillian, Chaney, 'Intercultural Business Communication', Pearson Education.
6. Chaturvedi, Mukesh, 'Business Communication': Concepts, Cases & Applications', Pearson Education.

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IT APPLICATION IN AVIATION LAB

Subject Code: BCOMS3-107	L T P C	Duration: 30 Hrs.
	0 0 2 1	

Course Objectives

The aim of this course is:

1. To provide a broad and integrative practice of IT application in Aviation.
2. To gain and understanding of the core concepts and technologies which constitute Information Technology.
3. To be able to articulate and demonstrate a basic understanding of the fundamental conceptsof Information Technology and Office Tools.

Course Outcomes:

After studying this course, the students will be able to

1. Learn Practical Application of IT Tools
2. Enhanced Presentation Skills.
3. Understand the Application of spreadsheet in Aviation Industry
4. Understand about Input devices

This laboratory course will comprise as exercises to supplement that is learnt under paper BBADS2-105.

The practical session may be related to

1. Word Processing Tools
2. Presentation Tools
3. Spreadsheet Tools
4. Input Devices

BUSINESS COMMUNICATION – I LAB

Subject Code: BCOMS3-108	L T P C	Duration: 30 Hrs.
	0 0 2 1	

Course Objectives

The aim of this course is:

1. To develop the reading, listening, and writing and presentation skills of the undergraduate students.
2. The students should be able to act with confidence, should be clear about their own personality, character and future goals

Course Outcomes:

After studying this course, the students will be able to

1. Getting Reading Skills and habit.
2. Enhanced communication Skills.
3. Understand the way of Communication in Business Environment
4. Understand the way of Presentation

This laboratory course will comprise as exercises to supplement that is learnt under paper BBADS2-106.

The Communication Lab involves interactive practice sessions related to following topics:

1. Pronunciation
2. Common Everyday Situations: Conversations and Dialogues
3. Communication at Workplace
4. Formal Presentations

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5. Business Etiquettes: Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings.
6. Conducting Role Plays (Framing Dialogues), Reading Novels and Summarizing Them with Different Vocab and Facial Expressions by Giving Demos.

AVIATION SKILL DEVELOPMENT LAB-I

Subject Code: BCOMS3-109   **L T P C**   **Duration: 30 Hrs.**
                                 0 0 2 1

Course Objectives
The aim of this course is:
1. To provide understanding of Airport Structure and its working.
2. To gain and understanding of the Various Department works in the Airport and their duties.
3. To aware regarding the security, navigation and traffic control.

Course Outcomes:
After studying this course, the students will be able to
1. Getting Aviation Skills
2. Enhanced Communication Skills.
3. Understand the structure of the Airport
4. Learn about the functioning of the Airport

In Aviation Skill Development Lab, Students will visit to Domestic Airport and collect information on the various departments, organizational Structure, facilities and functional areas and services, layout etc. Student will prepare report and submit to the department.

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HUMAN VALUES AND PROFESSIONAL ETHICS

Subject Code: BMNCC0-003   **L T P C**   **Duration: 30 Hrs.**
                                                        2 0 0 0

Course Objectives
The aim of this course is:
1. To provide a broad and integrative knowledge about Human Values and Professional Ethics
2. To gain and understanding of the core concept of role of Ethics in Profession
3. Create a Business Environment and Living Environment Friendly.

Course Outcomes:
After studying this course, the students will be able to
1. Learn Human Values and its Importance.
2. Understand the role of Professional Ethics.
3. Getting Moral Ethics.
4. Learn Duties and Responsibility of Professional.

UNIT-I (8 Hrs.)

Meaning of values, Values as social fact, Universal values – equality, justice, freedom/ liberty, inclusion. Distinction between social and culture values and values associated with crafts and occupations. Work and leisure as values – Marx and Veblen

UNIT-II (9 Hrs.)

Values, morality, ethics and their relation with Religion, values as mechanisms of control and coercion. Functional Theory of Values of Talcott Parsons, Theory of Basic Values of Shalom Schwartz, Theory of Protestant Ethic and Capitalism of Max Weber, Bhagwat Gita and Theory of Karma-Dharma, Sikhism and theory of work, dignity of labour, meditation and sharing.

UNIT-III (7 Hrs.)

Meaning and types of Professional Ethics, Goals of professional work and their problems, Normative and evaluative elements in professional work, Duties and obligations, Professional rights, Virtues in professional life (honesty, trustworthiness, transparency, competence, integrity and exemplary conduct), Engineering ethics and service ideals.

UNIT-IV (6 Hrs.)

Technology for and against mankind and environment- fulfilment of human needs, and industrial disasters: case studies – Bhopal Gas Tragedy, Chernobyl and Fukushima Disasters; Equality at work place: gender discrimination and caste/class-based exclusions.

Recommended Books

1. Schwartz, H. Shalom, 'An Overview of the Schwartz Theory of Basic Values'. Online Readings in Psychology and Culture. 2 (1). doi:10.9707/2307-0919.1116, 2012.
2. John Berry, Janek, Pandey; Poortinga, Ype 'Handbook of Cross-cultural Psychology', 2nd Edn.. Boston, MA: Allyn and Bacon. p. 77. ISBN 9780205160747, 1997.
3. Timo Airaksinen, 'The Philosophy of Professional Ethics', University of Helsinki, Finland. 4. Manju Jitendra Jain, 'Yes, It's Possible', Kalpana Publications, Mumbai, 2011.

SEMESTER 2ⁿᵈ

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

BASICS OF SUPPLY CHAIN MANAGEMENT

Subject Code: BCOMS3-201	L T P C	Duration: 60 Hrs.
	4 0 0 4	

Course Objectives
The aim of this course is:
1. To provide basic understanding of supply chain
2. To give knowledge about various supply chain models
3. To provide knowledge of functions of warehousing
4. To deliver knowledge about integration of supply chain with other areas

Course Outcomes:
After studying this course, the students will be able to
1. Understand the conceptual Framework of Supply Chain Management
2. Apply various supply chain models to examine and enhance Supply Chain Performance
3. Assess global supply chain network functioning
4. Apply supply chain with CRM practice

UNIT-I (15 Hrs)
Supply Chain Concepts: Objectives of a Supply Chain, Stages of Supply chain, Value Chain Process, Cycle view of Supply Chain Process, Key issues in SCM, logistics & SCM, Supply Chain Drivers and obstacles, Supply chain strategies,

UNIT-II (15 Hrs)
Supply Chain Performance: Bullwhip effect and reduction, Performance measurement: Dimension, Tools of performance measurement, SCOR Model. Demand chain management, Global Supply chain- Challenges in establishing Global Supply Chain, Factors that influences designing Global Supply Chain Network.

UNIT-III (15 Hrs)
Warehousing: Concept and types, Warehousing strategy, Warehouse facility location & network design, Reverse logistics, Outsourcing- Nature and concept, Strategic decision to Outsourcing, Third party logistics(3PL), Fourth party logistics(4PL)

UNIT-IV (15 Hrs)
Supply Chain and CRM- Linkage, IT infrastructure used for Supply Chain and CRM, Functional components for CRM, Green supply chain management, Supply Chain sustainability.
Practices in Supply Chain: Best practices in SCM, Strategic fit, Obstacles of streamlined SCM.

Suggested Readings
1. Chopra, Sunil, Meindl, Peter and Kalra, D. V.; Supply Chain Management: Strategy, Planning and Operation; Pearson Education
2. Altekar, Rahul V.; Supply Chain Management
3. Ballou, Ronald H.; Supply Chain Management; Pearson Education
4. Sahay, B.S.; Supply Chain Management; Macmillan

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FUNDAMENTALS OF LOGISTICS

Subject Code: BCOMS3-202   **L T P C**   **Duration: 60 Hrs**
                                      4 0 0 4

Course Objectives
The aim of this course is to:
1. Understand basics of logistics
2. Gain knowledge about transportation operations
3. Provide knowledge about import and export logistics
4. Give knowledge about global logistics operations

Course Outcomes
After completing this course, students will be able to:
1. Implement logistics and understand issues in logistics
2. Study the Important modes of logistics operations
3. Gain Knowledge of Special aspects of Export and Import Logistics.
4. Understand International logistics principles.

UNIT-I (15 Hrs)
Logistics: Evolution, Objectives, Components and Functions of Logistics
Management, 7R's, advantages & Disadvantages of Logistics, 3 – C of Logistics,
Distribution related Issues and Challenges

UNIT-II (15 Hrs)
Logistics Terminology, Types of Cargo, Types of Logistics, Inbound logistics, Outbound
Logistics, Reverse Logistics, Gaining competitive advantage through Logistics Management,
Transportation- Functions, Costs, and Mode; Network and Decision, Containerization, Cross docking.

UNIT-III (15 Hrs)
Export logistics: Picking, Packing, Vessel Booking [Less-than Container Load (LCL) / Full Container
Load (FCL)], Customs, Documentation, Shipment, Delivery to distribution centers, distributors and
lastly the retail outlets
Import Logistics: Documents Collection- Valuing- Bonded Warehousing Customs Formalities-
Clearing, Distribution to Units

UNIT-IV (15 Hrs)
Introduction of Global Logistics, International trade- Types of trade Advantages and Disadvantages of
international Trade, Importance of Insurance in international trade, Function of Customs House Agent,
Role of Customs in Global Logistics, Role of Bankers in Global Logistics

Suggested Readings

1. Alan E Branch, 'Global Supply chain Management and International Logistics'.
2. Ballou, Ronald H.; Supply Chain Management; Pearson Education
3. Ballou, R.H. Business Logistics Management. Prentice-Hall Inc.
4. Bowersox D.J., Closs D.J. , Logistical Management, McGraw-Hill, 1996

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

FINANCIAL ACCOUNTING

Subject Code: BCOMS3-203   **L T P C**   **Duration: 60 Hrs**
                                    4 0 0 4

Course Objectives
The main aim of this course is:
1. The aim is to provide an understanding of the basic principles of accounting and their application in business.
2. The course is designed to make the student familiar with generally accepted accounting principles of financial accounting.
3. To study applications of accounting principles in business organizations excluding corporate entitles.

Course Outcome
After competing this course, the students will be able to:
1. Define bookkeeping and accounting.
2. Explain the general purposes and functions of accounting
3. Explain the differences between management and financial accounting.
4. Describe the main elements of financial accounting information – assets, liabilities, revenue and expenses and identify the main financial statements and their purposes.

UNIT-I (15 Hrs)
Introduction to Accounting: Meaning, Objectives, Basic Accounting Terms.
Accounting Principles: Meaning and Nature, Accounting Concepts, Bases of Accounting, Nature of Accounts, Origin of Transactions Source Documents and Vouchers Accounting Equations
Rules of Debit and Credit Recording of Transactions: Book of Original Entry-Journal, Ledger Posting from Journal and Ledger Balancing, Subsidiary Books

UNIT-II (15 Hrs)
Trial Balance: Meaning, Objectives and Preparations of Trial Balance
Errors: Types of Errors and Rectification of Errors, Bank Reconciliation Statement, Capital Expenditure, Revenue Expenditure, Deferred Revenue Expenditure

UNIT-III (15 Hrs)
Accounting for Depreciation, Provision and Reserves, Preparation of Manufacturing, Trading and Profit & Loss Account, Balance Sheet (With Simple Adjustment in Preparation of Financial Statements)
Budgetary Control- Types of Budgets Master budget Zero base budgeting, Fixed Budget and Flexible Budgets, Zero Base Budget, Participative Budget and Performance Budget

UNIT-IV (15 Hrs)
Accounting for Non Profit Organizations: Receipts and Payment Account, Preparation of Income and Expenditure Accounts and Balance Sheet from Receipts and Payment Account with Additional Information

Recommended Books
1. Mukherjee & Hanif, 'Fundamentals of Accounting', Tata McGraw Hill
2. Khatri, 'Financial Accounting', Tata McGraw Hill
3. Libby, 'Financial Accounting', Tata McGraw Hill
4. S.N. Maheshwari, 'An Introduction to Accountancy', Vikas Publication
5. Guruprasad Murthy, 'Financial Accounting', Himalaya Publishing

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MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

AVIATION SECURITY & SAFETY MANAGEMENT

Subject Code: BCOMS3-204   **L T P C**   **Duration: 60 Hrs.**
                                    4   0   0 4

Course Objectives
The aim of this course is:
1.To enable the Students to learn about the importance of Safety and Security in Air Transportation
2.They will be learning about the techniques and methodologies used in protecting passengers, crew, baggage, cargo, mail, ground personnel, aircraft and property of Airports

Course Outcomes
After studying this course, the students will be able to
1. Understand various techniques of Aircraft protection
2. Learn about various steps to Combat Terrorism
3. Understand Hijacking and various Security measures to be taken.
4. Have knowledge about International aviation safety assessment.

UNIT-I (15 Hrs)

Importance of Air Transportation Safety and Security-Airport- Airways: Protecting Public Transportation -Screening- Personnel and Baggage – Metal Detectors-X ray Inspections, Passive and Active Millimeters-Trace- Detection Techniques-The way on Drug and Explosives.

UNIT-II (15 Hrs)

Terrorism: Terrorism – Introduction- Causes of Terrorism - Rival claim of pales tine- Palestine Liberation Organization - Nuclear Terrorism - Aircraft as Missiles - 9/11 Terrorist Act and its Consequences -Biological &Chemical Warfare - Steps to Combat Terrorism

UNIT-III (15 Hrs)

Hijacking : Hijacking – Security measures- Airport Security Programmed a Steps taken to Contend with Hijacking- Cockpit doors- Sky Marshal Program me -Public Law about Hijacking - Air Transportation Security Act of 2001 -Crimes against Humanity - The Tokyo Convention and Summit

UNIT-IV (15 Hrs)

Legislations and Regulations: ICAO/ECAC -Transportation security administration -International aviation safety assessment program. -Legislation after 9 Sep 2001 41
Technological Improvements on Aviation Safety and Security: Technological Improvements on Aviation Safety and Security -Introduction- Microwave Holographic Imaging -Body or Fire Security Scanner -New Generation of video Security Systems -Biosimmer – Biometric Systems

Recommended Text Books / Reference Books:
1. Aviation in Crisis – Ruwantissa I.R. Abeyratne – Ashgate Publishing Ltd.
2. Aviation Safety Programs – Richard H. Wood – Jeppesen Sanderson Inc.
3. Aviation and Airport Security – Kathleen M. Sweet –Pearson Education Inc.

BUSINESS COMMUNICATION – II

Subject Code: BCOMS3-205   **L T P C**   **Duration: 30 Hrs**
                                     2 0 0 2

Course Objectives

The aim of this course is:

1. To develop the reading, listening, and writing and presentation skills of the undergraduate students.
2. To impart confidence, clarity about their own personality, character and future goals.
3. To learning basic interview skills.
4. To introducing to various grammatical errors and daily usage words.

Course Outcomes

After completing of this course, the students will be able to:

1. Apply various communication concepts and theories to address everyday dilemmas within dimensions (ethical, social, legal, technological, relational, and cultural).
2. Effective business writing and communication.
3. Improved reading skills and word formulation.
4. Developing and delivering effective presentations.

UNIT-I (8 Hrs)

Developing Writing Skills: Sentences Formation - Simple Compound and Complex Formation, Transformation of Sentence: Idioms, One Word Substitution.   Active and Passive, Drafting, Editing, Paragraph Writing, Precise Making, Faxes, E-mails

Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume Report Writing: Types, Formats, Drafting of Various Types of Report.

Importance of Non-Verbal Communication– Positive Gestures, Symbols and Signs, Physical Appearance & The art of Self-Presentation & Conduct, Review/Summarizing of Newspaper Articles, Features etc.

UNIT-II (6 Hrs)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Learning How to Think and Read, Developing Effective Reading Habits; **Reading Strategies:** Training Eye, Reading

UNIT- III (6 Hrs)

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening and Difference Between Listening and Hearing.

UNIT-IV (10 Hrs)

Developing Speaking Skills: Its Advantages and Disadvantages, Conversation as Communication, Extempore, Speaking, Art of Public Speaking, Meetings Preparations, Group Communication through Committees, Conference, Seminar, Symposia, Ambiguity, Avoidance, Group Discussion- Guidelines, Uses and Importance.

Presentations: Four P's of Presentation, Structuring, Rehearsing and Delivery Methods, Effective Presentations.

Interviews: Types, Preparation Techniques- Dressing Etiquettes, Body Language and Facial Expression, Cross questioning skills, projecting a positive image.

Recommended Books

1. Lesikar, Petit, 'Business Communication', All India Traveler bookseller.
2. Bovee, Thill and Chaturvedi, 'Business Communication', Pearson Education.
3. Lucent's 'General English', Lucent Publishing.
4. Pal, Rajendra & Korlahalli, 'Essentials of Business Communication', Sultan Chand & Sons

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BUSINESS COMMUNICATION – II LAB

Subject Code: BCOMS3-206   **L T P C**   **Duration: 30 Hrs**
                                0 0 2 1

Course Objectives
The aim of this course is:
1. To develop the reading, listening, and writing and presentation skills of the undergraduate students.
2. The students should be able to act with confidence, should be clear about their own personality, character and future goals
3. learning basic interview and Group Discussion skills.

Course Outcomes:
After studying this course, the students will be able to
1. Understand the role of Business Communication
2. Gain Communication Skills
3. Practically Learn of Presentation Ways
4. Understand about Interviews

This laboratory course will comprise as exercises to supplement that is learnt under paper BMBAS1-205. The Communication Lab involves interactive practice sessions related to following topics:
1. Listening Comprehension
2. Speaking: Art of Public Speaking, Meetings
3. Group Communication through Committees, Conference, Seminar, Symposia, Ambiguity, Avoidance,
4. Group Discussion.
5. Effective Presentations Methods
6. Interviews: Types, Preparation Techniques

AVIATION SKILL DEVELOPMENT LAB - II

Subject Code: BCOMS3-207   **L T P C**   **Duration: 30 Hrs**
                                0 0 2 1

Course Objectives
The aim of this course is:
1. To provide understanding of Airport Structure and its working.
2. To gain and understanding of the Various Department works in the Airport and their duties.
3. To aware regarding the security, navigation and traffic control.

Course Outcomes:
After studying this course, the students will be able to
1. Getting Aviation Skills
2. Enhanced Communication Skills.
3. Understand the structure of the Airport
4. Learn about the functioning of the Airport

In Aviation Skill Development Lab, Students will visit to Domestic Airport and collect information on the various departments, organizational Structure, facilities and functional areas and services, layout etc. Student will prepare report and submit to the department

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

Subject Code: BCOMS3-208   **L T P C**   **Duration: 60 Hrs**
  0 0 4 2

Course Objectives
The main aim of this course is:
1. To learn how to use basic and advance spreadsheet tools
2. To construct formulas, including the use of built-in functions, and relative and absolute references
3. To learn enter, modify and edit data

Course Outcomes
After completing this course, students will be able to:
1. Set up the chart function of Excel to represent numeric data in multiple formats
2. Access and manipulate data using the database functions of spreadsheet
3. Knowledge of using graphs and charts
4. Efficiently use the various basic and intermediate level features of spreadsheet

UNIT – I (15 Hours)
Data Entry and Editing: Introduction to Spreadsheet, Data Entry, Editing, Cell Addressing Ranges, Commands, Menus, Copying & Moving cell content,
Rows & Columns - Inserting and Deleting Rows and Columns, Column Formats, Cell Protection, Printing, Creating, Displaying and Printing Graphs, Statistical Functions.

UNIT – II (15 Hrs)
Managing Work Sheets: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets
Charts & Graphs: Introduction, Types of Charts, Chart Style, Chart Layout, Add labels, Axis Options, Data labels

UNIT -III (15 Hrs)
Tables: Introduction, Insert a Table, Style Options, Add Rows and Columns, Functions in Tables
Conditional Formatting: Introduction, Highlight Cell rules, Top/Bottom Rules, data Bars, Color Scale, Customformatting rules, Proper Function, Trim Function

UNIT – IV (15 Hrs)
Sort & Filter: Introduction, Sort data, Filter data, Custom Sort & Filter
Pivot Table: Introduction, Create Pivot Table, Layout of Pivot Tables, Filtering Pivot Tables
Understanding Formula – Introduction to Common Formulas, Copying Formulas, Descriptive Statistics

Recommended Books

1. Greg Harvey, 'Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, 'Excel 2019 All – In – One' BPB Publication
3. Manisha Nigam, 'Data Analysis with Excel' BPB Publication
4. Paul McFedries, 'Excel 2016- Formulas and Functions' Que Publications

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-041   **L T P C**   **Duration: 30 Hrs.**
                                              2 0 0 0

Course Objectives
The main aim of this course is:
1. To learn how to Prevent from Drug Abuse
2. Understand the Social Management and Psychological Management
3. Aware the student about consequences of Drugs, violence and Crime.

Course Outcomes:
After studying this course, the students will be able to
1. Understand Drug Abuse and its consequences
2. Learn Prevention of Drug Abuse
3. Understand the Treatment and Control of Drug Abuse
4. Understand Psychological Management

UNIT-I (6 Hrs)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II (8 Hrs)

Consequences of Drug Abuse
Individual: Education, Employment, Income.
Family: Violence.
Society: Crime. Nation: Law and Order problem

UNIT-III (8 Hrs)

Prevention of Drug Abuse
Role of Family: Parent-child relationship, Family support, Supervision, Shipping Values, Active Scrutiny.
School: Counselling, Teacher as Role-Model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-IV (8 Hrs)

Treatment and Control of Drug Abuse: Medical Management: Medication for treatment and to reduce withdrawal effects.
Psychological Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental Intervention.
Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books
1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 & 2004.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.

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9. Bhim Sain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press, 2008.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017.

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

JOURNALISM AND MASS COMMUNICATION (2nd YEAR)

Total Contact Hours= 22   **Total Marks=700**   **Total Credits = 22**

SEMESTER 3rd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BJMC1-301	Introduction to Advertising	4	-	-	40	60	100	4
BJMC1-302	Media Ethics and Laws	4	-	-	40	60	100	4
BJMC1-303	Radio Journalism & Production	4	-	-	40	60	100	4
BJMC1-304	Basics of Camera, Lights & Sound	4	-	-	40	60	100	4
BJMC1-305	Advertising Lab	-	-	4	60	40	100	2
BJMC1-306	Radio Journalism & Production Lab	-	-	4	60	40	100	2
BJMC1- 307	Video Production Lab	-	-	4	60	40	100	2
		16		12	340	360	700	22

JOURNALISM AND MASS COMMUNICATION (2nd YEAR)

Total Contact Hours= 24   **Total Marks=700**   **Total Credits = 24**

SEMESTER 4th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BJMC1-401	Development Communication	4	-	-	40	60	100	4
BJMC1-402	Television Journalism & Production	4	-	-	40	60	100	4
BJMC1-403	Public Relations	4	-	-	40	60	100	4
BJMC1-404	Web Media	4	-	-	40	60	100	4
BJMC1-405	Folk Media	4	-	-	40	60	100	4
BJMC1-406	Web Media Lab	-	-	2	60	40	100	2
BJMC1-407	Public Relation Lab	-	-	2	60	40	100	2
		20		4	320	380	700	24

Overall

Semester	Marks	Credits
3rd	700	22
4th	700	24
Total	1400	46

677

JOURNALISM AND MASS COMMUNICATION

MRSPTU

THIRD SEMESTER SYLLABUS

INTRODUCTION TO ADVERTISING

Subject Code: BJMC1-301   **L T P C**   **Duration: 60 Hrs**
                              4 0 0 4

Course Objectives:
1. To define and explain advertising, its role and functions.
2. To identify various types of advertising.
3. To differentiate between advertising as a communication, marketing and PR tool.
4. To explain the working of an ad agency
5. To explain advertising as a social process

Course Outcomes: After completing the course student will be able to:
1. Understand the philosophy and the functions of Advertising Companies.
2. Understand different types of Advertisements and their making.
3. Understand the production, marketing and distribution of Advertising world.
4. Learn the functioning of Advertising agencies.

UNIT-I (15 Hrs)

Introduction: Definition & Meaning of Advertising; Role and functions of Advertising; Nature & Scope of Advertising; Growth & Development of Advertising in India & World; Global Scenario of Advertising; Ethical & Regulatory Aspects of Advertising

UNIT-II (15 Hrs)

Advertising as a tool & process: Advertising as communication tool, communication process & advertising; Models of Advertising Communication: AIDA model, DAGMAR model, Maslow's Hierarchy of need; Advertising as a social process- consumer welfare, standard of living and cultural values

UNIT-III (15 Hrs)

Classification & Aspects: Classification of Advertising on the basis of: Target Audience, Geographical Area, Medium, Purpose; Advertising Creativity- Definition & importance; Elements of Print advertising - Copy, slogan, identification mark, clashing illustrations; Characteristics, Advantages & Disadvantages of: Broadcast media – Television, Radio, Audio-Video Cassettes & CD's, Cyber media, Print Media – Newspaper, Magazines, Support Media – Out of–home, in-store, transit, yellow pages, Movie theatre, inflight, Direct marketing

UNIT-IV (15 Hrs)

Ad Agency Structure & Functions: Concept of advertising agencies; Ad agency-Role, Types, Structure & functions; The advertisers; client –agency relationship; Criteria to select an ad agency

Suggestive Readings
1. Sandage C H, Fryburger Vernon & Rotzoll Kim: Advertising Theory and Practice: A.I.T.B.S. Publishers & Distributors, Delhi
2. Mohan Mahender: Advertising Management: Concepts & Cases; Tata McGraw Hill Publishers
3. Ogilvy David: Ogilvy on Advertising; Prion Books Ltd.

4. Lewis Herschell Gordion: The Complete Advertising and Marketing Handbook: East West Books (Madras) Pvt. Ltd., Chennai
5. Little Field James E & Kirkpatrik C.A.: Advertising: Mass Communication in Marketing; Vakils, Feffer & Simons Pvt. Ltd., Bombay
6. White Roderick: Advertising: What it is and how to do it: McGrawHill Book Company, London
7. Bulmore Jeremy: Behind the scenes in Advertising; NTC Publishers, Henley
8. Sandra, Moriarty: Advertising and IMC Principles and Practices

MEDIA LAWS & ETHICS

Subject Code: BJMC1-302   **L T P C**   **Duration: 60 Hrs**
                                        4 0 0 4

Course Objectives:

1. To define freedom of the press as enshrined in article 19(1) (a) of the Constitution.
2. To list the reasonable restrictions for freedom of the press.
3. To describe the salient features of the Press Council of India, its powers and functions.
4. To identify and apply the necessary provisions of laws and acts applicable to publication and broadcast of news and programmes of a sensitive nature.
5. To cover judicial proceedings, parliament and state legislature without attracting penal action.

Course outcomes: After studying this course the students will ability to:

1. Understand the Indian Constitution specially article 19(1) in a better way.
2. Understand the roles, responsibilities and powers of different media authorities.
3. Understand the working process of legislature, executive and judiciary.
4. Understand different media ethics and laws of print, electronic and web media.

UNIT-I (15 Hrs)

Freedom of the Press and the Law: Salient Features of Indian Constitution: Relevance of Fundamental Rights and Directive Principles; Freedom of the press and the Constitution-need for a free press in a democracy; Article 19(1)(a) of the Indian Constitution-Freedom of speech and expression; Article 19(1)2 reasonable restrictions to freedom of speech and expression; Supreme Court decisions on freedom of the press; Press laws before Independence and after; First Press Commission and Second Press Commission; The Press Council Acts, National Emergency.

UNIT-II (15 Hrs)

Media laws pertaining to the State, Citizens, Judiciary, Legislature and Parliament: The State: Sedition-incitement to violence (section 121 IPC) IPC 121 read with 511

inflammatory writing (IPC 353); Citizens: Defamation (IPC (499) 500) civil and criminal defamation-libel, slander; Legislature: Parliamentary privileges / Articles 105 (Parliament) Article 194 (State

Legislation); Judiciary: Contempt of Court, Covering and reporting court proceedings (Article

361A); Common court terminology - Plaintiff, defendent, affidavit, evidence, prosecution, conviction, accused, acquittal, bail, prima facie, subjudice; Media Ethics- Why Media Ethics-truth-accuracy-balance-decency-human rights; Ethics and Principles

UNIT-III (15 Hrs)

Acts and Laws: Introduction to various Acts/Laws which a journalist needs to know: Press and Registration of Books Act. 1867/1955 role of RNI, Role and functions of the Registrar of Newspapers, Intellectual Property Rights: Design and Patent Act, Copyright Act 1957, Official Secrets Act 1923, Working Journalist Act 1955, Right to Information Act 2005

UNIT-IV (15 Hrs)

Electronic and New Media Laws: The Commercial and Broadcasting Codes of AIR & Door darshan; Cable Television Act and Rules; IT Act; Advertising Standards Council; Cinematography Act.

Suggestive Readings
1. Relevant Sections of IPC from Criminal Law Manual, Universal
2. Constitution of India (Article 19 (1) and 19 (2) 105, 194) The Law Dictionary, Universal

3. Vidisha Barua: Press & Media Law Manual, Universal Law Publishing Co. Pvt. Ltd. New Delhi
4. P.K. Ravindranath: Press Laws and Ethics of Journalism, Author Press, New Delhi

5. R.K.Ravindrana: Press in the Indian Constitution
6. K.S. Venkateshwaran: Mass Media Laws and Regulations in India, Published by AMCIC
7. Dr. Ambrish Saxena: Freedom of Press and Right to Information in India, Kanishka Publication, New Delhi
8. M. Neelamalar: Media Law and Ethics, PHI Publisher.
9. Dash, Ajay: Freedom of Press

RADIO JOURNALISM AND PRODUCTION

Subject Code: BJMC1-303	L T P C	Duration: 60 Hrs
	4 0 0 4	

Learning Objective:
1. To describe the characteristics of radio as a medium of mass communication and its limitations
2. To describe different formats of radio programs
3. To list basic inputs, equipment and main elements of radio production
4. To identify the right kind of music and sound effects for different formats of radio programs
5. To acquaint students with different modes of transmission.

Course outcomes: After the completion of the course, students will be able to;
1. Understand the concept of Radio as a mass communication medium.
2. Work on different formats of Radio programs.
3. Produce various Radio programs including jingles and news.
4. Work on community Radio station for the welfare of poor people.

UNIT-I (15 Hrs)

Radio as a medium: Radio: as a medium of mass communication, Characteristics, and Limitations; Different types of radio stations: State, Private FMs, Community Radio; Three Modes of transmission: AM, SW and FM; AIR Code, Commercial Broadcast Code and Guidelines of Election Broadcast; Autonomy of All India Radio: Chanda Committee to Varghese Committee Prasar Bharati Act 1997—Formation of Prasar Bharati —Composition and Functions of Prasar Bharati.

UNIT-II (15 Hrs)

Radio Formats: Types of Formats: Simple announcements, Radio News, Radio talks, Radio features and documentaries, Radio play, Radio ads, Phone in Programs and Music Shows

UNIT-III (15 Hrs)

Writing for the Ear: Knowing your audience; Developing your style; Writing for different formats

UNIT-IV (15 Hrs)

Radio Production: Radio production: Introduction, Elements, Acoustics, Sound effects and Music; Different types of microphones; Recording; Editing

Suggestive Readings
1. H.R. Luthra: Indian Broadcasting, Publications Division
2. Robert Mc Liesh: Radio Production, Focal Press
3. James R. Alburger: The Art of Voice Acting, Focal Press
4. Gilmurray, Bob: Media Students Guide to Radio Production
5. Robert Mcleish: Radio Production

BASICS OF CAMERA, LIGHTS AND SOUND

Subject Code: BJMC1-304	**L T P C**		**Duration: 60 Hrs**
	4 0 0 4		

Course Objectives:
1. To understand basic operations and functions of a video camera.
2. To describe techniques of lighting for video production.
3. To describe the methods of recording and mixing of sound in video production.
4. To understand the role of aesthetics in visual composition.
5. To learn about post production work in TV programs.

Course Outcomes: After the completion of the course, students will be able to;
1. Handle and functioning of video camera, sound and light equipment.
2. Work on different Radio program techniques and situations.
3. Record or produce the programs related to TV and films.
4. Make use of aesthetics in visual composition.

UNIT-I (15 Hrs)

Camera: Introduction to camera, Parts of video camera and their functions, Types of Cameras, other equipment, depth of field and aperture control, Lenses –functions and its types.

UNIT-II (15 Hrs)

Visualization: Compositions –different types of shots, camera angles and camera movements, Aesthetics in visual communication, subject –camera relationship.

UNIT-III (15 Hrs)

Lights: Lights and its properties, different types of lights, other tools used in lighting – diffusers, reflectors, cutters and gels. Basic lighting techniques, accessories used in lighting

UNIT-IV (15 Hrs)

Sound: Audio fundamentals, various audio elements in video programmes – lip synchronized sound, voice music, ambience, sound effects, Types of microphones, Use of audio mixers for recording and editing of sound, different audio equipment for studio and location recording.

Suggestive Readings

1. Handbook of Television Production – Herbert Zettl
2. Television Field production and reporting – Fred Shook
3. Writing and Producing Television news – Eric. K.Gormly
4. Television Production – Gerald Millerson

ADVERTISING LAB

Subject Code: BJMC1-305	L T P C	Duration: 30 Hrs
	0 0 4 2	

Course Objectives

1. Plan an advertising t campaign
2. Design and develop a marketing plan
3. Evaluate and analyze various brand campaigns.
4. Write TV commercials and develop script.
5. Write Radio spots and jingles.

Course Outcomes: After completing this course, students will be able to;

1. Understand the philosophy and the functioning of Advertising Campaigns.
2. Understand the production, marketing and distribution of a brand.
3. Deconstruct various campaigns of the brands.
4. Acquire fundamental knowledge of TV commercials.

Exercises/Assignments: Students should undertake the following assignments as part of their practical training in advertising

1. Analyse 5 Print Advertisements
2. Critically evaluate print ads of competing brands two each from FMCG, Consumer Durables and Service Sector
3. Design display advertisement, classified & display classified (one each)
4. Print advertising preparation – copy writing, designing, making posters, handbills
5. Writing radio spots and jingles
6. Writing TV commercials, developing script and story board
7. Formulate, plan and design an Ad Campaign based on market and consumer research on the assigned topic/theme.
8. Making advertisements for print, Radio and TV.

Suggestive Readings

1. Advertising: Wright, Winter, Zeig1st
2. Creative Advertising: Moriarty, Sandra E.
3. Advertising Principles &Practice: Chunawala and Sethia, K.C.
4. Advertising Writing: Kaith, Hafer W., White Fordo E.

5. I he fundamentals of Advertising: Wilmshurst, John
6. Pass Communication in India: Kumar, Kewal J.
7. Advertising in the Mind of Consumer: Max Suther Land
8. Principles of Advertising: Monle Lee, Johnson, Viva Books Pvt. Ltd.
9. Advertising Management: David A. Parker, Rajiv Batra, Practice Hall M97, Connaught Circus, New Delhi.
10. Reading in Advertising: Bellur V. V. Himalaya Publishing Management House, Bombay.

RADIO JOURNALISM AND PRODUCTION LAB

Subject Code: BJMC1-306   **L T P C**   **Duration: 30 Hrs.**
                                 0 0 4 2

Course Objectives
1. To prepare an audio brief
2. To apply various elements of radio production for producing different radio formats
3. To write and record effectively for radio
4. To produce radio interviews, discussions, features and documentaries
5. To learn the basics of sound editing.

Course Outcomes: After Completing this course, students will be able to;
1. Make a Radio bulletin.
2. Produce various Radio Programs including Jingles and News.
3. Write Radio Script and record the Voice.
4. Take Interviews and Documentaries on various issues for radio.

Practical Exercises
1. Research and Preparation of audience profile
2. Writing exercises: Scripting of radio documentary/feature/drama
3. Recording: In the studio and OB recordings
4. Production: Radio discussions, Radio Social messages (max 30 seconds), Radio documentary/feature
5. Sound editing exercises

Suggested Readings
1. H.R. Luthra: Indian Broadcasting, Publications Division
2. Robert Mc Liesh: Radio Production, Focal Press
3. James R. Alburger: The Art of Voice Acting, Focal Press
4. Gilmurray, Bob: Media Students Guide to Radio Production

VIDEO PRODUCTION LAB

Subject Code: BJMC1-307   **L T P C**   **Duration: 30 Hrs.**
                                 0 0 4 2

Course Objectives
1. To get exposure of using camera under different conditions
2. To apply various lights and camera dimensions
3. To ger experience of using filters, microphones
4. To learn the basics of light setting

Course Outcomes
On completion of this course, the student should be able to:
o Use video camera, lights for shooting
- Use sound for studio and location shooting
- Demonstrate proficiency of skills to operate
- Handle video system

Exercises/Assignments

Camera
1. Operate and handle video camera:
   a. White Balancing
   b. Exposure
   c. Depth of Field
   d. Filters (External and Internal)
2. Camera mounts, composition, continuity of shots and camera movements

Lighting
1. Use different types of lights (Indoor and Outdoor) for videography
2. Use of filters, reflectors and gels

Sound
1. Audio Control and audio adjustment in video camera: audio levels and audio channels
2. Use of different types of microphones for indoor and location video recordings

Final Product: Produce a Public Service Message (up to 1 minute) using in-cam editing technique

Suggested Readings
1. Handbook of Television Production – Herbert Zettl
2. Television Field production and reporting – Fred Shook
3. Writing and Producing Television news – Eric. K.Gormly
4. Television Production – Gerald Millerson

JOURNALISM AND MASS COMMUNICATION

FOURTH SEMESTER

SYLLABUS

DEVELOPMENT COMMUNICATION

Subject Code: BJMC1-401   **L T P C**   **Duration: 60 Hrs**
   4 0 0 4

Course Objectives:
1. To develop understanding of development issues
2. To contribute positively towards the development process of country as responsible mass communicators.
3. To understand role of communication for rural, urban and tribal development.
4. To know development communication approaches and development support communication.

Course Outcomes: After completing the course student will be able to;
1. Understand development issues for Journalistic activities.
2. Write and report the different kinds of development stories.
3. Work with National & International Development agencies as a development mass communicator.
4. Be proficient in designing messages.

UNIT-I (15 Hrs)

Concept and Indicators of Development: Definition, meaning, scope and concept of development communication Development communication and society, measures of development communication Characteristics of developed and developing societies

UNIT-II (15 Hrs)

Development Communication - Concept and Theories: Theories of development: Social, Political and Economic theory Models of development: Western, Eastern, Gandhian, Schumacher's Development communication, process - special reference to India.

UNIT-III (15 Hrs)

Development Journalism: Role of mass media organizations in development communication, Newspaper, Radio, TV, Traditional media, PIB, DAVP, Song and Drama Division etc. Strategies of development communication, Role of NGO's in development.

UNIT-IV (15 Hrs)

Communication in different perspectives: Role of legislature, the executive and the judiciary in development. Cyber media and development: E –governance, digital democracy & E–chaupal. Communication for rural development, communication for urban development. Panchayati raj, urban sanitation, consumer awareness, modernization, industrialization

Suggestive Readings
1. Understanding Development communication- Uma Joshi
2. Communication, Modernisation & Social Development- Edited: Ito Youichi, Kiran Prasad, K. Mahadevan.
3. India Economy- Ruddar Dutt, K.P.M. Sundharam
4. International Development Communication- bella mody
5. Traditional Media and Development Communication- K. Madhusudan
6. Development Communication – V.S. Gupta

TELEVISION JOURNALISM AND PRODUCTION

Subject Code: BJMC1-402   **L T P C**   **Duration: 60 Hrs**
                                          4 0 0 4

Course Objectives:
1. To explain the salient features of TV as a medium.
2. To describe the process of gathering news and reports for TV.
3. To list the stages of production of a video program.
4. To describe the steps involved in editing of a video program.
5. To describe the use of graphics and special effects.

Course Outcomes: After completing the course student will be able to;
1. Analyze and work in the TV industry.
2. Write stories and collect news for the TV news and entertainment industry.
3. Produce different formats of TV programs.
4. Work on editing software's.

UNIT-I (15 Hrs)

TV as a medium: Understanding the medium - Nature and Language of TV; Formats and types for TV Programmes; TV News script format; Scripting for Fiction/Non Fiction

UNIT-II (15 Hrs)

TV News Gathering: Fundamentals of TV reporting – Reporting skills, Ethics for TV reporting; Writing and Reporting for TV: Finding the story and Developing the sources, Gathering the facts (Getting right visuals, facts and figures, establishing the scene, cut away); Interview – types of news interview, art of conducting a good interview; Anchoring - Live shows; Packaging

UNIT-III (15 Hrs)

TV Programme Production: Steps involved in production & utilisation of a TV Program; Stages of production- pre-production, production and post-production; The production personnel – Single camera and Multi camera production; Use of graphics and special effects; Developing a video brief.

UNIT-IV (15 Hrs)

Basics of Video editing and Programme Evaluation: Aesthetic Factor of video editing; Types of video editing- Non-Linear editing, cut to cut, assemble & insert, on line, off line editing; Designing, Evaluation and field testing of programme.

Suggestive Readings
1. Jan R. Hakemulder: Broadcast Journalism, Anmol Publications, Ray AC de Jonge, PP Singh New Delhi
2. Janet Trewin: Presenting on TV and Radio, Focal Press, New Delhi
3. Stuart W. Hyde: TV & Radio Announcing, Kanishka Publishers
4. Andrew Boyd: Techniques of Radio and Television News Publisher: Focal Press, India.
5. Janet Trewin: Presenting on TV and Radio, Focal Press, India.
6. Ralph Donald and Thomas Spann: Fundamentals of Television Production Surjeet Publications,New Delhi.
7. Herbert Zettl: Handbook of Television Production, Publisher: Wadsworth
8. Thomas D Burrows & Lynne S.: Video Production Publisher: MC Graw Hill
9. Ralph Donald, Thomas Spann: Fundamentals of TV Production, Surjeet Pubications, New Delhi
10. Lynn S Gross, Larry W. Ward: Electronic Movie making Wadsworth Publishing

11. Neill Hicks: Screen Writing, Michael Wiese Productions
12. Thomas D Burrows, Lynne S Gross: Video Production, Mc Graw Hill
13. Belavadi, Vasuki: Video Production

PUBLIC RELATIONS

Subject Code: BJMC1-403   **L T P C**   **Duration: 60 Hrs**
                                   4 0 0 4

Course Objectives:
1. To define PR and its functions
2. To differentiate between PR & Corporate Communication
3. To apply tools and techniques for handling public and corporate relations.
4. To understand PR ethics.
5. To define role of PR in developing countries

Course Outcomes: After completing the course student will be able to;
1. Understand the philosophy and the concept of public relations activities.
2. Analyze public relations and other communications.
3. Produce and handle different tools and techniques of PR activities.
4. Acquire the knowledge of PR ethics.

UNIT-I (15 Hrs)
Public Relations: Definition of Public Relations - Its need, nature and scope; Types of Publics, Functions of PR; How PR is different from advertising, publicity and propaganda; Corporate Communication, Difference between Corporate communication & PR; Ethics of PR - IPRA code - professionalism, PRSI

UNIT-II (15 Hrs)
Tools & Techniques: Tools and techniques of Corporate Communication; News release - seven point formula; Media relations - press conference and press tours; Internal and External PR media - corporate film, house journal, annual report, speech writing, minutes and official memo, institutional advertising

UNIT-III (15 Hrs)
Role of PR: Role of PR in developing countries; Role of PR in Educational and Research Institutions; Role of PR in Rural Sector; Role of PR in Defense; Role of PR in Political and Election Campaigns; PR for Individuals

UNIT-IV (15 Hrs)
PR Campaign: Finding a problem; PR campaign - programme planning, evaluation; Research in PR; Role of Digital Public Relation

Suggestive Readings
1. Black Sam & Melvin L. Sharpe: Practical Public Relations, Universal Book Stall, New Delhi
2. JR Henry and A. Rene: Marketing Public Relations, Surjeet Publications, New Delhi
3. Jefkins Frank: Public Relations Techniques, Butterworth Heinmann Ltd., Oxford
4. Cutlip S.M and Center A.H.: Effective Public Relations, Prentice Hall
5. Kaul J.M.: Public Relation in India, Noya Prakash, Calcutta Pvt. Ltd.
6. Heath Robert L: Handbook of Public Relations, Sage Publications, New Delhi
7. K.R. Balan: Applied Public Relations and Communications, Sultan Chand and Sons
8. Philip Hens lowe: Public Relations: A Practical Guide to the Basics, Crest Publishing House

9. Dennis L. Wilcose & Glen T: Public Relations, Pearson, New Delhi Cameron
10. Lesly, Philip: Hand Book of Public Relation and Communication
11. Vachani, Jagdish: Public Relations Management in Media And Journalism

WEB MEDIA

Subject Code: BJMC1-404 **L T P C** **Duration: 60 Hrs**
 4 0 0 4

Course Objectives:
1. To explain new media technology for journalistic purpose
2. To describe online discussion forums keeping in mind cyber laws and create blogs.
3. To understand the language and write the text for social media.
4. To understand various dimensions of cybercrimes and security
5. To understand the basics of website designing.

Course Outcomes: After the completion of the course, students will be able to;
1. Understand the purpose & features of Online Communication for the betterment of the society.
2. Handle the tools and techniques of Online Media.
3. Make websites and write text for the same.
4. Empower them by imparting education about cyber-crimes and security.

UNIT-I (15 Hrs)

Cyber Communication and Internet: Cyber Communication: Meaning and definition, Features of Online Communication; Internet: Characteristics, Networking, ISP and browsers, Types of websites, Video conferencing, Webcasting

UNIT-II (15 Hrs)

Web Media: Digital media and communication, ICT and digital divide; Information Society, New World Information Order and E-governance; Convergence : Need, nature and future of convergence; Emerging Trends: Mobile Technology, Social Media & Web 2.0, Social Networking Websites

UNIT-III (15 Hrs)

Online Journalism: Online Journalism-difference in news consumption, Presentation and uses; Online Writing & Editing: do's and don'ts; Cyber Crimes & Security: Types and Dimension; Cyber Laws & Ethics and the difficulty in enforcing them

UNIT-IV (15 Hrs)

Web Designing and Web Series: Writing for various web platform; OTT; Current trends: News and Analysis platforms; Basics of Web designing

Suggestive Readings
1. Ronal Dewolk Introduction to Online Journalism Allyn & Bacon, ISBN 0205286895
2. John Vernon Pavlik New Media Technology Allyn & Bacon ISBN 020527093X
3. Michael M. Mirabito, Barbara Mogrenstorn: New Communication Technologies: Application, Policy & Impact Focal Press, 4th edition ISBN 0240804295
4. Jagdish Chakravarthy Cyber Media Journalism Emerging Technologies

FOLK MEDIA

Subject Code: BJMC1-405   **L T P C**   **Duration: 60 Hrs**
                                     4 0 0 4

Course Objectives: On completion of the course students should be able to:
1. Understand how folk media reflects societal concerns.
2. Describe the scope and characteristics of folk media.
3. Know the roots and type of folk art form.

Course Outcomes: After completing the course student will be able to define and explain the scope of entertainment industry and the history of entertainment of the industry

UNIT-I (15 Hrs)

Introduction to Folk Media: Folk media: Meaning & definition; Nature and Scope of Folk media; Characteristics of folk media

UNIT-II (15 Hrs)

Types of Folk Media: Types of folk media: Dance, theatre & music; Folk theatre: Bhavai, Tamasha, Nautanki, Ramlila, Raslila and Jatra; Folk music: Bengal, Gujarat & Maharashtra.; Folk dance: Garba, Tamasha & Lavani

UNIT-III (15 Hrs)

Fairs & Festivals: Types of Festivals: Seasonal & Cultural; Importance of Fair & Festivals; Features of Fairs

UNIT-IV (15 Hrs)

Many aspects of Folk Media: Merits & demerits of folk media; Influence of modern media (radio & TV) on folk media; Folk media for promoting literacy, and social change.

Suggestive Readings
1. Singer, Melton: Traditions in India: Structure and Change, American Folk society, 1957
2. Doctor, Aspi and Farzana Chaze: Mass communication- A Basic Study, Mumbai: Sheth Publisher, 8th Ed, 2004
3. Kumar, Keval Kumar: Mass Communication in India, Mumbai, Jaico Publishers
4. Malik, Madhu: Traditional Form of Communication and the Mass Media in India, Paris: UNESCO
5. Parmar Shyam: Traditional Folk Media in India New Delhi: Geka Books 1975

WEB MEDIA LAB

Subject Code: BJMC1-406   **L T P C**   **Duration: 30 Hrs**
                                     0 0 2 2

Course Objectives:
1. To use search engines effectively
2. To write content for social media
3. To learn computer languages
4. To design websites.
5. To create and maintain blogs.

Course Outcomes: After completing this course, students will be able to;
1. Understand the purpose and the features of the Online Communication for the betterment of the society.
2. Handle the tools and techniques of the Online Media.

3. Make websites and write text for the same.
4. Understand the basics of fact checking.

Exercises/Assignments
1. To create and maintain blogs
2. Analyze different elements and content of a news website. Distinguish between news, views, opinions, advertisements
3. Web publishing, learning HTML, creating a simple web page with links to text document, graphics and audio & video document
4. Students in groups should create a dynamic website with each one given a different assignment regarding the components of website.

Suggestive Readings
1. Ronal Dewolk Introduction to Online Journalism Allyn & Bacon, ISBN 0205286895
2. John Vernon Pavlik New Media Technology Allyn & Bacon ISBN 020527093X
3. Michael M. Mirabito, Barbara Mogrenstorn: New Communication Technologies: Application, Policy & Impact Focal Press, 4th edition ISBN 0240804295
4. Jagdish Chakravarthy Cyber Media Journalism Emerging Technologies

PUBLIC RELATION LAB

Subject Code: BJMC1-407	L T P C	Duration: 30 Hrs
	0 0 2 2	

Course Objectives

The main objectives of this course are:

1. To provide understanding of public relations
2. To provide in depth knowledge of various sources of communication
3. To provide understanding about conducing Mock conference and other press conference
4. To get experience of compiling and writing media coverage

Course Outcomes

On completion of this course, the student should be able to:

1. Plan, design and implement different media release for the launch of a product/service /idea
2. Demonstrate proficiency of skills to design and manage a PR pitch and campaign
3. Develop the proficiency of scheduling and Liasioning for press release
4. Demonstrate proficiency of skills to manage a PR pitch and campaign

Exercises/Assignments

1. Plan, design and implement the following for the launch of a product/service /idea

a. Press release
b. Audio release
c. Video release
d. Social media news release

2. Write Minutes of the Meeting, Memo and Notice (one each)

3. Organise a Mock Press Conference

4. PR Pitch and Campaign: Plan, Design and Implement
   a. Plan: objectives, date, venue, time, invite, refreshments, equipment, infrastructure, checklist, guests, budget
   b. PR Personnel/staff
   c. Liaisoning, Licensing & permissions
   d. Designing a Press Kit: Press Release, backgrounder, fact-sheet, audio-visual material, stationery, gift
   e. Scheduling: Opening Speech, presentation, Q&A Session, vote of thanks
   f. Post-Conference PR: compilation of media coverage

MRSPTU BBA (AVIATION MANAGEMENT) SYLLABUS 2020 BATCH ONWARDS

Total Contact Hours= 20 **Total Marks= 600** **Total Credits= 23**

Semester 5th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BBADS2-501	Goods and Services Tax	4	-	-	40	60	100	4
BBADS2-502	Strategic Human Resource Management	4	-	-	40	60	100	4
BBADS2-503	Aircraft Maintenance Management	4	-	-	40	60	100	4
BBADS2-504	Cabin Crew Management	4	-	-	40	60	100	4
BBAD1-103	Micro Economics	4	-	-	40	60	100	4
BBADS2-505	Minor Project	-	-	-	30** Viva-Voce	70** Project Report	100	3
Total		20	0	0	230	370	600	23

* Mini Project on Airline Operations and Corporate Social Responsibility of an Airline company.
**The Student has to submit a Project Report of at least 50 Pages. The Project carries 70 Marks for the Report and 30 Marks for Viva-Voce.

Total Contact Hours= 20 **Total Marks= 600** **Total Credits= 23**

Semester 6th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BBADS2-601	Entrepreneurship Development	4	-	-	40	60	100	4
BBADS2-602	Principles of Airline and Airport Management	4	-	-	40	60	100	4
BBADS2-603	Airport Strategic Planning	4	-	-	40	60	100	4
BBAD1-309	Marketing Management	4	-	-	40	60	100	4
BBAD1-418	Production and Operation Management	4	-	-	40	60	100	4
BBADS2-604	Dissertation	-	-	-	30** Viva-Voce	70** Project Report	100	3

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

Total	20	0	0	230	370	600	23

*Research based Dissertation on Airline / Airport Employees, Air Passengers, Travel Agents, Tour Operators, Service Providers, etc.

**The Student has to submit Dissertation of at least 50 Pages. The Dissertation carries 70 Marksand 30 Marks for Viva-Voce

SEMESTER 5th

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

Subject Code: BBADS2-501   **L T P C**   **Duration: 60(Hrs.)**

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Course Objectives:

The aim of this course is:

1. To equip students with the principles and provisions of Goods and Services Tax (GST), which is, implemented from 2017 under the notion of One Nation, One Tax and One Market
2. To provide an insight into practical aspects and apply the provisions of GST laws to various situations.

Course Outcomes:

After studying this course the students will be able to understand

1. Objectives and basic scheme of GST, Salient features of GST
2. Salient features of CGST Act, SGST Act (Punjab State),
3. Registration under GST
4. Simple Problems on utilization of input tax, Problems on Assessment of tax and tax liability.

UNIT-I(14 Hours)

Introduction To Goods And Services Tax (GST): Objectives and basic scheme of GST, Meaning – Salient features of GST – Subsuming of taxes – Benefits of implementing GST – Constitutional amendments - Structure of GST (Dual Model) – Central GST – State / Union Territory GST – Integrated GST - GST Council: Structure, Powers and Functions. Provisions for amendments.

UNIT-II (16 Hours)

GST ACTS: CGST Act, SGST Act (Karnataka State), IGST Act : Salient features of CGST Act, SGST Act (Punjab State), IGST Act - Meaning and Definition: Aggregate turnover, Adjudicating authority, Agent, Business, Capital goods, Casual taxable person, Composite supply, Mixed supply, Exempt supply, Outward supply, Principal supply, Place of supply, Supplier, Goods, Input service distributor, Job work, Manufacture, Input tax, Input tax credit, Person, Place of business, Reverse charge, Works contract, Casual taxable person, Non-resident person. Export of goods / services, Import of goods / services, Intermediary, Location of supplier of service, Location of recipient of service.

UNIT-III (16 Hours)

PROCEDURE AND LEVY UNDER GST :

Registration under GST: Procedure for registration, Persons liable for registration, Persons not liable for registration, Compulsory registration, Deemed registration, Special provisions for Casual taxable persons and Non-resident taxable persons. Exempted goods and services - Rates of GST.
Procedure relating to Levy: (CGST & SGST): Scope of supply, Tax liability on Mixed and Composite supply, Time of supply of goods and services, Value of taxable supply. Computation of taxable value and tax liability.

Procedure relating to Levy: (IGST): Inter-state supply, intra-state supply, Zero rates supply, Value of taxable supply – Computation of taxable value and tax liability.

Input tax Credit: Eligibility, Apportionment, Inputs on capital goods, Distribution of credit by Input Service Distributor (ISD) – Transfer of Input tax credit - Simple Problems on utilization of input tax

<center>UNIT-IV(14 Hours)</center>

ASSESSMENT AND RETURNS: Furnishing details of outward supplies and inward supplies, First return, Claim of input tax credit, Matching reversal and reclaim of input tax credit, Annual return and Final return. Problems on Assessment of tax and tax liability.

Recommended Text Books / Reference Books:

1. Deloitte: GST Era Beckons, Wolters Kluwer.
2. Madhukar N Hiregange: Goods and Services Tax, Wolters Kluwer.
3. All About GST: V.S Datey - Taxman's.
4. Guide to GST: CA. Rajat Mohan,
5. Goods & Services Tax – Indian Journey: N.K. Gupta &SunnaniaBatia, Barat's Publication
6. Goods & Services Tax – CA. Rajat Mohan,
7. Goods & Services Tax: Dr.Sanjiv Agrawal & CA. Sanjeev Malhotra.
8. GST - Law & Practice: Dr. B.G. Bhaskara, Manjunath. N & Naveen Kumar IM,

<center>**STRATEGIC HUMAN RESOURCE MANAGEMENT**</center>

Subject Code: BBADS2-502 **L T P C** **Duration: 60(Hrs.)**

<center>4 - - 4</center>

Course Objectives:
The aim of this course is:
1. To introduce to student the basic concepts related to Human Resource Management which can form foundation to understanding advanced concepts in managing human resources in an organization.
2. To understand about acquiring, Developing and Rewarding of Human Resources

Course Outcomes:
After undergoing this subject, the student will learn
1. Functions of Human Resource Management, Managerial and operative role of Human Resource Management
2. Job Analysis and Design, Job Restructuring, Recruitment and Selection
3. Training and Development , Significance of Career Planning
4. Performance Appraisal , Methods and needs for Performance Appraisal

<center>UNIT-I (15 Hours)</center>

Introduction To Human Resource Management And Environment: Functions of Human Resource Management. Managerial and operative role of Human Resource Management. Personnel

Management vs. Human Resource Management – Strategic Management Approach. The Role of Globalization in HR Policy and Practice.

UNIT-II (15 Hours)

Acquiring Human Resources: Human Resource Planning and Alignment – Job Analysis and Design. Job Description, Job Specification and Job Evaluation, Job Restructuring – Job Rotation, Job Enlargement and Job Enrichment. Recruitment and Selection – Placement – Induction and Orientation. Line and Staff.

UNIT-III (15 Hours)

Developing Human Resources: Training and Development – Employee Training and Retraining – Assessing Training Needs and Designing Training Programmes. An overview on employee orientation: Career Planning and Development: Role and Significance of Career Planning – Impact of Career Planning on Productivity.

UNIT-IV (15 Hours)

Rewarding Human Resources: Performance Appraisal – Methods and needs for Performance Appraisal – Organization Climate and its impact on HRM. Components of Organization Culture. Quality of Work Life – Determinants of quality of work life. Impact of QWL on Organization Climate and Culture.

Recommended Text Books / Reference Books:

1. Human Resources - Bernandin H. John. TMH.
2. Managing Human Resources – Wayne E. Casio. – TMH
3. Human Resources Management – David Lepak and Mary Gowan – Pearson

AIRCRAFT MAINTENANCE MANAGEMENT

Subject Code: BBADS2-503　　　　**L　T　P　C**　　　　　**Duration: 60(Hrs.)**

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Course Objectives:
The aim of this course is:
1. To enable the Students to learn the importance of Aircraft Maintenance without which Aircraft Movements will be disturbed terribly
2. To learn about the safety of Aircraft Operations cannot have ensured unless the proper Maintenance is taken care as per the schedule

Course Outcomes:
After undergoing this subject, the students will learn
1. Introduction of Maintenance Steering Group Process
2. Types of Documentation Regulatory Documents Airlines
3. Forecasting and Production Planning &Control
4. Responsibilities Line Maintenance Operations, Maintenance Crew Skill Requirement

UNIT-I (15 Hours)

Goals And Objectives Of Maintenance Types Of Maintenance: Reliability, Redesign. Establishing Maintenance Programme- Introduction of Maintenance Steering Group Process and Task Oriented Maintenance- Maintenance Intervals Defined.

UNIT-II(15 Hours)

Documentation For Maintenance :Types of Documentation Regulatory Documents Airlines Generated Documents ATA Document Standards Maintenance and Engineering Organization

UNIT-III(15 Hours)

Production Planning And Control:-Forecasting- Production Planning &Control -Feedback for Planning Organization of PPC Technical Publications- Functions of Technical Publication Technical Training – Training for Aviation Maintenance.

UNIT-IV (15 Hours)

Maintenance Control Centre : Responsibilities Line Maintenance Operations Maintenance Crew Skill Requirement Hamper Maintenance Activities Maintenance Overall Shops (off aircraft)

Recommended Text Books / Reference Books:

1. Aviation Maintenance Management - Harry AKinnison mc Graw hill

2. Risk Management and Error Reduction in Aviation Maintenance – Manoj S. Patankar and James C. Taylor – Ashgate Publishing Ltd

3. 2. Managing Maintenance Error – James Reason and Alan Ho

CABIN CREW MANAGEMENT

Subject Code: BBADS2-504	L	T	P	C	Duration: 60(Hrs.)
	4	-	-	4	

Course Objectives:
The aim of this course is:
1. Understanding the skills for effective revalidation and implementation through training
2. Enabling the standards and requirements for crew professionalism
3. Identifying errors and corrective actions on time and analyzing the depth of knowledge requirement in every crew designation.
4. To develop business environment and through effective communication skills

Course Outcomes:
After undergoing this subject, the student will learn
1. Introduction to CRM, CRM Training
2. CRM Training Methods
3. Error Management ,Initial Training & Objectives
4. CRM for Cabin Crew and Flight Deck Crew.

UNIT-I (15 Hours)

Introduction : Introduction – CRM defined – Cognitive Skills – Interpersonal Skills – Factors affecting individual performance – CRM Training – Behavioural Markers – Conclusion

UNIT-II (15 Hours)

CRM History: STANDARDS & TRAINING UK & JAA CRM Requirements – CRM Standards – Objectives of CRM Training – CRM Training Methods.

UNIT-III (15 Hours)

Human Error, Reliability & Error Management : Basic Theory – Error Management – Initial Training & Objectives – Practical Notes – Suggested Training materials – Case Studies

UNIT-IV (15 Hours)

CRM Requirements & Instructors : CRM for Cabin Crew – Flight Deck Crew – Scheme of Charges – Instructor Requirements – Accreditation – Revalidation Criteria – Record Keeping

Recommended Text Books / Reference Books:

1. Crew Resource Management 2nd Edition: Barbara Kanki, Robert Helmreich& Jose Anca; Academic Press, 2010 .

MICRO ECONOMICS

Subject Code: BBAD1-103	L	T	P	C	Duration: 60 Hrs.
	4	0	0	4	

Course Objectives:
The aim of this course is:
1. To cover the area of economics commonly defined as microeconomics which is concerned with the individual parts of the economy such as individual businesses or industries, individual consumers, and individual products.
2. To provide a thorough introduction to economic theory starting from the basic concepts of microeconomics, utility functions, production functions, demand and supply, effect of market forces.
3. To study whether the economy uses our limited resources to obtain the maximum satisfaction possible for society.

Course Outcomes:
After studying the subject the students will be able to
1. Understand and explain the concept of economics
2. Understand its managerial perspective including the real insight of the consumer's economic behaviour.
3. Estimate the demand for the new product as well as changes in the existing products.

UNIT-I (14 Hours)

Micro Economics: Meaning, Nature, Scope and Limitations

Basic concepts: Marginal and Incremental Principles, Opportunity Cost, Equilibrium

Utility: Cardinal Utility Approach: Diminishing Marginal Utility; Ordinal Utility Approach, Indifference Curve, Properties, Consumer Equilibrium and Marginal Rate of Substitution.

UNIT-II (16 Hours)

Demand: Meaning, Determinants, Law of Demand and its Exceptions.

Elasticity of Demand: Measurement, Degree of Elasticity. Price, Income and Cross Elasticity of Demand.

Revenue: Total Revenue (TR), Average Revenue (AR), Marginal Revenue (MR) and their Relationship.

UNIT-III (15 Hours)

Production Function: Meaning, Short-Run Production Function and Law of Variable Proportions, Long Run Production and Laws of Returns.

Cost of Production: Concept of Economic and Managerial Costs, Short Run and Long Run Cost Curves. Economies and Diseconomies of Scale

UNIT-IV (15 Hours)

Equilibrium of Firm and Industry: Perfect Compet ition, Monopoly and Discriminating Monopoly.

Monopolistic Competition: Characteristics, Individual and Group Equilibrium, Concept of Selling Cost.

Oligopoly: Characteristics, Cornet's Model, Kinked Demand Curve, Concepts of Cartel and Price Leadership.

Distribution: Marginal Productivity and Modern Theory of Determination.

Recommended Text Books / Reference Books:

1. D. Salvatore, 'Microeconomic Theory', Tata McGraw Hill.

2. R.H. Dholkia and A.N. Oza, 'Microeconomics for Management Students', Oxford University Press.

3. D. Kreps, 'Micro Economics for Managers', Viva Books Pvt. Ltd.

4. Koutsayiannis, 'Modern Microeconomics', Macmillan Publications.

5. D.N. Dwivedi, 'Managerial Economics', Vikas Publishing.

1. P.L. Mehta, 'Managerial Economics', Sultan Chand.

2. L. Peterson and Jain, 'Managerial Economics', Pearson Education.

MINOR PROJECT

Subject Code: BBADS2-505   **L T P C**   **Duration:45 (Hrs.)**

                                                          -   -   -   3

MINOR PROJECT

*Industrial Visit to Domestic Airport and Report on Organizational Structure and Corporate Social Responsibility.

*The Student has to submit a Project Report of nearly 50 to 80 Pages. This Project must be prepared based on the Organizational Structure and Corporate Social Responsibility of an Airport. The Project carries 70 Marks for Project Report and 30 Marks for Viva-Voce.

SEMESTER 6ᵗʰ

Subject Code: BBADS2-601	**L T P C**	Duration: 60(Hrs.)
	4 - - 4	

Course Objectives:
The aim of this course is
1. To enable students to understand the basic concepts of entrepreneurship and preparing a business plan to start a small industry.
2. To understand the meaning and formation of small scale industries and Business Plans

Course Outcomes:
After undergoing this subject, the student will learn
1. Meaning & Definition of Entrepreneurship, Entrepreneur & Enterprise and its Functions
2. Role played by SSI in the development of Indian Economy and Problems faced by SSI's and the steps taken to solve the problems
3. Steps involved in the formation of a small business
4. Human Resource aspects of the BP, Technical , Social aspects of the BP.

UNIT-I (15 Hours)

Entrepreneurship : Introduction – Meaning& Definition of Entrepreneurship, Entrepreneur & Enterprise –Functions of Entrepreneur - Factors influencing Entrepreneurship - Pros and Cons of being an Entrepreneur – Qualities of an Entrepreneur – Types of Entrepreneur

UNIT-II (15 Hours)

Small Scale Industries : Meaning &Definition – Product Range - Capital Investment - Ownership Patterns – Meaning and importance of Tiny Industries, Ancillary Industries, Cottage Industries. Role played by SSI in the development of Indian Economy. Problems faced by SSI's and the steps taken to solve the problems - Policies Governing SSI's.

UNIT-III (15 Hours)

Small Scale Industries : Meaning &Definition – Product Range - Capital Investment - Ownership Patterns – Meaning and importance of Tiny Industries, Ancillary Industries, Cottage Industries. Role played by SSI in the development of Indian Economy. Problems faced by SSI's and the steps taken to solve the problems - Policies Governing SSI's.

UNIT-IV (15 Hours)

Preparing The Business Plan (BP) : Meaning – importance – preparation –BP format: Financial aspects of the BP, Marketing aspects of the BP, Human Resource aspects of the BP, Technical aspects of the BP, Social aspects of the BP. Common pitfalls to be avoided in preparation of a BP.

Recommended Text Books / Reference Books:

1. Vasanth Desai, Management of Small Scale Industry, HPH

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2. Mark. J. Dollinger, Entrepreneurship – Strategies and Resources, Pearson Edition.

Subject Code: BBADS2-602   **L   T   P   C**   **Duration: 60(Hrs.)**

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Course Objectives:
The aim of this course is
1. To enable the students to learn the development and growth of Aviation Industry in the world, which
2. To create the right foundation for a prospective career in Airlines and Airport Management for the Students future.

Course Outcomes:
After undergoing this subject, the student will learn
1. History of Aviation and Development of Air transportation in India
2. Current challenges in Airline Industry and Competition in Airline industry
3. Airport planning-,Operational area and Terminal planning, design, and operation
4. Organization Structure of Airline Sectors Airline Terminal Management

UNIT-I(15 Hours)

Introduction: History of Aviation- Development of Air transportation in India- Major players in Airline Industry-Market potential of Indian Airline Industry— Current challenges in Airline Industry-Competition in Airline Industry**.**

UNIT-II(16 Hours)

ICAO – International Civil Aviation Organization
International body comprising Governments of various Countries Origin – Aims of ICAO, Functions of ICAO-Role of ICAO in International Air Transportation
IATA- International Air Transportation Association
IATA is the world organization of Scheduled Airlines of all countries Origin – Aims of IATA, Functions of IATA-Role of IATA in International Air Transportation.

UNIT-III(14 Hours)

Airport Management: Airport planning- Operational area and Terminal planning, design, and operation- Airport Operations-Airport functions- Organization structure of Airports Sectors- Airport Authorities- Global and Indian scenario of Airport management – DGCA –AAI.

UNIT-IV (15 Hours)

Airline Operations : Organization Structure of Airline Sectors Airline Terminal Management- Flight Information Counter/Reservation and Ticketing- Check In/Issue of Boarding pass-Customs and Immigration formalities-Co-ordination- Security Clearance-Baggage-Handling-Handling of

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Stretcher Passengers and Human Remains-Handling of CIP, VIP & VVIP- Co-ordination of Supporting Agencies /Departments.

Recommended Text Books / Reference Books:

1. Graham .A-Managing Airport an International Perspective –Butterworth Heinemann, Oxford-2001
2. Wells .A-Airport Planning and Management, 4th Edition-McGraw-hill, London-2000.
3. Doganis .R.-The Airport Business-Routledge, London-1992
4. Alexander T.Well, Seth Young –Principles of Airport Management-McGraw Hill 2003
5. P.S. Senguttuvan –Fundamentals of Airport Transport Management – McGraw Hill 2003

AIRPORT STRATEGIC PLANNING

Subject Code: BBADS2-603   **L   T   P   C**   **Duration: 60(Hrs.)**

                                                      4   -   -   4

Course Objectives:
The aim of this course is
1. To enable Students to learn the International standards in Airport System Planning and Airport Planning and Design which should match the continuous innovation taking place in Aircraft Characteristics and Airline operations
2. To understand the Growth of Air Transport, Airport Organization and Associations, Classification of Airports Airfield

Course Outcomes:
After undergoing this subject, student will learn
1. About the International standards in Airport System Planning and Airport Planning and Design which should match the continuous innovation taking place in Aircraft Characteristics and Airline operations
2. The Growth of Air Transport, Airport Organization and Associations, Classification of Airports Airfield

UNIT-I (15 Hours)

Introduction: Growth of Air Transport, Airport Organization and Associations, Classification of Airports Airfield Components, Air Traffic Zones and Approach Areas. Context of Airport System Planning – Development of Airport Planning Process – Ultimate Consumers – Airline Decision – Other Airport Operations.

UNIT-II (15 Hours)

Airport Characteristics Related To Airport Design: Components Size, Turning Radius, Speed, Airport Characteristics. CAPACITY AND DELAY: Factors Affecting Capacity, Determination of Runway Capacity related to Delay, Gate Capacity, and Taxiway Capacity.

UNIT-III (15 Hours)

Airport Planning And Surveys: Runway Length and Width, Sight Distances, Longitudinal and Transverse, Runway Intersections, Taxiways, Clearances, Aprons, Numbering, Holding Apron.

UNIT-IV (15 Hours)

Planning And Design Of The Terminal Area: Operational Concepts, Space Relationships and Area Requirements, Noise Control, Vehicular Traffic and Parking at Airports.

Air Traffic Control And Aids : Runways and Taxiways markings, Day & Night Landing Aids, Airport Lighting and other Associated Aids.

Recommended Text Books / Reference Books:

1. Strategic Airport Planning –Robert E.Caves& Geoffrey D.Gosling-Elsevier Science Ltd
2. Airport Marketing –David Jarach –Ashgate Publishing Limited
3. Aviation Safety Programs A Management Hand Book-Richard H.Wood – Jeppesen Sanderson Inc.
4. Strategic Management –Gregory G.Dess and Alex Miller –McGraw Hill
5. Strategic Management: An Integrative Perspective-A.C.Hax and NS-Majifu, Prentice Hall.

MARKETING MANAGEMENT

Subject Code: BBAD1 – 309   **L   T   P   C**   **Duration: 60 Hrs.**

                                                     4   0   0   4

Course Objectives:
The aim of this course is
1.   To make the student learn that Marketing is one of the foremost functions of Management in present day corporate world, its understanding results in developing best products in terms of goods and services that brings consumer satisfaction.
2.   To imbibe the basic understanding among the students to become successful marketers.

Course Outcomes:
After studying this course, the students will be able to

1. Apt with the foundation terms and concepts that are commonly used in marketing.
2. To understand the essential elements for effective marketing practice in the industry.
3. To create a balance between marketing and other management functions.

UNIT-I (13 Hours)

Marketing: Nature and Scope of Marketing, Customer Needs, Wants and Demand. Various Marketing Concepts: Production, Product, Selling, Marketing and Societal Marketing, and Analysing Marketing Environment: Micro, Macro Environment.

UNIT-II (15 Hours)

Market Segmentation: Need, Concept, Nature, Basis and Strategies, Mass Marketing Vs. Segmentation. Marketing Mix: 4Ps of Products and 7Ps of Services, Components and Factors Affecting.

UNIT-III (15 Hours)

Product Decisions: Product Definition, New Product Development Process and Product Life Cycle, Positioning, Branding, Packaging and Labelling Decisions Pricing Decisions:Importance, Objectives, Designing Strategies, Pricing Techniques.

UNIT-IV (17 Hours)

Product Promotion: Promotion Mix-introduction, Importance, Advantages and Disadvantages of Various Components and Factors Affecting. Distribution: Types of Channel, Factors Affecting Decision, Designing and Managing Marketing Channel, Managing Retailing, Physical Distribution System and its Components, Digital Marketing.

Recommended Text Books / Reference Books:

1. P. Kotler, K.L. Keller, A. Koshy and M. Jha, 'Marketing Management: A South Asian Perspective', Pearson Education.

2. M. Etzel, B. Walker, W. Stanton and A. Pandit, 'A Marketing Management', Tata McGraw Hill.

3. V.S. Ramaswamy and S. Namakumari, 'Marketing Management: Global Perspective Indian Context', Macmillan Publishers India Ltd.

4. Rajan Saxena, 'Marketing Management', Tata McGraw Hill Education Pvt. Ltd

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PRODUCTION AND OPERATION MANAGEMENT

Subject Code: BBAD1 - 418   **L   T   P   C**   **Duration: 60 Hrs.**

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Course Objectives:
The aim of this course is
to understand the importance of the whole process of manufacturing a product or a service, focusing on the concept of optimum utilization of resources and minimization of costs.
Course Outcomes:
After the completion of this course the students will have
   1.   An understanding of the concepts of production
   2.   Operations management of an industrial undertaking and the benefits of automation.

UNIT-I (15 Hours)

Production and Operations Management; its Functions and Relationship with Other Functional Areas, Facility Location Decision, Layout Decision, Product and Process Layout, Capacity Planning.

UNIT-II (15 Hours)

Production Planning and Control: Planning, Scheduling, Routing etc. Assembly Line Balancing, Work Study: Method Study and Time Study, Work Simplification, Productivity Linked Incentives.

UNIT-III (15 Hours)

Inventory Management – Concepts, Classification: Objectives: Factors Affecting Inventory Control Policy: Inventory Costs: Basic EOQ Model: Re-Order Level: ABC Analysis, Supply Chain Management, and Brief Introduction to JIT.

UNIT-IV (15 Hours)

Quality Management: What is Quality, Quality as a Corporate Strategy, Statistical Methods, SPC Control Charts, Acceptance Sampling, and Total Quality Management (TQM) Quality Circles Cost of Quality, Taguchi Philosophy.

Recommended Text Books / Reference Books:

1. S.N. Chary, 'Production & Operations Management', Tata McGraw Hill Publishing.

2. Buffa, 'Modern Production Management', Wiley Eastern Pvt. Ltd.

3. Adam, 'Production & Operations Management', Prentice Hall.

4. L.C. Jhamb, 'Production & Operations Management', Everest Publishing House.

5. K. Aswathappa & Bhat, 'Production & Operations Management', Himalaya Publishing.

DISSERTATION				
Subject Code: BBADS2- 604	**L**	**T**	**P**	**C**	**Duration: 60 Hrs.**
	4	0	0	4	

Students have to do a project under the assigned supervisor by the department. They have to submit a project report and give presentation and Viva Voce on their project.

B.Com-M.Com 2nd Year Syllabus

Study Scheme
Integrated/Dual Degree B.Com-M.Com

Semester – III

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Core Papers								
BMCMS1-301	Management Accounting	4		-	40	60	100	4
BMCMS1-302	Income Tax Law	4		-	40	60	100	4
Generic Elective								
BMCMS1-303	Fundamentals of Research Methodology	4		-	40	60	100	4
BMCMS1-304	Principles of Marketing	4	-	-	40	60	100	4
Discipline Specific Elective								
BMCMS1-305	Fundamental of Corporate Finance	4	-	-	40	60	100	4
BMCMS1-306	Financial Modeling and Statistical Lab	-	-	2	60	40	100	2
	Total	**20**		**2**	**260**	**340**	**600**	**22**

Semester – IV

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Core Papers								
BMCMS1-401	Indirect Tax	4		-	40	60	100	4
BMCMS1-402	Financial Markets and Services	4		-	40	60	100	4
Generic Elective								
BMCMS1-403	Financial Reporting and Analysis	4		-	40	60	100	4
BMCMS1-404	Entrepreneurship Development	4	-	-	40	60	100	4
XXXXXX	Open Elective	4		-	40	60	100	4
Skill Enhancement Course								
BMCMS1-405	Computer Based Accounting Lab	-	-	2	40	60	100	2
	Total	**20**	**-**	**2**	**240**	**360**	**600**	**22**

Subject Code: BMCMS1-301 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objectives
The main aim of this course is:
1. To be familiar with corporate accounting procedures and in-depth knowledge of preparation of various accounts related to corporate field.
2. To be familiar with basic management accounting concepts and their applications in managerial decision making.
3. Developing students with skills to evaluate organization performance spot inefficiencies.

Course Outcomes
After completing of this course, the student will be able to:
1. Learning accounting standards and other regulatory pronouncements that address accounting for inter-entity relationships
2. Apply various financial analysis tools to examine financial information for finding business solution
3. Implement latest costing techniques for sustainability of business
4. Demonstrate how the concepts of accounting and costing could integrate

UNIT-I (13 Hrs)
Management Accounting - Meaning, Nature, Scope, Functions, Advantages, Limitations of Management Accounting, Role of Management Accounting in decision making, Management Accounting Vs Cost Accounting, Cost Control, Cost Reduction
Responsibility Accounting: Introduction, Significance, Different Responsibility Centres

UNIT-II (15 Hrs)
Budgeting and Budgetary Control: Concept of budget, budgeting and budgetary control, objectives, merits, and limitations. Budget administration. Functional budgets. Fixed and flexible budgets. Zero base budgeting. Programme and performance budgeting
Standard Costing: Meaning and need of Standard Costing, Steps involved in Standard Costing, Standard Cost Vs Estimated cost.

UNIT-III (15 Hrs)
Variance Analysis: Introduction, Classification of Variances, Introduction of direct material Variances and direct labor Variances
Marginal Costing: Concept of Marginal Costing, Scope, Characteristic, Assumptions and Limitations of Marginal Costing, Absorption versus Variable Costing, Cost-Volume-Profit Analysis, Profit / Volume ratio. Break-even analysis-algebraic and graphic methods. Angle of incidence, Determination of cost indifference point

UNIT-IV (17 Hrs)
Decision Making: Steps in Decision Making Process, Concept of Relevant Costs and Benefits, Various short term decision making situations – profitable product mix, Acceptance or Rejection of special/ export offers, Make or buy.
Pricing Decisions: Major factors influencing pricing decisions, various methods of pricing

Recommended Books
1. T.P Ghosh, 'Accounting Standards and Corporate Accounting', Taxman's.
2. M.C. Shukla, T. S. Grewal & S. C. Gupta, 'Advanced Accounts', Sultan Chand & Company Ltd
3. R. L. Gupta & M. Radhaswamy, 'Company Accounts', Sultan Chand & Sons
4. S.N. Maheshwari, 'Corporate Accounting',Vikas Publishing House

Subject Code: BMCMS1-302   **L T P C**   **Duration: 60 Hrs**
4 0 0 4

Course Objectives
The main aim of this course is:
To provide basic knowledge and equip students with application of principles and provisions of Income-tax Act, 1961 and the relevant Rules.

Course Outcomes
After completing of this course, the student will be able to:
1.Compute the income from capital gains of an individual.
2.Compute Gross Total Income, Total Income and the tax liability of an individual.
3.Discuss the deductions applicable to individuals under Chapter VI A of the Income Tax Act.
4.Compute Gross Total Income, Total Income and the tax liability of an individual.

UNIT-I (10 Hrs)

Basic concepts: Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income, maximum marginal rate of tax; Permanent Account Number (PAN) Residential status; Scope of total income on the basis of residential status Exempted income under section 10

UNIT-II (15 Hrs)

Computation of Income under different heads: Income from Salaries; Income from house property, Profits and gains of business or profession; Capital gains; Income from other sources

UNIT-III (20 Hrs)

Computation of Total Income and Tax Liability: Income of other persons included in assessee's total income; Aggregation of income and set-off and carry forward of losses; Deductions from gross total income; Rebates and reliefs Computation of total income of individuals and firms; Tax liability of an individual and a firm; Five leading cases decided by the Supreme Court

UNIT-IV (15 Hrs)

Preparation of Return of Income: Filing of returns: Manually, On-line filing of Returns of Income & TDS; Provision & Procedures of Compulsory On-Line filing of returns for specified assesses.

Suggested Readings
1. Singhania, Vinod K. and Monica Singhania. Students' Guide to Income Tax, University Edition. Taxmann Publications Pvt. Ltd., New Delhi.
2. Ahuja, Girish and Ravi Gupta. Systematic Approach to Income Tax. Bharat Law House, Delhi.
3. Income Tax Reports. Company Law Institute of India Pvt. Ltd., Chennai.
4. Taxman. Taxman Allied Services Pvt. Ltd., New Delhi.
5. Current Tax Reporter. Current Tax Reporter, Jodhpur.

Subject Code: BMCMS1-303　　　　**L T P C**　　　　**Duration: 60 Hrs**
　　　　　　　　　　　　　　　　　　4 0 0 4

Course Objective: The main objectives of this course are:

1. To familiarize participants with basic of research and the research process.
2. To enable the participants in conducting research work and formulating research synopsis and report.
3. To familiarize participants with Statistical packages such as SPSS/EXCEL.
4. To impart knowledge for enabling students to develop data analytics skills

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Explain the objectives and process of conducting research and its application in business.
2. Analyses the different types of research design and experimental errors
3. Understand various techniques of sampling and methods of data collection.
4. Examine different types of scales and appraise about data preparation and analysis.

UNIT-I (15 Hrs)

Introduction: definition, objectives, scope in management research, process of Research and limitations. Research Design: Formulating the Research Problem, Choice of Research Design, Types of Research Design, Sources of Experimental Errors, Research Ethics

UNIT-II (15 Hrs)

Sampling: Advantages and Limitation of Sampling, Sampling process, Types of Sampling: Nonprobability sampling techniques, Probability sampling techniques, Sampling and non sampling errors. Data collection: primary, secondary data collection, observation methods and survey methods

UNIT-III (15 Hrs)

Scaling: Measurement Concept, Levels of measurement—Nominal, Ordinal, Interval and Ratio Attitude Measurement: Comparative scaling techniques, Non-comparative scaling techniques,

Questionnaire Designing: Types, Guidelines for developing a good questionnaire

Data Preparation and Analysis: Editing, Coding, Cross Tabulation and Practices through Excel

UNIT-IV (15 Hrs)

Applications of Business Research Methodology – Marketing Research, Financial Research, HR Research

Report Writing: Types of Research Reports, Guidelines for Writing a Report, Report Format, Guidelines for evaluating a report.

Suggested Readings

1. K.V. Rao, Research Methodology, *Sterling Publishers*
2. Srivastava and Rego, Business Research Methodology, *Tata McGraw Hill*
3. Rajinder Nargundhkar, Marketing Research, *Tata McGraw Hill*
4. Cooper and Schindler, Business Research Methods, *Tata McGraw Hill*
5. C.R. Kothari : Research Methodology, *New Age International Publishers*

PRINCIPLES OF MARKETING	

Subject Code: BMCMS1-304 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objective: The main objectives of the course are:
1. To understand the concepts of marketing management.
2. To learn about marketing process for different types of products and services.
3. To understand the tools used by marketing managers in decision situations.
4. To understand the marketing environment.

Course Outcomes (COs): After completion of the course, the students shall be able to:
1. Explain the basics of marketing, selling, marketing mix and its core concepts.
2. Describe the intricacies of the marketing environment and marketing information systems for effective marketing planning and strategies.
3. Develop necessary skills for effective market segmentation, targeting and positioning.
4. Develop an understanding of promotion mix and strategies for successful promotion.

UNIT-I (15 Hrs)

Marketing: Nature and Scope of Marketing, customer needs, wants and demand. Various Marketing Concepts: production, product, selling, marketing and societal marketing, Analyzing marketing environment: micro, macro environment

UNIT-II (15 Hrs)

Market Segmentation: Need, concept, nature, basis and strategies, mass marketing vs. Segmentation. Marketing mix: 4Ps of products and 7Ps of services, components and factors affecting mix.

UNIT-III (15 Hrs)

Product and Pricing Decisions: Product definition, new product development process, and product life cycle, positioning, branding, packaging and labeling decisions.
Pricing decisions: importance, objectives, designing strategies, Pricing Techniques

UNIT-IV (15 Hrs)

Distribution: Types of channel, factors affecting decision, Designing and Managing Marketing Channel, Managing Retailing, physical distribution system and its components.
Product Promotion: promotion mix-introduction, importance, advantages and disadvantages of various components and factors affecting. Designing and managing Integrated Marketing Communications.

Suggested Readings
1. Kotler,P., Keller, K.L. Koshy, A. and Jha, M., "**Marketing Management: A South Asian Perspective"**, *Pearson Education.*
2. Etzel, M., Walker, B., Stanton, W. and Pandit, A "**Marketing Management**", *Tata McGraw Hill.*
3. Ramaswamy, V.S and Namakumari, S. "**Marketing Management: Global Perspective Indian Context**", *Macmillan Publishers India Ltd.*
4. Saxena, Rajan, "**Marketing Management**", *Tata McGraw Hill Education Pvt. Ltd.*

CORPORATE FINANCE

Subject Code: BMCMS1-305   **L T P C**   **Duration: 60 Hrs**

4 0 0 4

Course Objective: The main objectives of this course are:
1. Provide an in-depth view of the process in financial management of the firm.
2. Develop knowledge on the allocation, management and funding of financial resources.
3. Improving students' understanding of the time value of money concept and the role of a financial manager in the current competitive business scenario.

Course Outcomes (COs): After completion of the course, the students shall be able to:
1. Demonstrate the decision making by applying financial theory to problems faced by business enterprises.
2. Apply foundational finance theories and to analyse a forecast using relevant data and to conduct preliminary measurement of leverage analysis.
3. Apply time value of money techniques to various pricing and budgeting problems.
4. Apply modern techniques in capital budgeting analysis.

UNIT-I (15 Hrs)

Financial Management Introduction: Meaning, nature and Scope, Goals of Financial Management-Profit Maximization vs. Wealth Maximization; Finance functions-investment, Financing, Liquidity and dividend decisions. *Sources of finance*-Long term and short term.
Time Value of Money: Present value, Future value, Annuity

UNIT-II (15 Hrs)

Cost of Capital: Meaning and significance of cost of capital; cost of equity shares; cost of preference shares; cost of debt, weighted average cost of capital. Form of Capital: Introduction to Capital Structure; theories- NI approach; NOI approach; MM approach; Traditional approach
Operating and Financial Leverage: Types of leverages

UNIT-III (15 Hrs)

Investment Decision Making: Meaning, importance, nature of investment decisions. Investment evaluation criteria
Capital budgeting Techniques: Non-discounted cash flow, Pay back methods; Post Payback period; Accounting rate of return method, Discounted cash flow techniques-Net Present value method; Internal rate of return method; Profitability index method.

UNIT-IV (15 Hrs)

Working Capital: Meaning, significance, types, approaches, Factors affecting working capital management capital.
Dividend Policies: Issues in dividend decisions. Forms of dividend- Theories of relevance and irrelevance of dividends.

Suggested Readings
1. Khan, M. Y. and Jain P. K "Financial Management, Text, Problems & Cases". Tata McGraw Hill Company, New Delhi.
2. Pandey, I.M. "Essentials of Financial Management", Vikas Publishing House Pvt. Ltd., New Delhi.
3. Maheshwari, S.N."Financial Management – Principles & Practice", Sultan Chand & Sons, New Delhi.
4. Rustagi, Dr. R.P. "Basic Financial Management", 8 th Edition, Sultan Chand & Sons, New Delhi.

FINANCIAL MODELING AND STATISTICAL LAB

Subject Code – BMCMS1-306   **L T P C**   **Duration – 30 Hrs**
                                                    0 0 4 2

Course Objectives - The objectives of this course are:

1. Knowledge of statistical analysis in finance in Spreadsheet
2. Ability to apply concepts, and solve valuation related numericals
3. Understand and Apply portfolio analysis on practical problems.
4. Awareness of the financial analysis and its impacts on businesses.

Course Outcomes- After completion of course, students will be able to:

1. Apply financial analysis methods in real time business
2. Predict cash flow and financial statement analysis
3. Apply business valuation models and company analysis
4. Understand portfolio forecasting and apply for forecasting methods to make financial decisions

UNIT-I (6 Hrs)

Statistical Finance Function. Scenario analysis Simulation and Sensitivity Analysis, Filing historical data.

UNIT-II (8 Hours)

Projecting Cash Flow Models - Analyzing Financial Statements Analysis, Ratio Analysis, Company analysis, Market Based Models – EPS and Multiples, EV/EBITDA, EV/Sales

UNIT-III (8 Hours)

Valuation – Cost of Capital, Equity Valuation, Bond Valuation, Discounted Cash Flow (DCF) Analysis, WACC

UNIT-IV (8 Hours)

Portfolio Analysis, Estimating Beta, Security Market Line, Trend Analysis, Forecasting – Regression Models.

Suggestive Readings

1. Bodhanwala J, Rujhbeh, 'Understanding and Analyzing balance sheet using Excel Worksheets'. Prentice Hall India
2. Sengupta Chandan 'Financial Analysis and Modeling using Excel and VBA', Wiley Publications
3. Tjia John, 'Building Financial Models' McGraw-Hill Professionals.
4. Soubiga Eric, 'Making Financial Modeling: A professional guide to building financial modeling in MS Excel', McGraw-Hill Professionals.
5. Day Alastair, 'Mastering Financial Modeling: A professional guide to building financial models in Excel', McGraw Hill Professionals.

Integrated/Dual Degree B.Com-M.Com
SEMESTER -IV

INDIRECT TAX LAWS

Subject Code: BMCMS1-401 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objectives: The main objectives of this course are:

1. To acquaint the students with basic principles underlying the provisions of indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices.
2. To give an understanding of the relevant provisions of Goods & Service Tax.
3. To Expose the participants to real life situations involving taxation

Course Outcomes: After completion of this course, the students will be able to:

1. Compute the assessable value of transactions related to goods and services for levy and determination of tax liability.
2. Identify and analyze the procedural aspects under different applicable statutes related to indirect taxation.
3. Understand the basic principles underlying the Indirect Taxation Statutes Delivery of goods and services, Tax rates, Periodic tax returns.
4. Understand the registration, payment and refund of GST and other business related issues

UNIT-I (15 Hrs)

Indirect Tax: Introduction, Definition & nature, Basis for changing indirect tax, constitutional frame work of indirect tax before GST. Structure of GST, GST network, Slab of GST

UNIT-II (15 Hrs)

Levy and collection of GST: Taxable event: supply of goods and services, place of supply, within state, interstate, import and export, Time of supply **Valuation for GST-** Valuation rules, Taxability of reimbursement of expense, exemption from GST: Small supplier and composition scheme, classification of goods and service.

UNIT-III (15 Hrs)

Registration, Tax Invoice, Credit and Debit notes, Audit GST,

GST Return assessment: Self assessment, summary and security: offence and penalties, appeal.

Customs Act, 1962—An overview, Levy, Collection & Exemptions from custom duty, date of Determination of duties & tariff valuation. Prohibitions/restrictions of export & import, Determination of duty where Goods consist of articles of different rate of duties.

UNIT IV (15 Hrs)

Central Excise Act, 1944—Its meaning, definitions, levy and collection, classification of goods, valuations, assessment, payment of duty and removal of goods, refund of duties, Appeals and Penalties and CENVAT *Central Sales Tax Act*—Its features, terms, definitions, registration of dealer, procedure of assessment, filing of returns, Sales Tax Authorities—its powers and functions, penalty and appeal.

Suggested Readings

1. GST- Made Easy; ArpitHaldiya
2. GST- Work Contract and Other Construction Contract; SudeeptaBhattacharjee
3. V.S. Datey, Indirect Taxes- Law & Practices, Taxmann
4. V.S. Datey, Elements of Indirect Taxes- Law & Practices, Taxmann

FINANCIAL MARKETS AND SERVICES

Subject Code: BMCMS1-402   **L T P C**   **Duration: 60 Hrs**
                                         4 0 0 4

Course Objectives - The aim of this subject is to:
1. To provide an in-depth view of the financial markets of country
2. To develop knowledge on the various financial services
3. To develop student's ability in dealing with New issue market and money markets

Course Outcomes - After successful completion of this course, students will be able to:
1. Understand the working of financial markets and services
2. Demonstrate the knowledge of structure and working of primary and secondary markets
3. Compare and evaluate the different products of financial services.
4. Comprehend the functioning of merchant banking, mutual funds and their performance

UNIT-I (15 Hrs)

Financial Markets: Structure and Significance *SEBI* - Role, Objectives and Functions.
Capital Market- Introduction, Types of Capital Markets**,** Functions of Capital Markets.
Primary Markets: Definition, Functions of Primary Markets, Instruments in New Issue Markets, IPO - Methods followed, Book Building, Offer for sale, SEBI guidelines for new issues.

UNIT-II (15 Hrs)

Secondary Markets: Definition and functions of secondary markets, Stock Exchanges, Evolution and Growth of Stock Exchanges in India, NSE, BSE, SME Exchanges and Overseas Stock Exchanges, Recent Development in Stock Exchanges, Stock Market Indices. Link between Primary Market and Secondary Market

UNIT-III (15 Hrs)

Financial Services Meaning, Classification, Scope, Fund Based Activities, Non Fund Based Activities, Modern Activities, Sources of Revenue, Need for Financial Innovation, New Financial Products & Services

Merchant Banking: Definition, Origin, Merchant Banking in India, Merchant Banks and Commercial Banks, Services of Merchant Banks, Qualities of Merchant Bankers in Market Making Process, Problems, Scope of Merchant Banking in India.

UNIT-IV (15 Hrs)

Mutual Funds Introduction to Mutual Funds, Structure of Mutual Fund in India, Classification of Mutual Funds, AMFI Objectives, Advantages of Mutual Funds, Disadvantages of Mutual Funds, NAV Calculation and Pricing of Mutual Funds, Future of Mutual Funds Industry.

Factoring: Meaning, Terms and Conditions, Functions, Types of Factoring, Factoring vs. Discounting, Cost of factoring, Benefits. **International Factoring**: Definition, Types of Export Factoring

Forfeiting- Definition, Factoring vs. Forfeiting, Working of Forfeiting, Cost of Forfeiting, Benefits and Drawbacks of Forfeiting.

Suggested Readings
1. S Gurusamy, 'Financial Services & System' Thomson Publications
2. M Y Khan, 'Financial Services' Tata McGraw-Hill
3. L M Bhole, 'Financial Institutions & Markets' Tata McGraw- Hill
4. Gordon &Natarajan, 'Financial Markets & Services' Himalaya Publications
5. V. A. Avdhani, 'Financial Services in India', Himalaya Publications
6. Vasant Desai, 'Financial Markets and Financial Services', Himalaya Publications

FINANCIAL REPORTING AND ANALYSIS

Subject Code – BMCMS1-403   **L T P C**   **Duration – 60 Hrs**
                                        4 0 0 4

Course Objectives

The main aim of this course is:

1. To acquaint the students regarding various accounting concepts and its application in managerial decision making.
2. To understand financial statements of cashflow and balance sheets.
3. To understand the appropriate accounting tools and techniques of financial accounting and management accounting for preparing and analyzing financial statements.
4. To make students understand about the financial reporting.

Course Outcomes

After the completion of this course students will be able to:

1. Identify and utilise value-relevant information contained within financial statement.
2. Explain the relationship between strategic business analysis, accounting analysis and financial analysis
3. Understand the impact of financial reporting choices on the usefulness of reported earnings to predict future performance.
4. Conduct applied business research (including locating, critically interpreting and evaluating firm-specific financial information)

UNIT-I (15 Hrs)

Financial Statements - Need of Financial Statement, Nature, Objectives, Uses and Limitations of Financial Statement, Stakeholders of Financial Statements
Readings of Financial Statements: Income Statement, Balance Sheet, Statement of Retained Earnings, Fund Flow Statement, Cash Flow Statement,

UNIT-II (13 Hrs)

Techniques of Financial Statement Analysis: Common Size Statements, Comparative Statements, Trend Analysis and Ratio Analysis (Liquidity, Leverage, Solvency, Turnover Ratio, Market Ratio and Profitability Ratio), Du Pont Analysis.
Analysis of Firm Performance: Time Series Analysis and Cross-Sectional Analysis

UNIT-III

Financial Reporting System - Content of Annual Reports, Quality of Financial Reporting, Consolidated Financial Statements, Global Financial Reporting System

UNIT-IV (12 Hrs)

Directors' Report, Segment Report, Ethical Issues in Financial Reporting (Window Dressing, Quality of Earnings, Financial Scams etc.)

Short Project

Students have to submit a mandatory project in group. The project will be equivalent to two regular assignments. (Maximum Three students can be part of one group). Students have to do financial analysis of two or more companies on the basis of their annual reports. A comparative study of Indian and Foreign companies is preferred)

Recommended Books

1. Narayanaswamy, R., 'Financial Accounting – A Managerial Perspective', 5th Edn.,Prentice Hall of India. *Latest Edition*

2. Gerald White, Ashwinder paul Sondhi and Dov Fried, 'The Analysis and Use of Financial Statements', <u>Wiley India Edn.</u>, *Latest Edition*
3. Gokul Sinha, 'Financial Statement analysis', <u>Prentice Hall of India, New Delhi</u>, *Latest Edition*
4. John J. Wild, K. R. Subramanyam and Robert F. Halsey, 'Financial Statement Analysis', <u>Tata McGraw Hill Publishing company Ltd. New Delhi,</u> *Latest Edition*
5. Stephen H Penman, 'Financial Statement Analysis and Security Valuation', <u>Tata McGraw Hill Publishing Company Ltd. New Delhi,</u> *Latest Edition*

ENTREPRENEURSHIP DEVELOPMENT

Subject Code: BMCMS1-404   **L T P C**   **Duration: 60 Hrs**
                                                        4 0 0 4

Course Objective: The main objectives of this courses are:
1. Explain the meaning and nature of small business.
2. Appreciate the role of small business in India.
3. Analyze the problems of small business.
4. Classify the different forms of assistance provided by the government to small business, particularly in rural and hilly areas.

Course Outcomes (COs): After completion of the course, the students shall be able to:
1. Describe the concept and theories of entrepreneurship and its role in economic development of nation.
2. Develop business plan and identify the reasons of failure of business plans.
3. Comprehend government policies and regulatory framework available in India to facilitate the process of entrepreneurial development
4. Identify different sources of finance for new enterprises and assess the role of financial institutions and various government schemes in entrepreneurial development.

UNIT-I (15 Hrs)
Introduction: Definition and Concept of Entrepreneurship, Theories of Entrepreneurship, Myths about Entrepreneurship, Entrepreneurial Traits and Motivation, Role of Entrepreneurship in economic development. Types of Entrepreneurs. Barriers in the way of Entrepreneurship. Entrepreneurship Development (ED) Cycle. Social Entrepreneurship, Women Entrepreneurship

UNIT-II (15 Hrs)
Creativity and Business Ideas: Blocks to creativity. Business Plans and reasons of failure of business plans.
Micro-Small-Medium (MSME) Enterprise – Definition – Characteristics- Objectives-Advantages- Disadvantages-Role in developing countries Problems- steps for starting- – Government Policies.

UNIT-III (15 Hrs)
Sources of business ideas and tests of feasibility: Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation

UNIT-IV (15 Hrs)
Financing Options: Bridge capital, Seed capital assistance, Margin money scheme, Industrial Sickness, Causes-Remedies- An overview on the roles of institutions/schemes in

entrepreneurial development- SIDBI, Commercial Banks. Other financing options- venture capital, lease funding, Angel Investors. Revival, Exit and End to a venture.

Suggested Readings
1. Kumar, Arya,"Entrepreneurship", Pearson, New Delhi.
2. Gopal, V.P.Nanda, "Entrepreneurial Development", Vikas Publishing, New Delhi.
3. Desai, Vasant, "Dynamics of Entrepreneurial Development & Management", Himalaya Publishing House.
4. Khanka, S S, Entrepreneurial Development, S.Chand & Co.,New Delhi.

COMPUTER BASED ACCOUNTING LAB

Subject Code: BMCMS1-405	L T P C	Duration: 30 Hrs
	0 0 4 2	

Course Objectives
The main aim of this course is
1. To acquaint student with accounting concepts
2. To teach them about filling various accounting tools
3. To teach about GST and other business transactions

Course Outcomes
After completing this course, students will be able to:
1. Expose the students to computer applications in the field of accounting.
2. Make student aware of payroll information and inventory master, vouchers, and basic reports in tally.
3. Prepare the cash flow and fund flow statements using Computer based accounting software
4. Develop the awareness regarding statutory features especially GST, VAT features.

UNIT-I (08 Hrs)
Computerized Accounting: Meaning, need, Concepts of Accounting groups, Hierarchy of accounts, Codification in accounting.
Accounting Package: Setting up an accounting entity, Creation of groups and accounts Designing and creating vouchers; Data Entry operations using the vouchers, Processing for reports to prepare ledger accounts, trial balance and balance sheet.

UNIT-II (06 Hrs)
Fundamental of Computerized Accounting: Creating and Setting Up of Company, Setting Up Account Heads, Stock Groups, Stock Categories, Locations, Stock Items
Vouchers: Accounting Vouchers, Invoicing, Inventory Vouchers

UNIT-III (08 Hrs)
Advanced Inventory: Order Processing, Reorder Level, Batch-wise Details, Tracking Numbers, Bills of Materials, Zero Value Entries

UNIT-IV (08 Hrs)
Point of Sales (POS): Creating POS, POS Transactions, POS Reports
VAT, GST

Suggested Readings

1. Gupta, Ambrish, "Financial Accounting for Management: An Analytical Perspective", Pearson Education, New Delhi.
2. Khatri, Dhanesh, "Financial Accounting" Tata McGraw-Hill, New Delhi.
3. Tax Sarthi, "Basic Accounting & Inventory, Tally Prime Book, Volume-I
4. Gelinas, Ultric, J. and Steve, G. Suffon, "Accounting Information System, South Western Thomson Learning.
5. "Tally- ERP 9, Simple Steps of Learning", Kogent Learning
6. Tally Essentials – Level -I Tally Prime
7. Tally Essentials – Level – II Tally Prime

Open – Elective - I		
Subject Code: *******	**L T P C** **3 0 0 3**	**Duration: 45 Hrs**

Open elective will be an inter-disciplinary subject. Students will study one subject from other disciplines.

Integrated/Dual Degree BBA-MBA

SEMESTER - FIFTH

Contact Hours – 23   **Maximum Marks = 800**   **Total Credits = 22**

Subject Code	Subject Name	Contact Hours			Marks			Credits
		L	T	P	Int.	Ext.	Total	
Semester 3rd								
BMBAS1-501	Business Environment	4	-	-	40	60	100	4
BMBAS1-502	Investment Management	4	-	-	40	60	100	4
BMBAS1-503	Advertising & Sales Management	4	-	-	40	60	100	4
BMBAS1-504	Business Laws	4	-	-	40	60	100	4
BMBAS1-505	Financial Analysis and Modeling Lab	-	-	4	60	40	100	2
BMBAS1-506	Seminar on Training Report	-	-	-	60	40	100	2
******	Open Elective	3	-	-	40	60	100	3
Total (Theory = 5 Lab =1)		**19**	**-**	**4**	**380**	**420**	**800**	**23**

SEMESTER- SIXTH

Contact Hours – 19   **Maximum Marks = 600**   **Total Credits = 22**

Subject Code	Subject Name	Contact Hours			Marks			Credits
		L	T	P	Int.	Ext.	Total	
Semester 1st								
BMBAS1-601	Corporate Strategy	4	-	-	40	60	100	4
BMBAS1-602	International Business	4	-	-	40	60	100	4
BMBAS1-603	Management of Financial Services	4	-	-	40	60	100	4
BBADS1-604	Industrial Relation and Labour Law	4	-	-	40	60	100	4
BMBAS1-605	Major Project and Viva Voce	-	-	-	60	40	100	3
********	Open Elective – II	3	-	-	40	60	100	3
Total (Theory = 5 Lab = 1)		**19**	**0**	**0**	**260**	**340**	**600**	**22**

BUSINESS ENVIRONMENT

Subject Code – BMBAS1-501	L T P C	Duration – 60 Hrs
	4 0 0 4	

Course Objectives

The aim of this subject is:

1. To study Law of Contract, Sale of Goods Act and Negotiable Instrument for legally smooth functioning of a business.
2. To highlight about Company Law as well as constitutional framework of taxation.
3. To provide insights about Business Environment, Complexity and Diversity of current business environment in the 21st century
4. To provide a deeper understanding of the environmental factors influencing Indian business organizations.

Course Outcomes

After successful completion of this course, students will be able to:

1. Understand the impact of legal environment in a business context and demonstrate knowledge of and need for sustainable development
2. Analyze the various facets of basic case laws of each Act from a legal and managerial perspective
3. Apply the legal provision of Acts in common business situations.
4. Scanning internal and external environment for the sustainability of business

UNIT – I (15 Hrs)

Introduction: The Concept, Nature and Significance of business environment. Influence of environmental factors like economic, political, legal, social, technological and international upon business. The relationship of various environmental forces on business. The need for environmental analysis and diagnosis.

Description of environmental analysis: Techniques for environmental analysis, the role of business manager in analysis and diagnosis of environment

UNIT – II (15 Hrs)

Environmental Scanning: Definition, Process and its importance. Environmental Threats and Opportunity Profile (ETOP) and SWOT analysis

Aspects of Economic Reforms: Liberalisation; Privatisation; Globalisation and its Implications for India

UNIT-III (15 Hrs)

Political & Legal Environment: Key Elements of Political Environment, Relationship between Business and Government, Economic Role of Government. FEMA, Competition Act, SEBI & Consumer Protection Act, 1986 with latest amendments

Social Environment: Corporate Social Responsibility, Cross-Cultural Business Environment.

UNIT-IV (15 Hrs)

Technological Environment: Impact of Technology on Business, Technological Policy, Intellectual Property Rights, Import of Technology, Problems in Technology Transfer.

Natural Environment: Ecological Issues and Indian Business

Suggested Readings

1. Dr Francis Cherunilam, Business Environment Text & Cases, <u>Himalaya Publishing</u>
2. Paul Justice, Business Environment- Text and Cases, <u>TATA McGraw Hill.</u>
3. Aswathappa, Essential of Business Environment, <u>Himalaya Publishing</u>
4. Aggarwal &Diwan, Business Environment, <u>Excel Books</u>

INVESTMENT ANALYSIS		
Subject Code – BMBAS1-502	**L T P C** **4 0 0 4**	Duration – 60 Hrs

Course Objectives

The aim of this subject is:

1. To equip the students with the theoretical and practical knowledge of capital market.
2. To develop the skills for developing the portfolio constructions, revision, reconstruction and investment advisory.
3. To develop the skills required for portfolio management so as to be able to judge the competitive position of firm in capital market to support investment decisions

Course Outcomes

After successful completion of this course, students will be able to:

1. Understand various functions of Primary and Secondary markets.
2. Evaluate the performance of companies by applying fundamental and technical analysis
3. Develop the equity and bond portfolio and measure their performance through various techniques
4. Comprehend the applications of derivatives and various risk management strategies in derivative market.

UNIT-I (15 Hrs)

Investment – Meaning, Nature, Objectives and Process; Investment Avenues; Investment vs. Gambling; Investment vs. Speculation.

Risk and Return: Concept, Types, CAPM, Arbitrage Pricing Theory and Multi – Factor Models

UNIT-II (15 Hrs)

Economic Analysis: Analysis of Macroeconomic Variables. **Industry Analysis:** Industry Life Cycle, Key Characteristics in Industry Analysis. **Company Analysis**: Analysis of Financial Statements, Key Financial Ratios

UNIT-III (15 Hrs)

Technical Analysis – Theoretical Framework; Dow Theory

Charts- Candlestick Chart, Line Chart and Open High Low Close Chart

Overlays- Support, Resistance and Trend Line; Market Indicators Advance Decline Index

Price Indicators- Relative Strength Index, Average Directional Index and Momentum

UNIT-IV (15 Hrs)

Market Efficiency - Introduction to Efficient Market Hypothesis, Random Walk Model, Forms of EMH.

Markowitz Portfolio Selection Model: Portfolio Diversification, Markowitz Model, Portfolios of Two Risky Securities, A Three Security Portfolio.

Relevant Case Studies should be discussed in class.

Suggested Readings

1. Reily and Brown, 'Investment Analysis and Portfolio Management', Cengage, New Delhi
2. Bodie, Kane, Marcus and Mohanty, 'Investments', Tata McGraw Hill, New Delhi
3. Fisher DE and Jordon RJ, 'Security Analysis and Portfolio Management', PHI, New Delhi
4. Hirt and Block, 'Fundamentals of Investment Management', Tata McGraw Hill, NewDelhi
5. A. Avdhani 'Security Analysis and Portfolio Management' Himalaya Publication

ADVERTISING AND SALES MANAGEMENT

Subject Code – BMBAS1-503	L T P C	Duration – 60 Hrs
	4 0 0 4	

Course Objectives - The objectives of this course are:

1. Research careers in the advertising and marketing fields.
2. Explore how companies use advertising and marketing to sell products.
3. Evaluate different strategies for selling products.
4. Learn how to use persuasive sales techniques.

Course Outcomes- **After completion of course, students will be able to:**

1. Explain use of advertising and sales management as a marketing tool.
2. Identify key players in advertising industry.
3. Explain appropriate selection of media.
4. Identify and make decisions regarding the most feasible advertising appeal, media mix and sales force.

UNIT-I (15 Hrs)

Introduction: Definition, Nature and Evolution of advertising, its functions and role and types of advertising Social, Economic and Legal aspects of advertising. Advertising and Marketing Mix, Advertising and Communication Process

Advertising Budget: Objectives, Preparation and Methods of Advertising Budget

UNIT-II (15 Hrs)

Advertising Agency: Function, Selection and Compensation.

Advertising Media: Different Types of Media, Function, Merits and Demerits of Media, Selection of media and its vehicles.

Copy Writing: Different Elements of a Copy and Layout

UNIT-III (15 Hrs)

Introduction to Sales Management: Nature, role and importance. Functions of sales manager,

Sales Organization: Formal, Informal, Horizontal, Vertical, Centralized, Decentralized, Geographic, Customer, Product, Combination, Organizations.

UNIT-IV (15 Hrs)

Planning and recruitment of sales force: Job analysis specification, Job description, Sources of Recruitment, Selection of Sales Person.

Sales Force Motivation: Nature, Importance, Factors Influencing the Motivation of sales force.

Evaluation of Sales Forces Performance: Qualitative and Quantitative Basis to Evaluate Sales Force Control and Budget.

Relevant Case Studies should be discussed in class.

Suggested Readings

1. Belch, George E. and Belch, Michael A. "Advertising and Promotion", Tata McGraw Hill.
2. Guinn, Allen, Chris T., Semenik, Richard J. "Advertising & Integrated Brand Promotion", Thomson – South Western.

3. Batra, Rajeev, Mayers, John G., and Aaker, David A. "Advertising Management", Pearson Education, New Delhi.
4. Spiro, Stanton and Rich "Management of a Salesforce", Tata McGraw Hill.
5. Richard R Still, Cundiff W Edward Govoni A P Norman, "Sales Management Decision Strategy and Cases", Pearson Education.

BUSINESS LAW

Subject Code – BMBAS1-504	L T P C	Duration – 60 Hrs
	4 0 0 4	

Course Objectives - The objectives of this course are:
1. Basic and broad knowledge in business laws in management.
2. Ability to apply concepts, principles and theories to understand simple business laws.
3. Global Perspective: Awareness of the different business laws.
4. Awareness of the global business laws and its impacts on businesses.

Course Outcomes- **After completion of course, students will be able to:**
1. Explain the concepts in business laws with respect to foreign trade.
2. Apply the global business laws to current business environment.
3. Analyse the principle of international business and strategies adopted by firms to expand globally.
4. Integrate concept of business law with foreign trade.

UNIT-I

Law of Contracts–I: Definition, kinds and Essential Elements of a Valid contract, offer and acceptance, consideration, capacity of contract, free consent, legality of objects, Performance and discharge of contract.

UNIT-II

Law of Contracts-II: Contract of indemnity and guarantee: Meaning and its distinction, rights and duties of indemnifier, indemnified and surety, discharge of surety's liability.

Bailment and Pledge: Meaning and distinction, Rights and duties of bailor and bailee, Pawnor and Pawnee

UNIT-III

Sales of Goods Act : Transfer of property in goods; Performance of the contact of sales; formation of contract of sale, conditions and warranties, Caveat emptor, Ownership of goods and transfer Unpaid seller and his rights, sale by auction; Hire purchase agreement.

The Consumer Protection Act (1886): Definition of consumer, Features, Grievance regressed machinery**.**

UNIT-IV

Law relating to partnership and negotiable instrument: Definition and nature of partnership, rights and duties of partners, types of partners, dissolution of partnership

Negotiable Instruments Act (1881): Definition of negotiable instruments, Features; Promissory note, Bill of Exchange, Cheque; Holder and holder in the due course. Crossing of a cheque, types of crossing. Dishonour and discharge of negotiable instrument.

Suggested Readings
1. Singh, Avtar, "The Principles of Mercantile Law", Eastern Book Company, Lucknow.
2. Kapoor, N.D., "Business Law", Sultan Chand & Sons, New Delhi.

3. Tulsian, P.C., "Business Law", Tata McGraw Hill, New Delhi.
4. Usa Tbp Usa, "Indian Business Law", International Business Publications, USA

FINANCIAL ANALYSIS AND MODELING LAB

Subject Code – BMBAS1-505   **L T P C**   **Duration – 30 Hrs**
0 0 4 2

Course Objectives - The objectives of this course are:
1. Knowledge of statistical analysis in finance in Spreadsheet
2. Ability to apply concepts, and solve valuation related numericals
3. Understand and Apply portfolio analysis on practical problems.
4. Awareness of the financial analysis and its impacts on businesses.

Course Outcomes- After completion of course, students will be able to:
1. Apply financial analysis methods in real time business
2. Predict cash flow and financial statement analysis
3. Apply business valuation models and company analysis
4. Understand portfolio forecasting and apply for forecasting methods to make financial decisions

UNIT-I (6 Hrs)

Statistical Finance Function. Scenario analysis Simulation and Sensitivity Analysis, Filing historical data.

UNIT-II (8 Hours)

Projecting Cash Flow Models - Analyzing Financial Statements Analysis, Ratio Analysis, Company analysis, Market Based Models – EPS and Multiples, EV/EBITDA, EV/Sales

UNIT-III (8 Hours)

Valuation – Cost of Capital, Equity Valuation, Bond Valuation, Discounted Cash Flow (DCF) Analysis, WACC

UNIT-IV (8 Hours)

Portfolio Analysis, Estimating Beta, Security Market Line, Trend Analysis, Forecasting – Regression Models.

Suggestive Readings
1. Bodhanwala J, Rujhbeh, 'Understanding and Analyzing balance sheet using Excel Worksheets'. Prentice Hall India
2. Sengupta Chandan 'Financial Analysis and Modeling using Excel and VBA', Wiley Publications
3. Tjia John, 'Building Financial Models' McGraw-Hill Professionals.
4. Soubiga Eric, 'Making Financial Modeling: A professional guide to building financial modeling in MS Excel', McGraw-Hill Professionals.
5. Day Alastair, 'Mastering Financial Modeling: A professional guide to building financial models in Excel', McGraw Hill Professionals.

SEMINAR ON TRAINING REPORT

Subject Code – BMBAS1-506	**L T P C**
	0 0 0 2

Students will submit their summer internship report and give presentation in front of evaluation committee. Department Training and Placement Coordinator will provide them the format of training report and students will submit their report as per the prescribed format.

Open – Elective - I

Subject Code: ******	**L T P C**	**Duration: 45 Hrs**
	3 0 0 3	

Open elective will be an inter-disciplinary subject. Students will study one subject from other disciplines.

SIXTH SEMESTER

CORPORATE STRATEGY

Subject Code: BMBAS1-601   **L T P C**   **Duration : 60 Hrs**
                                                     4 0 0 4

Course Objectives: The main objectives of this course are:
1. To understand the sustainable competitive advantages of the organization and identify the growth avenues.
2. To meet stakeholder interests through growth strategies based on ethical value
3. To conduct SWOT analysis and Competitive analysis through various tools and technologies.

Course Outcomes: After completing this course, students will be able to:
1. Apply holistic approach by integrating people, finance, marketing and organizational perspectives to develop appropriate organizational policies and strategies
2. Understand and investigate various sustainable competitive advantage of company in current business and economic scenario
3. Identify different strategic options available and their relation with dynamic environment
4. Apply knowledge of strategic tools in determining the firm's vision, mission, objectives and ethical operations for the organisations' success.

UNIT-I (15 Hrs)

Introduction - Definition, Nature, Scope, and Importance of strategy and strategic management (Business Policy). Strategic Decision Making, Process of Strategic Management

Strategic Intent: Vision, Mission, Business Definition, Goals and Objectives,

Environmental Appraisal - Concept of environment, components of environment (Economic, legal, social, political and technological).

Environmental scanning techniques- ETOP, QUEST and SWOT (TOWS).

UNIT-II (15 Hrs)

Internal Appraisal – The internal Environment, Organisational capabilities in various functional areas and Strategic Advantage Profile.

Corporate Level Strategies: Stability, Expansion, Retrenchment and Combination Strategies, Corporate Restructuring, Synergy. Mergers & Acquisitions, Corporate Restructuring

UNIT- III (15 Hrs)

Business Level Strategies: Porter's Framework of Competitive Strategies; Conditions, Risks and Benefits of Cost Leadership, Differentiation and Focus Strategies. Location and Timing Tactics, Core Competence.

UNIT-IV (15 Hrs)

Strategic Analysis and choice-Corporate level analysis (BCG, GE Nine-cell, McKinsey's 7-S Framework) Porter's five forces model.

Implementation and Control: Qualitative Factors in Strategic Choice, Strategy Implementation: Resource Allocation, Projects and Procedural Issues

Relevant case studies related to the topics should be discussed.

Suggested Readings
1. A Kazmi, 'Business Policy & Strategic Management', Tata McGraw Hill
2. Thomson & Strickland 'Strategic Management: Concept & Cases,' Tata McGraw Hill
3. S. Reddy, 'Strategic Management', Himalaya Publication
4. Wheelen & Hungar 'Strategic Management & Business Policy' Addison- Wesley
5. Johnson & Scholes, 'Exploring Corporate Strategy', Prentice Hall India

INTERNATIONAL BUSINESS

Subject Code: BMBAS1-602	**L T P C**	Duration: 60 Hrs
	4 0 0 4	

Course Objectives - The objectives of this course are:
1. Basic and broad knowledge in international business environment, strategies and management.
2. Ability to apply concepts, principles and theories to simple business situations.
3. Awareness of the different thinking and viewpoints of diverse cultures.
4. Awareness of the global business environment and its impacts on businesses.

Course Outcomes- **After completion of course, students will be able to:**
1. Explain the concepts in international business with respect to foreign trade/international Business.
2. Apply the current business phenomenon and to evaluate the global business environment in terms of economic, social and legal aspects.
3. Analyse the principle of international business and strategies adopted by firms to expand globally.
4. Integrate concept in international business concepts with functioning of global trade.

UNIT-I (15 Hrs)

Introduction to International Business: Globalization and its growing importance in world economy; Forces behind globalization; Criticism of globalization; International business contrasted with domestic business- complexities of international business.

UNIT-II (15 Hrs)

Theories of International Trade (a brief overview) - Mercantilism, Absolute Advantage, Comparative Advantage, Factor Endowment, Product life cycle, Porter's Diamond Model. Government Influence on Trade- Tariff and non- tariff measures.

UNIT-III (15 Hrs)

International Organizations: WTO- Its Objectives, principles, organizational structure and functioning. An overview of– UNCTAD, World Bank and IMF.

Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia. India's recent Trade Agreements.

UNIT-IV (15 Hrs)

Developments and Issues in International Business: Foreign Direct Investments in India; Measures for promoting foreign investments in India. Outward Foreign Direct Investments from India; Indian joint ventures, acquisitions and greenfield investments abroad. **Trends in India's Foreign Trade-** volume, composition and direction of trade. Balance of payment crisis.

Suggested Readings
1. Charles W L Hill, Arun Kumar Jain, "International Business- Competing in the Global Marketplace", Tata McGraw Hill
2. Francis Cherunilam, "International Business: Text and Cases", Prentice Hall of India
3. John D Daniels and Lee H Radebaugh, Daniel P Sullivan, "International Business Environment and Operations", Pearson Education
4. Justin Paul, "International Business", Prentice Hall of India
5. K. Ashwathapa, "International Business", Tata McGraw Hill

MANAGEMENT OF FINANCIAL SERVICES

Subject Code – BMBAS1-603   **L T P C**   **Duration – 60 Hrs**
                                        4 0 0 4

Course Objectives - The objectives of this course are:
1.To give an idea about fundamentals of financial services and players in financial sectors, key concept from environment studies, political, and social analysis
2.To examine forwards and futures contracts for equity indexes, commodities, and currencies
3.Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.
4.Evaluate and create strategies to promote financial products and services

Course Outcomes- After completion of course, students will be able to:
1.Understand the fundamental & operations of financial markets and financial service providers
2.Explain various fund-raising solution for the companies at domestic and global level to invest in projects
3.Comprehend the Role and importance of the credit rating agencies and their types.
4.Get familiarity with various financial sources for Start Ups to develop innovative solutions

UNIT-I (15 Hrs)

Financial Services - Meaning, types and their importance. Depository - Introduction, Concept, Depository Participants, Functioning & Benefits of Depository Systems. Dematerialization and Rematerialisation, Functions of NSDL and CDSL

Mutual Funds and AMCs- Definition, Management of MFS - Sponsors, Trustees, AMCs, and Custodians. Classification of Mutual Fund Schemes, Advantages and Disadvantages of Mutual Fund Schemes

UNIT-II (15 Hrs)

Merchant Banking – Origin, Scope, Role and Functions of Merchant Bankers, Issues Management Intermediaries – Merchant Bankers/Lead Managers, Underwriters. IPO, FPO, Book building, Pre- Post issue activities

UNIT-III (15 Hrs)

Lease and Hire purchase: Meaning and Types of leasing – Legislative frameworks – Difference between Leasing and Hire Purchase, Types of Leasing Business, Advantages to Lessor and Lessee. Hire Purchasing – Concepts and features

Factoring –Definition, Factoring, Types & Importance, **Forfeiting**

UNIT-IV (15 Hrs)

Credit Rating – Definition, Objective of Credit Rating, Various Credit Rating Agencies in India and International Credit Rating Agencies, Factors Affecting Credit Rating

Venture Capital: Meaning and Modes of Financing, Seed capital and Start-up financing.

Relevant Case Studies should be discussed in class.

Suggested Readings
1. S Gurusamy, 'Financial Services & System' Thomson Publications
2. M Y Khan, 'Financial Services' Tata McGraw-Hill
3. L M Bhole,'Financial Institutions & Markets' Tata McGraw- Hill
4. Gordon &Natarajan, 'Financial Markets & Services' Himalaya Publications
5. V. A. Avdhani, 'Financial Services in India', Himalaya Publications
6. Vasant Desai, 'Financial Markets and Financial Services', Himalaya Publications

INDUSTRIAL RELATIONS AND LABOUR LAWS

Subject Code: BMBAS1-604   **L T P C**   **Duration: 60 Hrs**
                                        4 0 0 4

Course Objectives
The aim of this course is:
1. To help students to understand basics of labour laws and industrial relations applicable in various business houses.
2. To familiarise the students with labour legislations and employee relations scenario in India.
3. To enable students, understand the important concepts of wage, salary and compensation management in India.
4. To make the students of Industrial Relations understand the concept of Public Relations and its various dimensions in the organisation.

Course Outcomes
After completion of course, students will be able to:
1. Understand the laws related to working conditions in different settings.
2. Learn the laws relating to Industrial Relations, Social Security
3. Able to identify and solve issues related to welfare and wage Legislations of groups in organization
4. Gain knowledge about the dispute settlement machinery and the laws related to dispute settlement

UNIT-I (15 Hrs)
Industrial Relations - Concept, Theories and Evolution, System approach to IR-factors, Context, Web of Rules & Ideology, Trade UNIONSIM, impact of trade unions on wages, Factories Act, 1948; Mines Act, 1952; Trade Unions Act, 1926.

UNIT-II (15 Hrs)
Trade Unionism in India: Origin, Growth, Structure and Management of Trade Unions, Recognitions, Leadership, Trade Unionisms, Employers' Organisations in India, Managerial Associations. **Collective Bargaining:** Concept, Meaning and Objectives, Approaches, Technique & Strategies to Collective Bargaining, Process of Collective Bargaining, Impact of CB and Workers Participation in Management on IR

UNIT-III (15 Hrs)
Workers' Participation in Management: Concept, Purpose and Practices in other countries; Workers' Participation Schemes in India – Works Committee, Joint Management Council, Worker – Director, Shop Council and Joint Council, WPM, EPM; Problems and Prospects in India; Quality Circles – Concept and Practices in India.

UNIT-IV(15 Hrs)
Laws relating to Industrial Relations: Industrial Disputes Act, 1947; Industrial Employment (Standing Orders) Act, 1946;Workmen's Compensation Act, 1923; Employees' State Insurance Act, 1948; Employees' Provident Funds & Misc. Provisions Act, 1952; Maternity Benefit Act, 1961; Payment of Gratuity Act, 1972. Payment of Wages Act, 1936; Minimum Wages Act, 1948; Payment of Bonus Act, 1965; Equal Remuneration Act, 1976.
Relevant case studies related to the topics should be discussed.
Suggested Readings
1. Arun Monappa & J.T., 'Dunlop Industrial System', <u>TATA McGraw Hill.</u>
2. C.N. Patil, 'Collective Bargaining', <u>University Press.</u>
3. Pramod Varma, 'Industrial Relations', <u>Tata McGraw Hill.</u>

4. S.C. Srivastava, 'Industrial Relation & Labor Laws', Vikas Publications.
5. Singh and Sinha, 'Labor Laws in Brief', Excel Books.

MAJOR PROJECT		

Subject Code: BMBAS1-605   **L T P C**   **Duration: 45 Hrs**
                                      0 0 0 3

A Faculty supervisor will be appointed to the students from the department. In consultation with the supervisor, student will decide their topic. Students can do their project on any topic of their choice (Finance/Marketing/HR/Entrepreneurship/Banking/Operations etc.) and submit the project in the department. Students must give presentation on their project in the department. Their final evaluation will be done based on the work done in the project and their performance during presentation and Viva Voce.

Open – Elective - II		

Subject Code: *******   **L T P C**   **Duration: 45 Hrs**
                                      3 0 0 3

Open elective will be an inter-disciplinary subject. Students will study one subject from other disciplines.

Study Scheme
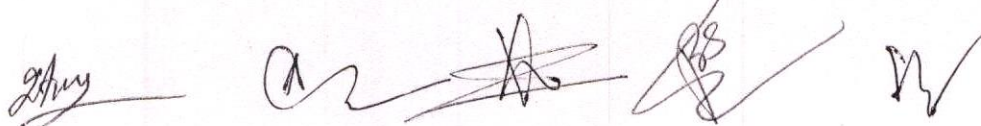
Additive Manufacturing (1year skill development course)

Semester I

Subject Code	Subject name	Contact Hours		Credits	Internal Marks	External marks	Total Marks
		Theory	Practical				
CMEE3-101	Communication Skills	8		1	25	25	50
CMEE3-101P	Communication Skills Lab		24	1	25	50	75
	Basics of Engineering Drawing	30		3	50	100	150
	Basic Engineering Drawing Lab		96	3	50	100	150
	Additive Manufacturing- I	30		3	50	100	150
CMEE3-106P	Student Centred Activities		48	2	25	---	25
CMEE3-105	Basic Workshop Practice	32		2	25	50	75
CMEE3-105P	Basic Workshop Practice Lab		144	5	100	100	200
CMEE3-107P	4 weeks Industrial training (during Vacations)			4	---	100	100
	Total	100	312	24	350	625	900

Semester II

Subject Code	Units	Contact Hours		Credits	Internal Marks	External marks	Total Marks
		Theory	Practical				
CMEE3-208	Basic Science	48		3	25	75	100
	Auto CAD Lab		144	5	100	100	200
	Additive Manufacturing-II	30		3	100	100	200
	Additive manufacturing Lab		144	5	100	100	200
	Inspection & Quality Control	32		3	50	100	150
	Inspection & Quality Control Lab		80	3	50	75	125
CMEE3-106P	# Student Centred Activities (SCA)		48	2	25	---	25
CMEE3-107P	4 weeks Industrial training (during Vacations)			4	---	100	100
	Total	110	416	28	500	650	1100

737

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobbyclub, suchas,photography,etc.,seminars,declamationcontest,educationalfieldvisits,NCC,NSS,cultur alactivities,etc.

+Industrial Training Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560 One credit is defined as one hour of lecture per week or two hours of practical per week in the program.

GUIDELINESFOR ASSESSMENTOFSTUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be25. The marks may be distributed as follows:

i) 5 marks for general behavior anddiscipline (by Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance asperfollowing (by the instructors/ trainers of thedepartment)
   a) Up to75% Nil
   b) 75%to80% 02marks
   c) 80%to85% 03marks
   d) Above85% 05marks

iii)15marksmaximumforsports/NCC/NSS/Cultural/Co-curricularactivitiesas perfollowing:(by In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities)

15marks - for National level participation or inter-university competition

10 marks - participation any two of the activities

05 marks – participation at the internal sports of the institute/college/university

Note: There should be no marks for attendance in the internal sessional of different subjects.

Salient features of the course

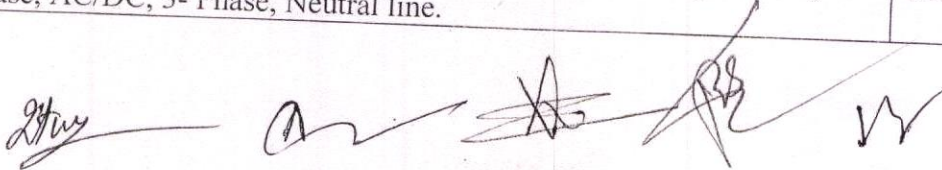| 1	Sector	Industry 4.0/ Mechanical Engineering
2	Name of the Certificate Program	Additive manufacturing
3	Entry Qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda
4	Duration of Program	1 year
5	Intake	30
6	Pattern of Program	Semester Pattern
7	NSQF level	Level III
8	Ratio of Theory & Practice	20:80

Unit:

Subject Code:

BASICS OF ENGINEERING DRAWING

LEARNING OUTCOMES:
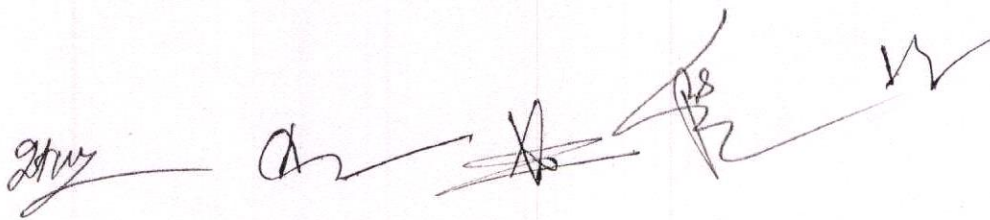
After undergoing this unit, students will be able to:

- Utilize various types of lines used in engineering drawing.
- Draw free hand sketches of various kinds of objects.
- Read and apply different dimensioning methods on drawing of objects.
- Read technical drawings for cost estimation and manufacturing/fabrication purpose

Introduction: Applications of various types of lines in engineering drawing, Technical lettering, Dimensioning, method of dimensioning, types of dimensioning, and rules of dimensioning.	3 hrs
Geometrical construction: Construction of regular pentagon, and hexagon, inscribe polygon (triangle, square, pentagon, hexagon) in a circle, circumscribe polygon (triangle, square, pentagon and hexagon) to a circle.	6 hrs
Orthographic projections: Features of first angle projection, Features of third angle projections, symbols, General preparation for multi-view drawings, conversion of pictorial view /isometric view into orthographic view	5 hrs
Isometric Projections: Terminology, isometric scale, isometric projection and isometric view, Methods of drawing an isometric view of right solids, truncated solids composite solids, four centre method for drawing approximate ellipse and elliptical arcs, Conversion of orthographic views into isometric views.	5 hrs
Projections of solids: Classification of regular solids, Polyhedron, Prism, Pyramid, solid of revolution, Frustum of pyramid and cone and orientation of solid.	6 hrs
Development of surfaces: development of prism, cylinders, cones and pyramids.	5 hrs

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce

739

<div align="center">

Unit:

Subject Code:

BASICS OF ENGINEERING DRAWING LAB

</div>

LEARNING OUTCOMES:

After undergoing this unit, students will be able to:

- Drawing practice for various types of lines used in engineering drawing.
- Draw free hand sketches of various kinds of objects.
- Apply different dimensioning methods on drawing of objects.

Practical demonstration with the help of blue prints/computer prints.	6 hrs
Drawing board, T-square, minidrafter, set squares, protractor, drawing instrument box, pencils of different grades, erasing shield • Learn methods of folding of blue print/drawing prints as per BIS SP: 16-2003 • Size of drawing sheets and designation of sheets. • Preparation of A3/A2 sheet for preparing drawings.	**9 hrs**
Practice construction of different types of lines (horizontal and vertical)	**6 hrs**
Construction of triangle, rectangle, rhombus, parallelogram circle quadrilateral and ellipse.	**3hrs**
Practice writing alphabets and numerals in capital/lower case as per BIS: 9609 in vertical and inclined style:	**6 hrs**
Practice construction of elements dimensioning with the help of a view of an object. • Practice dimensioning of a diameter, radius, angles, holes, chamfers, undercut, functional dimensions,nonfunctional dimensions.	**6 hrs**
Practice of free hand sketch of an object in orthographic and isometric views.	**6 hrs**
Free hand sketches of orthographic views of an object in first angle and third angle projections.	**6 hrs**
Construction of different points existing in first/second/third and fourth quadrants. • Identification of the position of points w.r.t. their projection drawings.	**6 hrs**
Practice the construction of plan and elevation of lines w.r.t. their different positions such as a line parallel to both V.P. and H.P, line perpendicular to V.P. and parallel to H.P., line perpendicular to H.P. and parallel to V.P., line parallel to H.P. and inclined to V.P., line parallel to V.P. and inclined to H.P.	**9 hrs**
Practice construction of cone, cylinder, pentagonal prism and hexagonal pyramid.	**6hr**
Practice on the sheets showing all conventions as graphical symbols for materials and equipment/instruments/engineering components cast iron, aluminum audits alloys, steel, brass, bronze, copper etc. concrete, glass, plastic/rubber/insulating material/pack material (Marble, Slate, Porcelain and stone wares) Liquids, Woods	**9 hrs**
Practice on the sheets showing the different welding joints	**6 hrs**
Practice the construction of views of the riveted joints.	**6 hrs**
Practice of sign convention of D.C. A.C. Positive, Negative, Single Phase, Three Phase, AC/DC, 3- Phase, Neutral line.	**6 hrs**

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740

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Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce
- Sketching
- Drawing

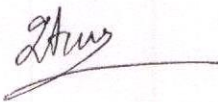| Unit:	
Subject Code:	
ADDITIVE MANUFACTURING- I	

LEARNING OUTCOMES:	
After undergoing this unit, students will be able to: • Understand various types of manufacturing processes and industry 4.0. • Understand the working of various types of additive manufacturing processes. • Understand various slicing parameters required for 3D printing.	
Introduction to additive manufacturing, flexible manufacturing system, Manufacturing processes, Industry 4.0	4 hrs
	6 hrs
Classification of various additive manufacturing techniques such as fused deposition modeling (FDM), laminated object manufacturing (LOM), selective laser sintering (SLS), stereolithography (SLA), direct metal printing etc.	**10 hrs**
Fused deposition modelling, working principle, process parameters, types of materials used in FDM, types of 3D printers.	**10 hrs**

Means of Assessment

• Assignments and quiz/class tests

• Mid-term and end-term written tests

• Viva-voce

742

Unit: **Subject Code:** **AUTOCAD LAB**	
LEARNING OUTCOMES: After undergoing this unit, students will be able to: • Drawing practice for various types of AutoCAD toolbars. • Draw sketches of various kinds of objects. • Apply different dimensioning methods on drawing of objects.	
Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids	50 hrs
Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles	50 hrs
Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques	**44 hrs**

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce
- Sketching
- Drawing

Unit:	
Subject Code:	
ADDITIVE MANUFACTURING- II	

LEARNING OUTCOMES:
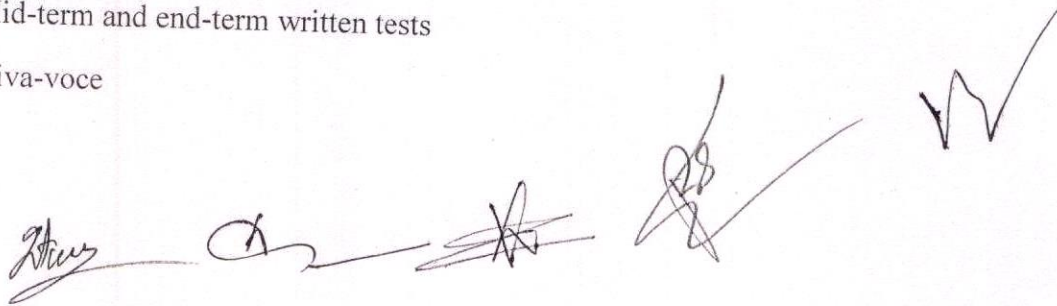
After undergoing this unit, students will be able to:

- Understand various types of engineering materials.
- Understand various types of material testing methods.
- Understand the use of various types of slicing parameters.
- Understand various Post processing techniques used for 3D printed parts.

Introduction to materials, classification of materials, material properties, selection process of materials.	4 hrs
Material testing methods such as hardness, impact strength, tensile strength, flexural strength.	6 hrs
Slicing software, slicing parameters such as material selection, nozzle size, pattern, infill density, raster angle, layer width. Layer thickness etc.	**10 hrs**
Surface roughness techniques, Post processing techniques in additive manufacturing, process parameters.	**10 hrs**

Means of Assessment

- Assignments and quiz/class tests

- Mid-term and end-term written tests

- Viva-voce

744

ADDITIVE MANUFACTURING LAB

LEARNING OUTCOMES:
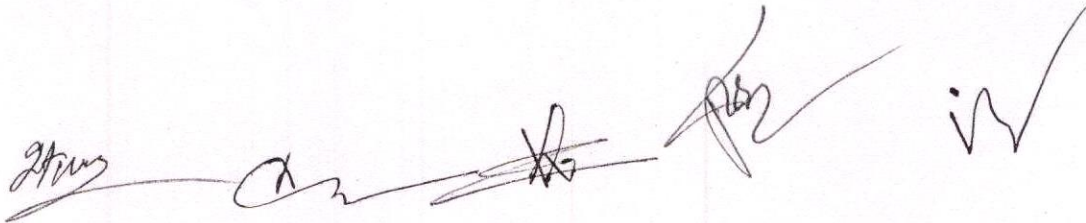
After undergoing this unit, students will be able to:

- Understand and select various types of slicing parameters.
- Set FDM printer.
- Print 3D parts.

Listing the computer technologies that impact on 3D printing, Transfer of CAD file into .stl file format. Demonstrating knowledge of the theory of slicing software and slicing parameters such as: material selection, nozzle size, pattern, infill density, raster angle, layer width. Layer thickness etc.	50 hrs
FDM printer setting, bed levelling, nozzle setting, feedstock filament loading/ unloading	50 hrs
3D printing of parts, post processing of printed parts.	**44 hrs**

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce
- 3D printing

745

Unit:	
Subject Code:	
INSPECTION AND QUALITY CONTROL	

LEARNING OUTCOMES:
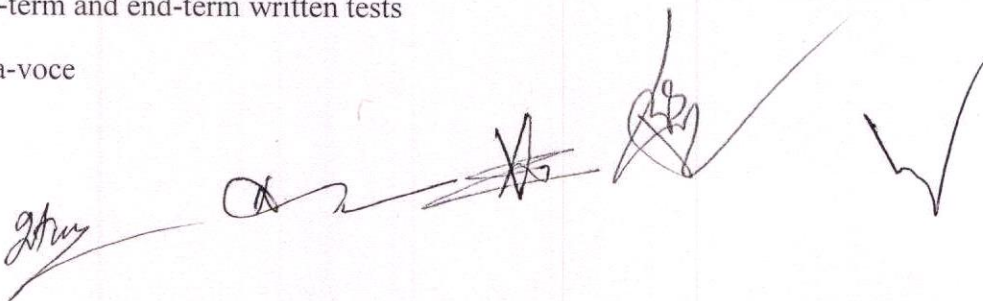
After undergoing this unit, students will be able to:

- Understand metrology and standard of measurement.
- Understand the working of various types of inspection instruments.
- Understand the concept of surface roughness and its measurement.

Define Metrology, Inspection, Accuracy and Precision, Standards of measurements.	4 hrs
Vernier calliper, micrometre, height gauge, filler gauges, sine bars, Screw Thread Measurement: Errors in threads, screw thread gauges, measurement of element of the external and internal threads, thread caliper gauges.	6 hrs
Metrology of Surface finish: Surface Metrology Concepts and terminology, Analysis of surface traces, Specification of surface Texture characteristics, and Method of measuring surface finish: Stylus system of measurement, Stylus probe instruments, methods for measuring surface roughness	6 hrs
Miscellaneous Metrology: Precision Instrumentation based on Laser Principals, Coordinate measuring machines: Structure, Modes of Operation, Probe, Operation and applications.	**8 hrs**
Optical Measuring Techniques: Tool Maker's Microscope, Profile Projector, Optical Square. Optical Interference and 8. Interferometry, Optoelectronic measurements.	**8 hrs**

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce

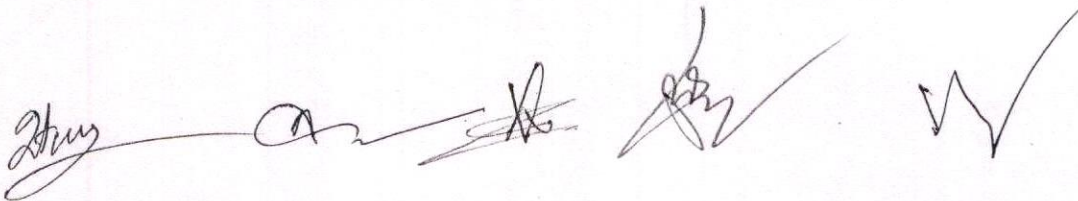| Unit:	
Subject Code:	
INSPECTION AND QUALITY CONTROL LAB	
LEARNING OUTCOMES: After undergoing this unit, students will be able to: • Use the inspection instruments. • Understand the selection of instrument for particular job. • Carry out the maintenance of the instruments.	
Use of various inspection instruments such as vernier calliper, micro-meter, surface roughness tester, height gauge, tool maker microscope, optical microscope, sine bars, filler gauges, thread gauges and Surface plate. Maintenance of instruments.	80 hrs

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Viva-voce

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN MSC NASTRAN/PATRAN

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme								Total Marks
					Internal Assessment			External Assessment					
		Th	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE5-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CMEE5-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
	Aspects of FEM	20	-	1	25	-	25	50	2	-	-	50	75
	Introduction to Patran and MSC Apex	-	60	2	-	50	50	-	-	100	4	100	150
	Preprocessing	30	-	1	25	-	25	50	2	-	-	50	75
	Preprocessing Lab in Patran and MSC Apex	-	92	3	-	50	50	-	-	100	4	100	150
	Solution development in MSC Nastran	25	-	1	25	-	25	50	2	-	-	50	75
	Nastran Lab	-	90	3	-	75	75	-	-	100	4	100	175
	Post Processing	23	-	1	25	-	25	50	2	-	-	50	75
	Post Processing Lab in Patran and MSC Apex	-	92	5	-	75	75	-	-	100	4	100	175
CMEE5-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMEE5-107P	+4–Week Industrial Training at the end of Semester and Major Project	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	**106**	**406**	**25**	**125**	**300**	**425**	**225**	**-**	**550**	**-**	**775**	**1200**

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography,etc., seminars, declamation contest, educational field visits, NCC,NSS, cultural activities,etc.

+**Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560
One credit is defined as one hour of lecture per week or two hours of practical per week in the program.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:

i) 5 marks for general behavior and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
   a) Up to75%   Nil
   b) 75%to80%   02marks
   c) 80%to85%   03marks
   d) Above85%   05marks

iii) 15 marks maximum for sports/NCC/NSS/Cultural/Co-curricular activities as per following:
(by in-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15 marks
- for National level participation or inter-university competition 10 marks - participation any two of the activities
05 marks – participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

SALIENT FEATURES OFTHE PROGRAMME

1	Sector	Aerospace/Mechanical Industry
2	Name of the Certificate Program	Nastran/Patran
3	Entry Qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda
4	Duration of Program	Six months
5	Intake	30
6	Pattern of Program	Semester Pattern
7	NSQF level	Level III
8	Ratio of Theory & Practice	20:80

<table>
<tr><td colspan="2" align="center">UNIT – I
SUBJECT CODE:CMEE5-101
COMMUNICATION SKILLS</td></tr>
<tr><td colspan="2">Learning Outcomes:
After undergoing this unit, the students will be able to:
1. Speak confidently.
2. Overcome communication barriers.
3. Write legibly and effectively.
4. Listen in proper prospective.
5. Read various genres adopting different reading techniques.
6. Respond to telephone calls and E-Mails effectively.</td></tr>
</table>

Practical (24Hours)	**Theory** (08Hours)
	Basics of Communication • Process of communication • Types of communication-formal and informal, oral and written, verbal and non-verbal • Objectives of communication • Essentials of communication • Barriers to communication (1hour)
• Looking up words in a dictionary(meaning and pronunciation) (2hours)	Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2hours)
• Self and peer introduction • Greetings for different occasions (1 hour)	Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improve speaking • Manners and etiquettes (2hours)
• Newspaper reading (1 hour)	Reading • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading (1hour)
• Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately (6hours)	Functional Vocabulary • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases (2hours)

• Reading a loud article and essays on current and social issues • Comprehension of short paragraph (5hours)	
• Write a short technical report • Letter writing (3hours)	
• Participate in oral discussion • Respond to telephonic calls and emails effectively. • Mock interview (6hours)	

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Laboratory and practical work
4. Viva-voce

UNIT-II SUBJECT CODE: INTRODUCTION	
Learning Outcomes: After undergoing study of this unit the students will be able to 1. Understand the basics of FEA 2. Know the software basics 3. Learn about meshing.	
Practical's **60hrs.**	**Theory** **20hrs.**
• Introduction to Patran • Patran Workspace • Entering and Reviewing Data • Working with files • All about groups • Viewports • Right Mouse Button • Viewing a model • Display control • Tools • Preferences • Patran Model Browser tree • Random Analysis • Printing options • Mass properties • List Processor	• Introduction to Finite Element analysis • Past present and Future of FEA • Types of analysis • Basics of Statics and Strength of Material • Introduction to Meshing • 1D Meshing • 2D Meshing • 3D Meshing • Materials property and boundary condition

Means of Assessment
1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

UNIT-III SUBJECT CODE: Preprocessing Preprocessing Lab in Patran and MSC Apex	
Learning Outcomes: 1. Patran 2. MSC Apex	
Practical **92hr** **s.**	**Theory** **30hrs** **.**
• Features of Patran • Geometry import • Different types of import • Geometry clean up • Mid surface extraction • Geometry edit tools for mid surface • Meshing in 1D • Meshing in 2D • Meshing in 3D • Quality Parameters. • 3D solid linear static analysis • Point masses, springs problems • Shells and cylindrical coordinates problems • Linear buckling analysis problem. • Modal Transient response problems with bars, springlets • Transient heat transfer problems • Steady state heat transfer • S-N analysis Design optimization: • Design model definition procedure—choosing the design variables, objective, and constraints • Structural Optimization • Approximation concept NASTRAN	• Linear static analysis: Definition, staring any Finite Element Analysis Project, checking mesh model, Design modification, Case study, Linear static solver, solution restart method, h element vs p modeling's modelling, linear Bulking analysis. • Dynamic analysis : Static analysis vs Dynamic analysis, definition, difference between time domain and frequency domain, types of loading, simple harmonic solution, free vibration, resonance, damping, forced vibration, Single DOF frequency response analysis, single DOF transient response analysis, Mass input (lumped and coupled mass),Dynamic analysis solvers. • Thermal analysis: Introduction, conduction heat transfer, steady state, convection heat transfer, forced convection, meshing for thermal analysis.

Means of Assessment
1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

UNIT-IV **SUBJECT CODE:** Solution Development in MSC Nastran	
Learning Outcomes: After undergoing study of this unit, the students will be able to • Find solution to different problems	
Practical **90hrs.**	**Theory** **25 hrs.**
• Sol 101- Static Analysis • Organization of MSC NASTRAN Files • Overview of Nastran Input • Overview of Nastran Output files • Nastran element: 0D,1D,2D,3D • Material Cards • Property cards • Loads and Boundary conditions • Param Cards • Case control cards	• Explanation of BDF • Organization of BDF • FILE Management section • Execute section • Case control • Bulk Data Section

Means of Assessment
5. Assignment and quiz/class tests
6. Mid-term and end-term written tests
7. Viva–voce
8. Practical work

UNIT-V
SUBJECT CODE:
Postprocessing

Learning Outcomes:
1. After undergoing study of this unit, the students will be able to
2. Analyze and interpret results.

Practical	**92hrs.**	**Theory**	**23 hrs.**
- Validate and check accuracy of the result, - View results. - Average and unaverage stresses - Special tricks for post processing - Interpretation of results - Design Modifications - Common mistakes and errors		- Theories of failure - Maximum Principal stress theory - Maximum shear stress theory - Maximum Principal Strain theory - Maximum strain energy theory - Maximum distortion energy theory.	

Means of Assessment
1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
2. Developconfidenceamongstthestudentsthroughfirst-handexperiencetoenablethemto use and apply institute-based knowledge and skills to perform field activities.
3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their certificate program. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a) Punctuality and regularity   20%
b) Industrial training report   50%
c) Presentation and viva-voce   30%

Major Project: All students are required to submit a major project before the completion of the course using their knowledge and skills to solve industrial related practical problems.

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN SOLIDWORKS

Code	Units	Study Scheme Total Hrs.			Credits	Marks Evaluation Scheme								Total Marks
						Internal Assessment			External Assessment					
		Th	Tut	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE5-101	Communication Skills	8	-	-	1.0	25	-	25	25	1	-	-	25	50
CMEE5-101P	Communication Skills Lab.	-	-	24	1.0	-	25	25	-	-	50	3	50	75
CMEE5-102	Introduction to Design and Modeling	12	28	-	2.0	50	-	50	50	2	-	-	50	100
	Introduction to Design and Modeling Lab.	-	-	80	3.0	-	50	50	-	-	100	4	100	150
	Engineering Components and Design	25	45	-	2.0	50	-	50	50	2	-	-	50	100
	Engineering Components and Design Lab.	-	-	90	4.0	-	50	50	-	-	100	4	100	150
	Assembly of Engineering Components	25	55	-	2.0	50	-	50	50	2	-	-	50	100
	Assembly of Engineering Components Lab.	-	-	120	4.0	-	50	50	-	-	100	4	100	150
CMEE5-106P	#Student Centre Activity	-	-	48	2.0	-	25	25	-	-	-	-	-	25
CMEE5-107P	+4–Week Industrial Training and Major Project (At the end of Semester)	-	-	-	4.0	-	-	-	-	-	100	3	100	100
	TOTAL	70	128	362	25	175	200	375	175	-	450	-	625	1000

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, seminars, declamation contest, educational field visits, NCC, NSS, cultural activities.

+**Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560 One

credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

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The maximum marks for SCA should be25. The marks may be distributed as follows:

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    (By Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance asperfollowing

    (By the instructors/ trainers of thedepartment)

    a) Up to75%   Nil
    b) 75%to80%   02marks
    c) 80%to85%   03marks
    d) Above85%   05marks

iii) 15 marks maximum for sports/NCC/NSS/Cultural/Co-curricular activities as

    per following:

    (By In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15marks

    - for National level participation or inter-university competition 10 marks -

    participation any two of the activities

    05 marks – participation at the internal sports of the institute/college/university

    Note: There should be no marks for attendance in the internal sessional of different

    subjects.

SALIENT FEATURES OFTHE PROGRAMME

1	Sector	Mechanical Industry
2	Name of the Certificate Programme	SOLIDWORKS
3	Entry Qualification	Graduate/Postgraduate/Diploma holder or equivalent level as prescribed by MRSPTU, Bathinda
4	Duration of Programme	Six months
5	Intake	30
6	Pattern of Programme	Semester Pattern
7	NSQF level	Level III
8	Ratio of Theory & Practice	20:80

SUBJECT CODE:CMEE5-101

COMMUNICATION SKILLS

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Speak confidently.

2. Overcome communication barriers.

3. Write legibly andeffectively.

4. Listen in proper prospective.

5. Read various genres adopting different reading techniques.

6. Respond to telephone calls and E-mails effectively.

Practical	**(24Hours)**	**Theory**	**(08Hours)**
		Basics of Communication • Process of communication • Types of communication-formal and informal, oral and written, verbal and non-verbal • Objectives of communication • Essentials of communication • Barriers to communication (1hour)	
• Looking up words in a dictionary (meaning and pronunciation) (2hours)		Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2hours)	
• Self and peer introduction • Greetings for different occasions (1 hour)		Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improves peaking • Manners and etiquettes (2hours)	

• Newspaper reading (1 hour)	Reading • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading. (1hour)
• Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately (6hours)	Functional Vocabulary • One-wordsubstitution • Commonly used words which are often misspelt • Punctuation • Idioms andphrases (2hours)

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Viva-voce
4. Presentation

• Reading a loud articles and essay son current and social issues • Comprehension of short paragraph (5hours)	
• Write a short technical report • Letter writing (3hours)	
• Participate in oral discussion. • Respond to telephonic calls and E-mails effectively. • Mock interview (6hours)	

Means of Assessment

5. Assignments and quiz/class tests
6. Mid-term and end-term written tests
7. Laboratory and practical work
8. Viva-voce

UNIT-II
SUBJECT CODE: -----------
INTRODUCTION TO DESIGN AND MODELING

Learning Outcomes:

After undergoing study of this unit the students will be able to

1. Design and Modeling techniques used in Engineering.
2. 2D Modeling and sketching.
3. Engineering drawing techniques.
4. SOLIDWORKS 2D designing and sketching.

Practical	80hrs.	Theory	12hrs.
		Tutorials	28hrs.

• Introduction to SOLIDWORKS software package	• **Introduction to design and modeling:** Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Different types of Modeling Techniques/tools
• Features of SOLIDWORKS: Various products available in SOLIDWORKSfor Product Design, Simulation, Communication SOLIDWORKS Graphical User Interface - Feature manager design tree, Handles, Confirmation corner, mouse buttons, Command Manager	• **Introduction to Dimensioning:** Concepts of scale in drawing, Types of scales.
• Introduction to 2D drawing or sketching	• **Lettering and Numbering:** SingleStroke, Double Stroke, inclined, Upper case and Lowercase.
• Sketch Entities – Centerline line, Line, Circle, Arc, Ellipse, Rectangle, Slots, Polygon,Parabola,Ellipse,PartialEllipse, Spline, Spline tools, Points, Text, Constructiongeometry	• **Types of lines:** Definition,typesandapplicationsin Drawing Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight,curved)-Drawingofparallellines, perpendicular line – Methods of Division of linesegment
• Sketch Tools - Fillet, Chamfer, Offset, Convert entities, Trim, Extend, Mirror, Move,Copy,Rotate,Scale,Stretch,Sketch pattern, Sketchpicture	
• Blocks – Make block, Edit block, Insert block,Add/RemoveEntities,Rebuild,Save	• **Basic Definition of geometrical objects:**Points, lines and planes.Nomenclature and practice of - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle,Square,Parallelogram.
• ExplodeRelations-AddingSketchRelation, Automaticrelations.	
• Adding relations and Advanced	- Circle and its elements

dimensioning techniques and base feature options	

Means of Assessment

1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

UNIT-III
SUBJECT CODE:-----
ENGINEERING COMPONENTS AND DESIGN

Learning Outcomes:

After undergoing study of this unit the students will be able to learn

- 3D Designing and Modeling in SOLIDWORKS.

- Projection of Solids

- Method of Presentation of Engineering Drawing

Practical 90hrs.	Theory 25hrs.
	Tutorials 45hrs.
• **Dimensioning**-Smart, Horizontal, Vertical, fully define sketch.3DSketching • **Creating Extrude features** – Direction1, Direction2, from option, Thin feature, applying draft, Selectingcontours • **Creating Revolve features** – Selecting Axis, Thin features, selecting contours Creating Swept Features-Selecting, Profile and Path, Orientation/twisttype,Thinfeature,Creating referenceplanes • **Creating Loft features** – SelectingProfiles, Guide curves, Start/EndConstraints, • Centerline parameters, Closeloft. • **Selecting geometries** – SelectionManager, Multiple Bodyconcepts • **Creating Reference** - points,axis, coordinates • **Creatingcurves-** Splitline,Projectcurve, Composite curve, Helix andSpiral • **Creating Fillet Features-** Inserting Hole types, • Creating Chamfer, Creating Shell,	• **Dimensioning:** Definition, types and methods of dimensioning (functional, nonfunctional and auxiliary) - Typesof arrowhead -Leader Line withtext • **Method of Presentation of Engineering Drawing:** Pictorial View-Orthogonal View and Isometric view

Creating Rib • **Creating Pattern -** Linear pattern, Circular pattern, Sketch driven pattern, Curve driven pattern, Table driven pattern, Fill pattern, mirror. • Advanced Modeling Tools- Dome, Deform, indent, Flex. • *Minor projects:* **Design ofvarious machine elements** – Gears, springs, propeller, piston, turbine buckets, runners, pump impellers, pipe elbows, Tees, reducers, flanges, Trusses, etc. **Analysis of structures:** – Simulation of design: Motion study, animations, etc. – Optimization of design: Material optimization, shape optimization, flow stabilization, etc.	

UNIT-IV
SUBJECT CODE: ---------
ASSEMBLY OF ENGINEERING COMPONENTS

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Assembly Modeling

- Understand about Assembly Approaches

- Understand about tool parts and itsuses

Practical 120hrs.	Theory 25hrs.
	Tutorials 55hrs.

• **Introduction to Assembly Modeling &Approaches** – Top down and Bottom up Approach Applying Standard Mates- Coincident, Parallel, Perpendicular, Tangent, Concentric, Lock, Distance, Angle.	• **Importance of Machine Drawing** – Brief revision of 1st and 3rd angle projections - Understand the concepts of Orthographic projections and Sectional views.
• **Applying Advanced Mates** – Symmetric, Width, Path Mate, Linear/LinearCoupler,and Limit Mate.	• **Assembly Drawings and modeling – I:** – Cotter joint – Jib and cotter joint assembly – Knuckle joint assembly – Assembly of muffs coupling (solid & split) coupling – Flange couplings – Screw jack assembly
• **Applying Mechanical Mates** – Cam, Hinge, Gear, Rack Pinion, Screw, andUniversalJoint. Applying Smart mates Applying Mate reference.	
• **Manipulating Components -** Replacing Components, Rotating Components, Move Components, Collision Detection, Detecting Interference	• **Assembly Drawings and modeling – II:** – Bearings – Socket and spigot joint – Protective type flanged coupling – Piston of petrol engine – Cross head – Connecting rod – Sleeve and cotter joint – Lathe tool post – Big end of a connecting rod – Foot step bearing – Plummer block
• **CreatingPattern-**AssemblyPattern,Mirror Creating Exploded Views Top Down Assembly	
• SmartFasteners	
• Creating Extrude, Revolve, Swept, loft, Boundarysurface.InsertingPlanarSurface, Offset Surface, Free form Extending a surface, Surface fill, Ruled Surface, Trim	

Surface, Replace Face, Delete face, Untrim surface, knit surface, Thickening aSurface • Generating DrawingViews • Introduction to Angle ofProjection • **Generating Views -** Generating Model View, Projected Views, InsertingStandard 3 View, Auxiliary Views, and Detailed views. • **Crop view, Broken –**Out Section, Section View, Alternate Position View, Working assembly specific view, Drawing properties, Manipulatingviews. • **Design of various assemblies:** Cotter joint**,** Jib and cotter joint assembly**,** Knuckle joint assembly**,** Assembly of muffs coupling (solid & split) coupling**,** Flange couplings**,** Screw jack assembly**,** Bearings**,** Socket and spigot joint**,** Protective type flanged coupling**,** Piston of petrol engine**,** Cross head**,** Connecting rod, Sleeve and cotter joint**,** Lathe tool post**,** Big end of a connecting rod**,** Foot step bearing**.** Plummer block**,** Lathe tail stock. • Monocoque (Practical), spar fuselage structures basic modeling, assembly, application-oriented part. • *Minor projects:* Design and analysis on any of the design given by the instructor of the subject.	– Lathe tail stock. **Note: This unit will also cover the design of various couplings. The study of mass/material properties, forces, inertia, and motions will be covered in this theory part.**

Means of Assessment

1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

SUBJECT CODE: CMEE5-107P

INDUSTRIAL TRAINING– I and MAJOR PROJECT(4 Weeks)

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses ofstudy.

2. Developconfidenceamongstthestudentsthroughfirst-handexperiencetoenablethemto use and apply institute based knowledge and skills to perform fieldactivities.

3. Developspecialskillsandabilitieslikeinterpersonalskills,communicationskills,attitudes andvalues.

4. To choose a mechanical component design and make a major project in SOLIDWORKS.

It is needless to emphasize further the importance of Industrial Training of students during their certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks has been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real lifesituations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a)	Punctuality and regularity	20%
b)	Industrial training report	50%
c)	Presentation and viva-voce	30%

NOTE: Major project should include the complete use of SOLIDWORKS including the assembly tools. Physical model of this component should be available at the Industry where the student chooses to internship.Faculty will interact to the industry as well as students during the 4 weeks Industrial training.

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN CATIA

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme								Total Marks
					Internal Assessment			External Assessment					
		Th	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
	Introduction to Design	52	-	2	25	-	25	50	2	-	-	50	75
	Introduction to Design Lab.	-	150	4	-	50	50	-	-	100	4	100	150
	Engineering components and design	16	-	1	25	-	25	50	2	-	-	50	75
	Engineering components and design lab	-	160	4	-	75	75	-	-	100	4	100	175
	Assembly and Design	22	80	6	50	50	100	-	2	100	4	100	150
	#Student Center Activity	-	48	2	-	25	25	-	-	-	-	-	25
	+4–Week Industrial Training at the end of Semester	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	**98**	**462**	**25**	**125**	**300**	**475**	**125**	**-**	**650**	**-**	**775**	**1275**

SCA will consist of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as photography. seminars, declamation contests, educational field visits, NCC, NSS, cultural activities.

+**Industrial Training**
Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.
Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560
One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

GUIDELINES FOR ASSESSMENT OF STUDENT-CENTERED ACTIVITIES (SCA)

The maximum marks for SCA should be25. The marks may be distributed as follows:

i) 5 marks for general behavior and discipline
(By Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance as per following
(By the instructors/ trainers of the department)
   a) Up to75%   Nil
   b) 75%to80%   02marks
   c) 80%to85%   03 marks
   d) Above85%   05 marks

iii) 15 marks maximum for sports/NCC/NSS/Cultural/Co-curricular activities as per following:

(By In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15marks - for National level participation or inter-university competition 10 marks - participation any two of the activities
05 marks – participation at the internal sports of the institute/college/university Note: There should be no marks for attendance in the internal session of different subjects.

SALIENT FEATURES OF THE PROGRAMME

1	Sector	Mechanical / Aeronautical/ Aerospace Industry
2	Name of the Certificate Programme	CATIA
3	Entry Qualification	Diploma / B. Tech. or equivalent NSQF level as prescribed by MRSPTU, Bathinda
4	Duration of Programme	Six months
5	Intake	30
6	Pattern of programme	Semester Pattern
7	NSQF level	Level III
8	Ratio of Theory & Practice	20:80

UNIT – I	
SUBJECT CODE:	
COMMUNICATION SKILLS	

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Speak Confidently.
2. Overcome communication barriers.
3. Write legibly and effectively.
4. Listen in proper perspective.
5. Read various genres adopting different reading techniques.
6. Respond to telephone calls and E-mails effectively.

Practical (24Hours)	**Theory** (08 Hours)
	Basics of Communication ● Process of communication ● Types of communication-formal and informal, oral and written, verbal and non-verbal ● Objectives of communication. ● Essentials of communication. ● Barriers to communication. (1hour)
● Looking up words in a dictionary (meaning and pronunciation) (2hours)	Functional Grammar and Vocabulary ● Parts of speech ● Tenses ● Correction of incorrect sentences (2hours)
● Self and peer introduction ● Greetings for different occasions (1 hour)	Listening ● Meaning and process of listening ● Importance of listening ● Methods to improve listening skills Speaking ● Importance ● Methods to improve speaking ● Manners and etiquettes (2hours)
● Newspaper reading (1 hour)	Reading ● Meaning ● Techniques Of Reading: skimming, scanning, intensive and extensive reading (1hour)

● Vocabulary enrichment and grammar exercises ● Exercises on sentence framing accurately (6hours)	Functional Vocabulary ● One-word substitution ● Commonly used words which are often misspelled ● Punctuation ● Idioms and phrases (2hours)

● Reading a loud articles and essays on current and social issues ● Comprehension of short paragraph (5hours)	
● Write a short technical report ● Letter writing (3hours)	
● Participate in oral discussion ● Respond to telephonic calls and E-mails effectively. ● Mock Interview (6hours)	

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Laboratory and practical work
4. Viva-voce

UNIT-II
SUBJECT CODE: -----------
INTRODUCTION TO DESIGN

Learning Outcomes:

After undergoing study of this unit, the students will be able to

1. Design and Modeling techniques used in Engineering.

2. 2D Modeling and sketching.

3. Engineering drawing techniques.

4. CATIA 2D designing and sketching

Practical 150hrs.	**Theory** 52hrs.
● Introduction to CATIA software	● **Introduction to design and modeling:** Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Different types of Modeling Techniques/tools
● Features of CATIA: Various products available in CATIA for Product Design, Simulation, Communication CATIA Graphical User Interface - Feature manager design tree, Handles, Confirmation corner, mouse buttons, Command Manager	
	● **Introduction to Dimensioning:** Concepts of scale in drawing, Types of scales.
● Introduction to 2D drawing or sketching	● **Lettering and Numbering:** Single Stroke, Double Stroke, inclined, Uppercase and Lowercase.
● Sketch Entities – Centerline line, Line, Circle, Arc, Ellipse, Rectangle, Slots, Polygon, Parabola, Ellipse, Partial Ellipse, Spline, Spline tools, Points, Text, Construction geometry.	● **Types of lines:** Definition, types and applications in Drawing Classification of lines (Hidden, Center, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved)- Drawing of parallel lines, perpendicular line – Methods of Division of line segment
● Sketch Tools - Fillet, Chamfer, Offset, convert entities, Trim, Extend, Mirror, Move, Copy, Rotate, Scale, Stretch, Sketch pattern, Sketch picture	
● Blocks – Make block, edit block, insert block, Add/Remove Entities, Rebuild, Save	● **Basic Definition of geometrical objects:** Points, lines and planes. Nomenclature and practice of - Angle: Measurement and its types, method of bisecting. - Triangle - different types - Rectangle, Square, Rhombus, Parallelogram.
● Explode Relations-Adding Sketch Relation, Automatic relations.	
● Adding relations and Advanced dimensioning techniques and base	● - Circle and its elements

feature options	

Means of Assessment

1. Assignment and quiz/class tests.
2. Mid-term and end-term written tests.
3. Viva–voce.
4. Practical Work.

UNIT-III SUBJECT CODE: ------ ENGINEERING COMPONENTS AND DESIGN	
Learning Outcomes: After undergoing study of this unit, the students will be able to learn ● 3D Designing and Modeling in CATIA. ● Projection of parts ● Method of Presentation of Engineering Drawing	
Practical 160hrs	**Theory** 16hrs

- **Introduction to part design:** Part modeling tool classification.

- Sketch based features, Dress up features, Surface based features, Transformation features.

- **Part design workbench document**: part design menu bar, specification tree, work area, compass, toolbar, prompt area, power input area.

- **Sketch based features**: pad, drafted fileted pad, multi-pad, pocket, drafted fileted pocket, multi-pocket, shaft, groove, hole, rib, slot, solid combine, stiffener, multi - sections solid, removed multi-sections solid

- **Dress-up Features**: edge filet, variable radius filet, face-face filet, tri- tangent filet, chamfer, draft angle, draft reflect line, variable angle draft, shell, thickness, thread/tap, remove face, replace face.

- **Transformation features:** Translation, rotation, symmetry, mirror, rectangular pattern, circular pattern, user pattern, scaling

- **Conditions of part design workbench:** Do's and Don'ts of shaft, rib, stiffener, solid combine, multi section solid, thread/tip.

    - **PROCEDURE:** Invoke pad command, Invoke pocket command,
    - Invoke hole command, invoke slot command, Invoke filet command.
    - **PART DESIGN EXERCISE**: Machine vise, die casting, screw jack and parts, landing gear and its components, piston, bulkhead, ribs and spars.
    - **Mathematical modeling of part design:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

    - **Motion Study of part design:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

- **Dimensioning:** Definition, types and methods of dimensioning (functional, nonfunctional and auxiliary) – Types Of arrowheads -Leader Line with text

- **Projection of PARTS-**Definition of solids, types of solids, and elements of solids. Projection of solids in the first or third quadrant.

- **Section of Solids:** Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes.

- **Method of Presentation of Engineering Drawing:** Pictorial View-Orthogonal View - Isometric view

- **Isometric Projection:** Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.

- **Orthographic Projection:** Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

- **Animation of part design:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

- **Analysis of Structures and Design:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

- **Case Studies:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

- **Design optimization:** Machine vise, die casting, screw jack and their parts, landing gear and its components, piston, bulkhead, ribs and spars.

- **Practical based on Industry**: Nut and bolt, engine and its components, Parts used in Automobile industry, fuselage, bulkheads and landing gear.

- **"Minor in House Projects":** Component and design.

UNIT-IV
SUBJECT CODE: ---------
ASSEMBLY & DESIGN

Learning Outcomes:

After undergoing study of this unit, the students will be able to:

● Assembly Modeling

● Understand about Assembly Approaches.

● Understand about tool parts and its uses.

Practical 80hrs	**Theory** 22hrs
Introduction to Assembly Modeling Approaches **Types of assembly design approach –** Top down and Bottom-up Approach . **Toolbars:** product structure tools, constraints, move, **Condition of assembly workbench:** Do's and Don'ts. **Products structure toolbar:** Import files, multi-instances **Constraints Toolbar:** contact constraint, fix, re-use pattern. **Manipulating Components -** Replacing Components, Rotating Components, Move Components, Collision Detection, Detecting Interference **Creating Pattern-**Assembly Pattern, Mirror Creating Exploded Views Top-Down Assembly - Smart Fasteners.	**Importance of Machine Drawing –** Brief revision of 1st and 3rd angle projections - Understand the concepts of Orthographic projections and Sectional views.

● Creating Extrude, Revolve, Swept, loft, Boundary surface. Inserting Planar Surface, Offset Surface, Free form Extending a surface, Surface fill, Ruled Surface, Trim Surface, Replace Face, delete face, Untrim surface, knit surface, Thickening a Surface ● Generating Drawing Views ● Introduction to Angle of Projection ● **Generating Views -** Generating Model View, Projected Views, Inserting Standard 3 View, Auxiliary Views, and Detailed views. ● **Crop view, broken –**Out Section, Section View, Alternate Position View, working assembly specific view, drawing properties, Manipulating views	

Means of Assessment

1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Minor project at the end of the semester.
4. Viva–voce
5. Practical Work

INDUSTRIAL TRAINING– I (4 Weeks)

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
2. Develop Confidence Amongst the Students Through First-hand experience to enable them to use and apply institute-based knowledge and skills to perform field activities.
3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of the world of work. It prepares students for their future role as a skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situation.

The instructor along with one industrial representative from the concerned trade will conduct a performance assessment of students. The components of evaluation will include the following:

a) Punctuality and regularity   20%
b) Industrial training report   50%
c) Presentation and viva-voce   30%

STUDY AND EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN ANSYS

Code	Units	Study Scheme Total Hrs.			Credits	Marks Evaluation Scheme								Total Marks
						Internal Assessment			External Assessment					
		Th	Tut	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE5-101	Communication Skills	8	-	-	1.0	25	-	25	25	1	-	-	25	50
CMEE5-101P	Communication Skills Lab.	-	-	24	1.0	-	25	25	-	-	50	3	50	75
CMEE5-102	Introduction to ANSYS TM workbench	12	28	-	2.0	50	-	50	50	2	-	-	50	100
	Sketching and part modeling	18	-	80	3.0	-	50	50	-	-	100	4	100	150
	Placed features and assembly	25	45	60	2.0	50	-	50	50	2	-	-	50	100
	Meshing	24	-	90	4.0	-	50	50	-	-	100	4	100	150
	Static Structural Analysis	25	55	70	2.0	50	-	50	50	2	-	-	50	100
	Electronic and Thermal analysis	24	-	92	4.0	-	50	50	-	-	100	4	100	150
CMEE5-106P	#Student Centre Activity	-	-	48	2.0	-	25	25	-	-	-	-	-	25
CMEE5-107P	+4–Week Industrial Training and Major Project (At the end of Semester)	-	-	-	4.0	-	-	-	-	-	100	3	100	100
	TOTAL	136	128	464	25	175	200	375	175	-	450	-	625	1000

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+**Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the program.

GUIDELINESFOR ASSESSMENT OF STUDENT-CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be25. The marks may be distributed as follows:

i) 5 marks for general behavior and discipline

(By Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance as per following

(By the instructors/ trainers of the department)

    a) Up to75%   Nil

    b) 75%to80%   02marks

    c) 80%to85%   03marks

    d) Above85%   05marks

iii) 15marksmaximumforsports/NCC/NSS/Cultural/Co-curricularactivitiesas per following:

(By In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15marks

- for National level participation or inter-university competition 10 marks - participation any two of the activities

05 marks – participation at the internal sports of the institute/college/university

Note: There should be no marks for attendance in the internal sessional of different subjects.

SALIENT FEATURES OFTHE PROGRAMME

1	Sector	AERONAUTICAL Industry
2	Name of the Certificate Program	ANSYS TM
3	Entry Qualification	Graduate/Postgraduate/Diploma holder or equivalent level as prescribed by MRSPTU, Bathinda
4	Duration of Program	Six months
5	Intake	30
6	Pattern of Program	Semester Pattern
7	NSQF level	Level III

8	Ratio of Theory & Practice	20:80

COMMUNICATION SKILLS

Learning Outcomes:

After undergoing this unit, the students will be able to:

1 Speak confidently.

2 Overcome communication barriers.

3 Write legibly and effectively.

4 Listen in proper prospective.

5 Read various genres adopting different reading techniques.

6 Respond to telephone calls and E-Mails effectively.

Practical (24Hours)	**Theory (08Hours)**
	Basics of Communication • Process of communication • Types of communication-formal and informal, oral and written, verbal and non- verbal • Objectives of communication • Essentials of communication • Barriers to communication • Respond to e-mail effectively (1hour)
• Looking up words in a dictionary (meaning and pronunciation) (2hours)	Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2hours)
• Self and peer introduction • Greetings for different occasions (1 hour)	Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improve speaking • Manners and etiquettes (2hours)
• Newspaper reading	Reading

(1 hour)	• Meaning
	Techniques of reading: skimming, scanning, intensive and extensive reading (1hour)
• Vocabulary enrichment and • Exercises on sentence framing accurately (6hours)	Functional Vocabulary • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases (2hours)

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Viva-voce
4. Presentation

UNIT-II

SUBJECT CODE……

INTRODUCTION TO ANSYS WORKBENCH

Learning Outcome	
1. Basic understanding of ANSYS Workbench	
Practical	**Theory (12hrs)**
• Introduction to ANSYS software • Features of ANSYS software • Working with FEM, Elements and shape functions, FEA software	• Engineering analysis, Procedure to conduct FEM • About ANSYS workbench • Database and file format in ANSYS • Changing the unit system • Component of system

Means of Assessment

1Assignments and quiz/class tests

2 Mid-term and end-term written tests

3 Viva-voce

4 Presentation

SUBJECT CODE…….

SKETCHING AND PART MODELLING IN DESIGN MODELER

Learning outcomes	
• How to use Design Modeler	
Practical (80hrs)	Theory (18 hrs)
- I-section - Spring plate - Clamp - Extrusion - Revolution - Sweep - Sketching - CAD System - Surface and line models	- Introduction to modeling - Introduction to design modeler

Means of Assessment

1. Assignments and quiz/class tests

2. Mid-term and end-term written tests

3. Viva-voce

4. Presentation

UNIT-VI

SUBJECT CODE…..

Placed Features and Assembly

Learning Outcomes	
Learn about assembly	
Practical (30hrs)	Theory (25hrs)
- Adding a hole - Adding a round - Adding a chamfer	- Introduction - Adding Features

• Patterns • Assembly • Extrusion , Union, Intersection,	

Means of Assessment

1 Assignments and quiz/class tests

2 Mid-term and end-term written tests

3 Viva-voce

4 Presentation

UNIT-V   **Meshing**

Learning outcome	
Understanding basic concept of Meshing	
Practical (24hrs)	Tutorial (90hrs)
• Meshing of Plate with holes (2D & 3D) • Optimizing the model • Generating the local mesh • Assembly meshing	• Meshing • Generating the mesh

Means of Assessment

1 Assignments and quiz/class tests

2 Mid-term and end-term written tests

3 Viva-voce

4 Presentation

UNIT-VI

Static Structural Analysis

Learning Outcome	
• Various Solution • Pre-processing • Holes and slots	
Practical (70 hrs)	Theory (25 hrs)
• Plate with central circular holes • Square Slot • Bracket	• Introduction to static structural analysis • Structural analysis of cantilever beam

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• Clevis assembly • Algorithm used to stabilize and improve accuracy of the solution • Numerical discretization • Boundary conditions	• Governing equations

Means of Assessment

1. Assignments and quiz/class tests

2. Mid-term and end-term written tests

3. Viva-voce

4. Presentation

UNIT-VII

Electronic and Thermal Analysis

Learning outcome	
• Thermal analysis and thermal stresses	
Practical (92 hrs)	Theory (24 hrs)
• Electronic Analysis • Steady state thermal analysis of brake • Heat Sink • Transient thermal analysis of piston • Thermal stress in cylinder	• Important term used in thermal analysis • Types of thermal analysis • Thermal stresses

Means of Assessment

1. Assignment and quiz/class tests

2. Mid-term and end-term written tests

3. Viva–voce

4. Practical work

INDUSTRIAL TRAINING– I and MAJOR PROJECT (4 Weeks)

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.

2. Develop confidence among the students through first-hand experience to enable them to use and apply institute based knowledge and skills to perform field activities.

3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

4. To choose a meshing and structural analysis make a major project in ANSYS.

It is needless to emphasize further the importance of Industrial Training of students during their certificate program. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks has been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva- voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a)	Punctuality and regularity	20%
b)	Industrial training report	50%
c)	Presentation and viva-voce	30%

NOTE: Major project should include the complete use of SOLIDWORKS including the assembly tools. Physical model of this component should be available at the industry where the student chooses to internship.

Certificate Course In Air Ticketing

Session: 2022-23

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme							Total Marks
					Internal Assessment			External Assessment				
		Th	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE5-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CMEE5-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	2	50	75
	Introduction to Aviation Industry	20	-	1	25	-	25	50	2	-	-	50	75
	Introduction to Aviation Industry Lab	-	50	2	-	50	50	-	-	100	4	100	150
	Computer Applications in Aviation Industry	30	-	1	25	-	25	50	2	-	-	50	75
	Computer Applications in Aviation Industry Lab.	-	60	2	-	50	50	-	-	100	4	100	150
	Air Ticketing	40	-	2	25	-	25	50	2	-	-	50	75
	Air Ticketing Lab	-	90	4	-	75	75	-	-	100	4	100	175
	Consumer behavior	40	-	2	25	-	25	50	2	-	-	50	75
	Consumer behavior Lab	-	92	2	-	50	50	-	-	75	3	75	100
	Passport and Visa	30		1	25	-	25	50	2	-	-	50	75
CMEE5-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMEE5-107P	+4–Week Industrial Training at the end of Semester and Major Project	-	-	4	-	-	-	-	-	100	4	100	100
	TOTAL	168	364	25	150	275	425	225	-	525	-	800	1200

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+**Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total Hours per day: 7, Total Hours in a semester: 16x5x7 = 560 One credit is defined as one hour of lecture per week or two Hours of practical per week in the programme.

GUIDELINESFOR ASSESSMENTOFSTUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be25. The marks may be distributed as follows:
i) 5 marks for general behavior and discipline
   (By Principal or HOD in consultation with the instructor(s)/trainers)
ii) 5 marks for attendance as per following
   (By the instructors/ trainers of the department)
   a) Up to 75%   Nil
   b) 75%to 80%   02 marks
   c) 80%to 85%   03 marks
   d) Above85%   05 marks
iii) 15 marks maximum for sports/ NCC/ NSS/Cultural/ Co-curricular activities as per following:
   (By In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15marks - for National level participation
   or inter-university competition 10 marks - participation any two of the activities
   05 marks – participation at the internal sports of the institute/college/university Note: There should be no marks for
   attendance in the internal sessional of different subjects.

SALIENT FEATURES OF THE PROGRAMME

1	Sector	Airlines
2	Name of the Certificate Programme	Air Ticketing
3	Entry Qualification	Minimum 12th Standard pass in any Stream
4	Duration of Programme	Six months
5	Intake	30
6	Pattern of Programme	Semester Pattern
7	NSQF level	Level III
8	Ratio of Theory & Practice	30:70

Name of the Course	Certificate course in Air Ticketing
Duration of the Course	06 months
Eligibility for Admission	Minimum 12th Standard pass in any Stream
Industrial Training (Practical Training in Travel related organization using Air Ticketing Software Galileo, Amadeus. Training project report + Viva and presentation)	02 Months

  *Required Faculty with knowledge of LINUX and the above software's
 **Required Airline Reservation Software: Galileo Airline Reservation System & Amadeus

<table>
<tr><td colspan="2" align="center">UNIT – I
SUBJECT CODE: CMEE5-101
COMMUNICATION SKILLS</td></tr>
</table>

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Speak confidently.
2. Overcome communication barriers.
3. Write legibly and effectively.
4. Listen in proper prospective.
5. Read various genres adopting different reading techniques.

Respond to telephone calls and e – mails effectively.

Practical	(24 Hours)	Theory	(08 Hours)
		Basics of Communication • Process of communication • Types of communication-formal and informal, oral and written, verbal and non- verbal • Objectives of communication • Essentials of communication • Barriers to communication (1 hour)	
• Looking up words in a dictionary (meaning and pronunciation) (2 Hours)		Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2 Hours)	
• Self and peer introduction • Greetings for different occasions (1 Hour)		Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improve speaking • Manners and etiquettes (2 Hours)	
• Newspaper reading (1 Hour)		Reading • Meaning • Techniques of reading: skimming, scanning, in tensive and extensive reading (1 Hour)	
• Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately (6 Hours)		Functional Vocabulary • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases (2 Hours)	
• Reading a loud articles and essays on current and social issues • Comprehension of short paragraph (5 Hours)			
• Write a short technical report • Letter writing (3 Hours)			
• Participate in oral discussion • Respond to telephonic calls and e - mails effectively • Mock interview (6 Hours)			

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Laboratory and practical work

4. Viva-voce

UNIT – II SUBJECT CODE INTRODUCTION TO AVIATION INDUSTRY		
Learning Outcomes: After undergoing this unit, the students will be able to: • Know basics of aviation industry. • Understand about the techniques and methodologies used in Aviation Industry. • Learn about the Safety and Security in Air Transportation. • Understand the role of travel agents and approved travel agencies in managing tourist's experiences.		
Practical (50 Hours)	**Theory** (20 Hours)	
	Introduction • Evolution of Aviation • Growth Drivers • Issues and Challenges • Commercial Aviation • Airport Handling	
• Introduction to aviation industry • Issues and Challenges	**Introduction to Airline Industry** • History of Airlines • Regulatory bodies • Navigation systems: Route Planning • Safety and Security • Training and Awareness	
• Navigation Systems: route planning • Regulatory bodies	**Airline Terminal Management** • Domestic and International Formalities • Check – in of hand baggages • Personal Screening and frisking • Ground announcements • Ramp handling and safety procedure	
• Safety and Security at airport • Airport Terminals	**Public Relations in Aviation Sector** • PR with Airport operators • Good Qualities of PR • Challenges • Types and role of media handling • Power of electronic media	
• Domestic and International Departures • Ground Announcements		
• Baggage handling • Delayed flights		
• Ramp handling and safety • Public Relation		
• Good Qualities of PR • Role of PR in Media handling • Do's and Don'ts in media handling		

UNIT – III
SUBJECT CODE
COMPUTER APPLICTIONS IN AVIATION INDUSTRY

Learning Outcomes:
After undergoing this unit, the students will be able to:
- Have knowledge of Computer Application in Aviation industry.
- Prepare students to use app software to solve business problem & increase efficiency at airports.
- Understand of why computers are essential components of Aviation Industry.

Practical	(60 Hours)	Theory	(30 Hours)
		Introduction • Concepts on word processing • Templates • Formatting • Inserting • Printing	
• Practical Knowledge of concepts of word processing • Templates • Formatting • Inserting • Printing		**Preparing presentations** • Basic Presentations • Design • Animation • Slideshow	
• Basic Presentations • Design • Animation • Slideshow		**Spreadsheet and its Applications in Aviation Industry** • Spreadsheet concepts • Organizing Charts and graphs • Database, and Text functions	
• Spreadsheet concepts • Organizing Charts and graphs • Database, and Text functions		**Creating Aviation Spreadsheet** • Payroll statements • Graphical representation of data • Frequency distribution and its statistical parameters	
• Payroll statements • Graphical representation of data • Frequency distribution and its statistical parameters			

UNIT – IV SUBJECT CODE AIR TICKETING			
Learning Outcomes: After undergoing this unit, the students will be able to: - Construct fares to various traffic conferences - Demonstrate the ability to issue tickets - Apply the practical knowledge in the travel agency			
Practical	**(90 Hours)**	**Theory**	**(40 Hours)**
		Introduction - Various aviation terminologies - Fare calculations - Type of journey	
- Knowledge of Air – fare calculation software Amadeus and Galileo - Types of Passengers - Coding and Decoding of Airport/Airline and Aircraft codes		**Reservation system in aviation sector** - Role of GDS and CRS - Type of CRS - Amadeus - Galileo - Encoding and decoding - Aircraft Real time tracking applications.	
- Phonetic alphabets in Aviation Industry - Various types of journey - Various discounts available		**Airline Terminology** - Abbreviations used in airline - Different types of Tickets - Airline timetable	
- Special fares calculated for different organizations of aviation sector - Aircraft Real time tracking applications.		**Air – fare Construction** - Special fares/ discounted fares - Types of passengers - Specified routing	

			UNIT – V		
		SUBJECT CODE			
		CONSUMER BEHAVIOR IN AVIATION INDUSTRY			

Learning Outcomes:
After undergoing this unit, the students will be able to:
- Have knowledge of Consumer behaviour in Aviation Industry.
- Prepare students to deal with customers from different cultural and sub – cultural backgrounds.
- Understand why consumers are essential components of Aviation Industry.

Practical	(92 Hours)	Theory	(40 Hours)
		Consumer Behaviour • Types of consumers • Consumer decision making process • Factors affecting buying of air tickets	
• Practical Knowledge of concepts of consumer, customer, buyer and seller • Factors affecting decision making of the consumer		**Consumer as an Individual** • Positive and Negative motivation • Needs Hierarchy • Personality theories	
• How family and culture affect in decision making		**Consumer in Social and Cultural Settings** • Factors affecting reference groups, family groups • Decision making • Culture and Sub – Culture influence	
• Opinion leadership process • Different levels of decision-making process		**Consumer Decision Making** • Opinion leadership process • Models of customer Decision making	

	UNIT – VI SUBJECT CODE PASSPORT AND VISA	

Learning Outcomes:
After undergoing this unit, the students will be able to:
- Have knowledge of the documents required in Aviation industry.
- Prepare students to have knowledge about the various modes of payment in the Aviation Sector.
- Understand the role of transportation in the Aviation Industry.

Practical	Theory	(30 Hours)
	Introduction • Types of Documents for domestic and international travel • Travel Insurance	
	• Travel vouchers • Credit cards • Cash back offers • Mobile applications	
	• Airport formalities • Local tourism services • Transportation and its Reservation	
	• Accommodation and its types • Different types of reservations	
	• Air Ticket rules: Cancellation, Deportation and Asylum • Liability of Airlines regarding above rules • Asylum and Deportation	

SUBJECT CODE: CMEE5-107P

INDUSTRIAL TRAINING– I (4 Weeks)

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
2. Develop confidence amongst the students through first-hand experience to enable them to use and apply institute-based knowledge and skills to perform field activities.
3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva- voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a) Punctuality and regularity   20%
b) Industrial training report   50%
c) Presentation and viva-voce   30%

GROUP-A
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	15	3	10	540	360	900	19

Note:
1. There will be Induction Programme of 3 weeks before start of normalclasses.
2. Drug Abuse: Problem, Management and Prevention and Introduction toConcerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.
* As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
	Total	12	2	12	400	400	800	20

Note:
1. Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester

GROUP-B
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	14	2	12	500	400	900	20

Note:
1. There will be Induction Programme of 3 weeks before start of normalclasses.
2. Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.
   * As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
	Total	13	3	10	440	360	800	19

Note:
1. Drug Abuse: Problem, Management and Prevention is a non-credit Course; however, it is necessary to secure at least E grade in it.
2. Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester

PHYSICS (SEMICONDUCTORPHYSICS)

Subject Code: BPHYS1-101   **L T PC**   **Duration: 38Hrs.**
                                      3 1 0 4

UNIT-I
Quantum Theory: (10 Hrs.)
Need and origin of Quantum Concept, Wave-particle duality, Matter waves, Group and Phase velocities, Concept of Uncertainty Principle and its application: nonexistence of electron in the nucleus, wave function & its significance, normalization of wave function, Schrodinger wave equation: time independent and dependent, Eigen functions & Eigen values, particle in a box in 1-D. Concept of scattering from a potential barrier and tunneling.

UNIT-II
Electronic Materials: (8 Hrs.)
Free electron theory, Density of states and energy band diagrams, Introduction to band gap theory, Direct and in direct and gaps. Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level, Effective mass, phonons.

UNIT-III
Semiconductors and Light- Semiconductor Interactions: (12 Hrs.)
Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices. Optical transitions in bulk semiconductors: absorption, spontaneousemission, and stimulated emission; Lasers: principles and working of laser: population inversion, pumping, types of lasers with emphasis on the semi-conductor Lasers.

UNIT-IV
Fibre Optics Communication: (8 Hrs.)
Introduction and importance of use of optical fibres in data transmission, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, applications of optical fibres.

Recommended Books:

1. Satayaparkash, 'QuantumMechanics'.
2. A. Ghatak and Lokanathan, 'QuantumMechanics'.
3. J.Singh,'SemiconductorOptoelectronics:PhysicsandTechnology',McGrawHillInc., **1995.**
4. S.M. Sze, 'Semiconductor Devices: Physics and Technology', Wiley,**2008**.
5. A. Yariv and P. Yeh, 'Photonics: Optical Electronics in Modern Communications', Oxford University Press, New York,**2007**.
6. P. Bhattacharya, 'Semiconductor Optoelectronic Devices', Prentice Hall of India,**1997**.
7. M R Shenoy, 'Online Course: Semiconductor Optoelectronics',NPTEL.
8. MonicaKatiyarandDeepakGupta,'OnlineCourse:OptoelectronicMaterialsandDevices', NPTEL.
9. Ben. G. Streetman, 'Solid State Electronics Devices', Pearson PrenticeHall.

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MATHEMATICS-I (CALCULUS, LINEARALGEBRA)

Subject Code: BMATH1-101   L T PC   Duration: 46Hrs.
                              3 1 0 4

UNIT–I

Calculus: (12 Hrs.)
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L' Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT –II

Sequences and Series: (10 Hrs.)
Convergence of sequence and series, tests for convergence (Comparison test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test, Cauchy's Integral test, series of positive and negative terms); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT –III

Multivariable Calculus: (12 Hrs.)
Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT –IV

Linear Algebra: (12 Hrs.)
Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Recommended Books:
1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9th Edn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9th Edn, John Wiley & Sons, **2006**.
3. T.Veerarajan,'EngineeringMathematicsforFirstYear',TataMcGrawHill,NewDelhi, **2008.**
4. B.V. Ramana, 'Higher Engineering Mathematics', 11th Reprint, Tata McGraw Hill, New Delhi, **2010**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2nd Edn., Brooks/Cole, **2005**.
6. B.S. Grewal, 'Higher Engineering Mathematics', 36th Edn., Khanna Publishers, **2010**.

CourseOutcomes:
The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students withstandard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in theirdisciplines.

The students will learn:

1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gammafunctions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineeringproblems.
3. The tool of power series and Fourier series for learning advanced EngineeringMathematics.

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4. To deal with functions of several variables that are essential in most branches of engineering.
5. The essential tool of matrices and linear algebra in a comprehensive manner.

ENGINEERING GRAPHICS &DESIGN

Subject Code: BMECE0-101   **L T P C**   **Duration: 30 Hrs.**
                                              2 0 0 2

1. Introduction

   Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.

3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.

4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.

5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.

6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.

8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.

9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.

10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books
1. N.D. Bhatt, V.M. Panchal& P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal& C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana& P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICALENGINEERING

Subject Code: BELEE0-101	L T P C	Duration: 42Hrs.
	3 1 0 4	

UNIT-1
DC Circuits: (8 Hrs.)
Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dcexcitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2
AC Circuits: (12 Hrs.)
Representation of sinusoidal waveforms, average, peak and rms values, phasorrepresentation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3
Transformers: (10 Hrs.)
Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load conditions,phasordiagrams,equivalentcircuit,calculationoflossesintransformers,regulation and efficiency, Auto-transformers, their applications and comparison with two winding transformers.

UNIT-4
Electrical Machines: (8 Hrs.)
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Direct-On-Line and Star-Delta starters**.** Construction and working of single-phase motors(Splitphase,shadedpole,capacitorstart,capacitorrun,capacitorstartandrunmotors).

Electrical Installations: (4Hrs.)
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), Moulded Case Circuit Breaker (MCCB), Types of Wiring, Earthing.

Recommended Books:
1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', Tata McGraw Hill,**2010**.
2. D.C. Kulshreshtha, 'Basic Electrical Engineering', McGraw Hill,**2009**.
3. L.S. Bobrow, 'Fundamentals of Electrical Engineering', Oxford University Press,**2011**.
4. E. Hughes, 'Electrical and Electronics Technology', Pearson,**2010**.
5. V.D. Toro, 'Electrical Engineering Fundamentals', Prentice Hall, India,**1989**.
6. J.P.S. Dhillon. J.S. Dhillon and D. Singh, 'Principles of Electrical & Electronics Engineering', Kalyani Publishers, New Delhi, **2005**.

Course Outcomes:

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1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phasetransformers.
3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electricalinstallations.

PHYSICS (SEMICONDUCTOR PHYSICS)LAB.

Subject Code: BPHYS1-102   **L T P C**
                                  0 0 2 1

Note: Students will have to perform at least 10 experiments from the given topic/list.
Experiments based on Semiconductor Physics:
1. To study the V-I characteristic of different PN junction diode-Ge andSi.
2. To study the V-I characteristic of Zenerdiode.
3. To study the V-I characteristic ofLED.
4. To analyze the suitability of a given Zener diode as a powerregulator.
5. To find out the intensity response of a solar cell/Photodiode.
6. To find out the intensity response of aLED.
7. To determine the band gap of asemiconductor.
8. To determine the resistivity of a semiconductor by four probemethod.
9. To confirm the de Broglie equation forelectrons.
10. To study voltage regulation and ripple factor for a half-wave and a full-wave rectifier without and with different filters.
11. To study the magnetic field of a circular coil carrying current.
12. To find out polarizability of a dielectric substance.
13. To study B-H curve of a ferromagnetic material using CRO.
14. To find out the frequency of AC mains using electric-vibrator.
15. To find the velocity of ultrasound in liquid.
16. To study the Hall effect for the determination of charge current densities.
17. Distinguish between Diamagnetic material, Paramagnetic and ferromagnetic material.
18. Measurement of susceptibility of a liquid or a solution by Quincke's method:
19. AFM experiment to study the sample with the nano-scale objects and measuresurface topography with different scales, width and height of nano objects, and force-distance curves.
20. To study the temperature coefficient of Resistance of copper.

Physics Virtual Lab. Experiments:
21. To plot the characteristics of thermistor and hence find the temperature coefficient of resistance.
22. To determine the resistivity of semiconductors by Four Probe Method.
23. To study the forward and reverse biased characteristics of PNP and NPN transistors.
24. To study the B-HCurve.
25. To study the Hall effect experiment to determine the charge carrier density.
26. To determine the magnetic susceptibilities of paramagnetic liquids by Quincke's Method.
27. To study the phenomena of magnetic hysteresis and calculate the retentivity, coercivity and saturation magnetization of a material using a hysteresis loop tracer.
28. Verification and design of combinational logic using AND, OR, NOT, NAND andXOR gates.

Note: Any other experiment based on the above mentioned topics may be included.

ENGINEERING GRAPHICS & DESIGNLAB.

Subject Code: BMECE0-102   **L T P C**   **Duration: 45 Hrs.**
                                                0   0 6* 3

1. **Overview of Computer Graphics**
   Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. **Customization & CAD Drawing**
   Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

3. **Annotations, Layering & other Functions**
   Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

.*Lab work will be performed in two parts:
   (i)   **Computer Lab (2 hours)** Computer Graphics, CAD Drawing etc.
   (ii)   **Drawing Hall (04 hours)**   Manual practice on drawing sheets of theory content the relevant theory part of Engineering Graphics & Design may also be covered in Lab work.

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BASIC ELECTRICAL ENGINEERINGLAB.

Subject Code: BELEE0-102　　　**L T P C**
　　　　　　　　　　　　　　　　　　0 0 2 1

EXPERIMENTS/DEMONSTRATIONS

1. To study basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors and inductors.
2. To verify Ohm's law.
3. To verify Kirchhoff's voltage and current laws.
4. To verify Superposition Theorem.
5. To verify Thevenin Theorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
8. To study resonance phenomenon in R-L-C series circuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstrationofcut-outsectionsofmachines:Inductionmachine(squirrelcagerotorand slip ring arrangement) and single-phase induction machines.
11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase induction motor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

Laboratory Outcomes:
1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

DRUG ABUSE: PROBLEM, MANAGEMENT ANDPREVENTION

Subject Code: BMNCC0-004　　　**L T P C**　　　　　　**Duration: 30Hrs.**
　　　　　　　　　　　　　　　　　　2 0 0 0

UNIT-I
Meaning of Drug Abuse:
Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II
Consequences of Drug Abuse:
Individual: Education, Employment, Income.
Family: Violence.
Society: Crime.
Nation: Law and Order problem.

UNIT-III

Prevention of Drug Abuse:

Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.

School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV

Treatment and Control of Drug Abuse:

Medical Management: Medication for treatment and to reduce withdrawal effects.

Psychological Management: Counselling, Behavioural and Cognitive therapy.

Social Management: Family, Group therapy and Environmental intervention.

Treatment: Medical, Psychological and Social Management.

Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, **2003**.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, **2004.**
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,**1981**.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,**1985**.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,**1982**.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications,Jaipur, **1997.**
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, **2003 &2004**.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,**2013**.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi,**1991**.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar,**2009**.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra,Delhi, **2000**.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press,**2008**.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, **2017**.
14. 'World Drug Report', United Nations Office of Drug and Crime,**2016**.
15. 'World Drug Report', United Nations Office of Drug and Crime,**2017**.

CHEMISTRY-I

Subject Code: BCHEM0-101   **L T P C**   **Duration: 42Hrs.**
                     3 1 0 4

Course Objectives:

1. To understand the atomic and & molecular nature of variousmolecules
2. To understand the bandstructures
3. To elaborate the applications of spectroscopictechniques
4. To understand the thermodynamic functions and theirapplications
5. To rationalize periodicproperties
6. To understand the concepts of stereochemistry and preparation of organicmolecules

UNIT-I
1. Atomic and Molecular Structure: (12Hrs.)

Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homonuclearandheteronucleardiatomics.Pi-molecularorbitalsofbutadieneandbenzeneand aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II
2. Spectroscopic Techniques and Applications: (8Hrs.)

PrinciplesandselectionrulesofElectronicspectroscopyandFluorescencespectroscopyalong withtheirapplications.PrinciplesandselectionrulesofVibrationalandrotationalspectroscopy of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonance imaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4Hrs.)

Ideal gas equation, Ionic, dipolar and vanDer Waals interactions. Realgas equation. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, and HCN

UNIT-III
4. Use of Free Energy in Chemical Equilibria: (6 Hrs.)

Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle

UNIT-IV
6. Stereochemistry: (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Books:
1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L.Tembe,KamaluddinandM.S.Krishnan,'EngineeringChemistry(NPTELWeb-book).
5. P.W. Atkins, 'PhysicalChemistry'.
6. K.P.C. Volhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5thEdn., http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes:
The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.
Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyzemicroscopicchemistryintermsofatomicandmolecularorbitalsandintermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguishtherangesoftheelectromagneticspectrumusedforexcitingdifferentmolecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

MATHEMATICS-II (PROBABILITY AND STATISTICS)

Subject Code: BMATH1-201	L T P C	Duration: 40Hrs.
	3 1 0 4	

UNIT–I

Basic Probability: (12 Hrs.)
Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

UNIT –II

Continuous Probability Distributions: (6 Hrs.)
Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate Distributions: (6 Hrs.) Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

UNIT –III

Basic Statistics: (10 Hrs.)
Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

UNIT –IV

Applied Statistics: (8 Hrs.)
Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Small Samples: (4 Hrs.)
Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Recommended Books:
1. E. Kreyszig, 'Advanced Engineering Mathematics', John Wiley & Sons,**2006**.

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2. P.G. Hoel, S.C. Port and C.J. Stone, 'Introduction to Probability Theory', <u>Universal Book Stall</u>, **2003**.
3. S. Ross, 'A First Course in Probability', <u>Pearson Education India</u>,**2002**.
4. W.Feller,'AnIntroductiontoProbabilityTheoryanditsApplications',Vol.-1,<u>Wiley</u>,**1968**.
5. B.S. Grewal, 'Higher Engineering Mathematics', <u>Khanna Publishers</u>,**2000**.
6. T. Veerarajan, 'Engineering Mathematics', <u>Tata McGraw Hill, New Delhi</u>, **2010**.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

1. The mathematical tools needed in evaluating multiple integrals and their usage.
2. The effective mathematical tools for the solutions of differential equations that model physical processes.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.

ENGLISH

Subject Code: BHUMA0-101	**L T P C**	**Duration: 25Hrs.**
	2 0 0 2	

UNIT-I

1. Vocabulary Building:
  The concept of Word Formation
  Root words from foreign languages and their use in English
  Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
  Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:
  Sentence Structures
  Use of phrases and clauses in sentences
  Importance of proper punctuation
  Creating coherence
  Organizing principles of paragraphs in documents
  Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:
  Subject-verb agreement
  Noun-pronoun agreement
  Misplaced modifiers
  Articles
  Prepositions
  Redundancies
  Clichés

UNIT-IV

4. Nature and Style of sensible Writing:
  Describing
  Defining

Classifying
Providing examples or evidence
Writing introduction and conclusion

5. Writing Practices:
Comprehension
Précis Writing
Essay Writing

Recommended Books:
1. Michael Swan, 'Practical English Usage', <u>OUP</u>, **1995**.
2. F.T. Wood, 'Remedial English Grammar', <u>Macmillan</u>,**2007.**
3. William Zinsser, 'On Writing Well', <u>Harper Resource Book</u>,**2001.**
4. Liz Hamp-Lyons and Ben Heasly, 'Study Writing', <u>Cambridge University Press</u>,**2006**.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', <u>Oxford University Press</u>,**2011**.
6. 'Exercises in Spoken English', Parts. I-III. <u>CIEFL, Hyderabad. Oxford University Press</u>.

Course Outcomes:
1. The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BCSCE0-101   **L T P C**   **Duration: 41Hrs.**
                                         3 0 0 3

UNIT-I
1. Introduction to Programming: (6 Hrs.)
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)**.** Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2. Arithmetic Expressions and Precedence: (12Hrs.)
Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II
3. Arrays: (5 Hrs.)
Arrays (1-D, 2-D), Character arrays and Strings

4. Basic Algorithms: (5 Hrs.)
Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-III
5. Function: (4Hrs.)
Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

6. Recursion: (4Hrs.)
Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-IV
7. Structure: (3 Hrs.)
Structures, Defining structures and Array of Structures

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8. Pointers: (2Hrs.)
Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

9. File Handling: (only if time is available, otherwise should be done as part of thelab)

Recommended Text Books:
1. Byron Gottfried, 'Schaum's Outline of Programming with C', McGrawHill.
2. E. Balaguruswamy, 'Programming in ANSI C', Tata McGrawHill.

Recommended Reference Books:
1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', Prentice Hall of India.

Course Outcomes:
The student will learn
1. To formulate simple algorithms for arithmetic and logicalproblems.
2. To translate the algorithms to programs (in Clanguage).
3. To test and execute the programs and correct syntax and logicalerrors.
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquerapproach.
6. To use arrays, pointers and structures to formulate algorithms andprograms.
7. To apply programming to solve matrix addition and multiplication problemsand searching and sortingproblems.
8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simpleintegration.

CHEMISTRY-I LAB.

Subject Code: BCHEM0-101   **L T P C**
                                      0 0 2 1

Course Objectives:
1. To learn the preparation and standardization ofsolutions
2. To learn the estimation of various physical properties of given liquidsamples
3. To estimate various crucial parameters for watersample
4. To learn the preparation of various molecules and detection of functionalgroups.

Choice of 10-12 experiments from the following:
1. Preparation of a standard solution
2. Determination of surface tension andviscosity
3. Thin layerchromatography
4. Determination of total Alkalinity/ Acidity of a watersample.
5. Determination of residual chlorine in watersample
6. Estimation of total, temporary and permanent hardness ofwater
7. Determination of the rate constant of areaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials andemfs
10. Synthesis of apolymer
11. Saponification /acid value of anoil
12. Detection and confirmation of organic functionalgroups.
13. Models of spatialorientation
14. Totestthevalidityof LambertBeerlaw/Determinationofλ_{max}/Determinationofunknown concentration of asolution.
15. Determination of the partition coefficient of a substance between twoimmiscible

liquids
16. Adsorption of acetic acid bycharcoal
17. Synthesis of a drug – Acetaminophen,Aspirin

Laboratory Outcomes:
The chemistry laboratory course will consist of experiments illustrating the
principles of chemistry relevant to the study of science and engineering. The
students will learn to:
1. Estimate rate constants of reactions from concentration of reactants/products asa
   function oftime
2. Measure molecular/system properties such as surface tension, viscosity,
   conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a saltsample

ENGLISHLAB.

Subject Code: BHUMA0-102   **L T P C**
                                      0 0 2 1

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)
1. ListeningComprehension
2. Pronunciation, Intonation, Stress andRhythm
3. Common Everyday Situations: Conversations andDialogues
4. Communication atWorkplace
5. Interviews
6. FormalPresentations

PROGRAMMING FOR PROBLEM SOLVING LAB.

Subject Code: BCSCE0-102   **L T P C**
                                      0 0 4 2

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach
or algorithm to be implemented for the problem given.
Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions
Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical
integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures
Tutorial 12: File handling:
Lab 12: File operations
Laboratory Outcomes:
1. To formulate the algorithms for simpleproblems
2. To translate given algorithms to a working and correctprogram
3. To be able to correct syntax errors as reported by thecompilers
4. To be able to identify and correct logical errors encountered at runtime
5. To be able to write iterative as well as recursiveprograms
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in definingself-referential structures.
8. To be able to create, read and write to and from simple textfiles.

MANUFACTURING PRACTICES (THEORY &LAB.)

Subject Code: BMFPR0-101   **L T P C**   **Duration: 80 Hrs.**
                                1 0 4 3

Lectures & Videos: (10 Hrs.)
1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing Methods.
2. CNC machining, Additivemanufacturing.
3. Fitting operations & powertools.
4. Sheet MetalOperations.
5. Electrical &Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glasscutting.
8. Metalcasting.
9. Welding (arc welding & gas welding),brazing.

Recommended Text/Reference Books:
1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd.,Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4thEdn., Pearson Education India Edn.,**2002**.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson,**2008**.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4thEdn., Prentice HallIndia, **1998**.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw HillHouse, **2017**.

Course Outcomes:
1. Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice: (70 Hrs.)
1. Machine shop **(10Hrs.)**
2. Fitting shop **(8Hrs.)**

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3. Carpentry **(6Hrs.)**
4. Electrical & Electronics **(8 Hrs.)**
5. Welding shop **(8 Hrs. (Arc welding 4 Hrs. + Gas welding 4Hrs.)**
6. Casting **(8Hrs.)**
7. Sheet Metal Operations **(10 Hrs.)**
8. Smithy **(6Hrs.)**
9. Plastic moulding& Glass Cutting **(6Hrs.)**
10. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:
1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. By assembling different components, they will be able to produce small devices of their interest.

INTRODUCTION TO COMPUTER SCIENCE & ENGINEERING

Subject Code: BMNCC0-014 **L T PC** **Duration: 24Hrs.**
2 0 0 0

UNIT-I

Introduction to Computer Science & Engineering, Difference between science & engineering, Applications of Computer Science & engineering.

UNIT-II

Different branches/fields of Computer Science, Scope of Computer Science in industry, self-employment etc.

UNIT-III

Introduction to Computer, parts of computer system. Difference between Hardware & software, Configuration of computer systems, Types of memory-RAM, ROM, Introduction to UPS-Online and Offline, printers etc.

UNIT-IV

Different types of Software- Application software and System Software, Types of Languages-High level and low level languages, Introduction to Operating System.

GROUP-A
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS4-101	Physics (Mechanics and Mechanics of Solids)	3	1	0	40	60	100	4
BMATH4-101	Mathematics-I (Calculus, Multivariable Calculus & Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS4-102	Physics (Mechanics & Mech. of Solids) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	15	3	10	540	360	900	19

Note:

1. **There will be Induction Programme of 3 weeks before start of normal classes.**
2. **Drug Abuse: Problem, Management and Prevention and Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.**

* As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH4-201	Mathematics-II (Differential Equations)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
	Total	12	2	12	400	400	800	20

Note:

1. **Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rd Semester**

GROUP-B
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH4-101	Mathematics-I (Calculus, Multivariable Calculus & Linear Algebra)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	14	2	12	500	400	900	20

Note:
1. **There will be Induction Programme of 3 weeks before start of normal classes.**
2. **Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.**

* As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS4-101	Physics (Mechanics And Mechanics of Solids)	3	1	0	40	60	100	4
BMATH4-201	Mathematics-II (Differential Equations)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS4-102	Physics (Mechanics & Mech. of Solids) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
	Total	13	3	10	440	360	800	19

Note:
1. **Drug Abuse: Problem, Management and Prevention is a non-credit Course; however, it is necessary to secure at least E grade in it.**
2. **Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester**

PHYSICS (MECHANICS AND MECHANICS OFSOLIDS)

Subject Code: BPHYS4-101   **L T PC**   **Duration: 38Hrs.**
                                     3 1 0 4

UNIT-I
Friction and Mechanics of Solids: (10 Hrs.)
Brief introduction to friction, its laws, types, motion on horizontal and inclined plane, methods of changing friction and applications of friction. Concept of stress–strain, elasticity, plasticity, strain hardening, failure (fracture/yielding), Generalized Hooke's law, one dimensional stress- strain curve. Force analysis -- axial force, shear force, bending moment and twisting moment. Bending stress; Shear stress; Concept of strain energy; Yield criteria.

UNIT-II
Simple Harmonic Oscillator: (8 Hrs.)
Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator- heavy, critical and light damping, energy decay inadamped harmonicoscillator, quality factor, orced oscillations and resonance (electrical and mechanical).

UNIT-III
Vector Mechanics: (**10 Hrs.**)
Transformationofscalarandvectorunderrotationtransformation,ForcesinNature,Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Potential energy function; $F = -$ Grad V, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field; Concept of Central forces; Conservation of Angular Momentum.

UNIT-IV
Frames of References and Rigid Body Dynamics: (**10 Hrs.**)
Inertial and Non-inertial frames of reference; Galilean and Lorentz transformations, Introduction to Cartesian, spherical and cylindrical coordinate system. Basic idea of Centripetal and Coriolis forces along with their applications. Definition and motion of a rigid body in the plane; Rotation in the plane, Angular momentum about apo into fa rigid body inplanar motion; introduction to three-dimension rigid body motion- only need to highlight the distinction from two-dimensional motion with examples.

Recommended Books:
1. M.K. Harbola, 'Engineering Mechanics', 2nd Edn.
2. M.K. Verma, 'Introduction to Mechanics'.
3. Mathur, 'Mechanics', S. ChandPublishing.
4. Upadhyaya, 'Classical Mechanics', Himalaya PublishingHouse.
5. J.L. Synge & B.A. Griffiths, 'Principles ofMechanics'.
6. J.L. Meriam, 'Engineering Mechanics – Dynamics', 7th Edn.
7. W.T. Thomson, 'Theory of Vibrations withApplications'.
8. N.C. Dahl & T.J. Lardner, 'An Introduction to the Mechanics of Solids', 2nd Edn. with SI Units-SHCrandall.
9. Malik and Singh, 'Engineering Physics', Tata McGrawHill.

MATHEMATICS-I (CALCULUS, MULTIVARIABLE CALCULUS & LINEAR ALGEBRA)

SubjectCode:BMATH4-101   **L T P C**   **Duration: 46Hrs.**
                             3 1 0 4

UNIT–I

Calculus: (14 Hrs.)

Rolle's theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions.

UNIT–II

Multivariable Calculus: (10 Hrs.)

Limit, continuity and partial derivatives, Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT–III

Multiple Integration: (12 Hrs.)

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes (Statement only), simple applications involving cubes, sphere and rectangular parallel epipeds.

UNIT–IV

Linear Algebra: (10 Hrs.)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Recommended Books:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9thEdn., Pearson, Reprint, **2002**.
2. T. Veerarajan, 'Engineering Mathematics for First Year', 11thReprint, Tata McGraw Hill, New Delhi,**2008**.
3. B.V. Ramana, 'Higher Engineering Mathematics', Tata McGraw Hill, New Delhi,**2010**.
4. B.S. Grewal, 'Higher Engineering Mathematics', Khanna Publishers, 35thEdn.,**2000**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2ndEdn., Brooks/Cole,**2005**.
6. V. Krishnamurthy, V.P. Mainra and J.L. Arora, 'An Introduction to Linear Algebra', Affiliated East–West Press, Reprint,**2005**.
7. ErwinKreyszig,'AdvancedEngineeringMathematics',9thEdn.,JohnWiley&Sons,**2006**.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding ofBeta and Gammafunctions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineeringproblems.
3. The tool of power series and Fourier series for learning advancedEngineering Mathematics.
4. To deal with functions of several variables that are essential in most branchesof engineering.
5. The essential tool of matrices and linear algebra in a comprehensivemanner.

ENGINEERING GRAPHICS &DESIGN

Subject Code: BMECE0-101 **L T P C** **Duration: 30 Hrs.**
  2 0 0 2

1. Introduction

Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.

3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.

4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.

5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.

6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.

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8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.

9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.

10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books
1. N.D. Bhatt, V.M. Panchal& P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal& C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana& P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICALENGINEERING

SubjectCode:BELEE0-101	L T P C	Duration: 42Hrs.
	3 1 0 4	

UNIT-1

DC Circuits: (8 Hrs.)
Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dcexcitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2

AC Circuits: (12 Hrs.)
Representation of sinusoidal waveforms, average, peak and rms values, phasorre presentation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3

Transformers: (10 Hrs.)
Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load conditions,phasordiagrams,equivalentcircuit,calculationoflossesintransformers,regulation and efficiency, Auto-transformers, their applications and comparison with two winding transformers.

UNIT-4

Electrical Machines: (8 Hrs.)
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Direct-On-Line and Star-Delta starters. Construction and working of single-phase motors(Splitphase,shadedpole,capacitorstart,capacitorrun,capacitorstartandrunmotors).
Electrical Installations: (4Hrs.)
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), Moulded Case Circuit Breaker (MCCB), Types of

Wiring, Earthing.

Recommended Books:
1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', <u>Tata McGraw Hill</u>,**2010**.
2. D.C. Kulshreshtha, 'Basic Electrical Engineering', <u>McGraw Hill</u>,**2009**.
3. L.S. Bobrow, 'Fundamentals of Electrical Engineering', <u>Oxford University Press</u>,**2011**.
4. E. Hughes, 'Electrical and Electronics Technology', <u>Pearson</u>,**2010**.
5. V.D. Toro, 'Electrical Engineering Fundamentals', <u>Prentice Hall, India</u>,**1989**.
6. J.P.S. Dhillon. J.S. Dhillon and D. Singh, 'Principles of Electrical & Electronics Engineering', <u>Kalyani Publishers, New Delhi</u>, **2005**.

Course Outcomes:
1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phase transformers.
3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electrical installations.

Subject Code: BPHYS4-102   **L T P C**
0 0 2 1

Note: Students will have to perform at least 10 experiments from the given topic/list.
Experiments based on Mechanics & Mech. of Solids (Broad Area):

Coupled Oscillators:
1. Experiments on an air-track;
2. Experiment on moment of inertia measurement,
3. Experiments with gyroscope;
4. Resonance phenomena in mechanical oscillators.

Experiments based on the above mentioned Topics:
1. To determine the Height of an object using a Sextant.
2. To determine the angular acceleration α and torque τ offly wheel.
3. To determine the Moment of Inertia of a Flywheel.
4. To determine **g** by Bar Pendulum.
5. To determine **g** by Kater's Pendulum.
6. To study the variation of time period with distance between centre of suspension and centre of gravity for a bar pendulum and to determine: (i)Radius of gyration of the bar about an axis through its C.G. and perpendicular to its length. (ii) The value of **g** in the laboratory.
7. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of **g** and(c) Modulus of rigidity.
8. To find the moment of inertia of an irregular body about an axis through its C.G with the torsional pendulum.
9. To compare the moment of inertia of a solid sphere and hollow sphere or solid disc of same mass with the torsional pendulum.
10. To study the variation of time period with distance between centre of suspension and centre of gravity for a bar pendulum and to determine: (i)Radius of gyration of the bar about an axis through its C.G. and perpendicular to its length. (ii) The value of **g** in the laboratory.
11. To determine the Elastic Constants/Young's Modulus of a Wire by Searle's method.
12. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
13. To determine the Modulus of Rigidity of brass.
14. To find the moment of inertia of an irregular body about an axis through its C.G with the torsional pendulum.
15. Tocomparethemomentofinertiaofasolidsphereandhollowsphereorsoliddiscofsame mass with the torsional pendulum.

Virtual Lab Experiments:
16. Toverifythatenergyconservationandmomentumconservationcanbeusedwithaballistic pendulum to determine the initial velocity of a projectile, its momentum and kinetic energy.
17. To verify the momentum and kinetic energy conservation using collision balls.
18. To understand the torsional oscillation of pendulum in different liquid. and determine the rigidity modulus of the suspension wire using torsion pendulum.
19. To find the Time of flight, Horizontal range and maximum height of a projectile for different velocity, angle of projection, cannon height and environment.
20. The Elastic and Inelastic collision simulation will help to analyse the collision variations for different situations.
21. Study of variation of Momentum, Kinetic energy, Velocity of collision of the objects and the Center of Mass with different velocity and mass.

22. Demonstration of collision behaviour for elastic and inelastictype.
23. Variation of collision behavior in elastic and inelastictype.
24. Calculation of the Momentum, Kinetic energy, and Velocity after collision.
**Note: Any other experiment based on the above mentioned broad topics maybe
included.**

ENGINEERING GRAPHICS & DESIGNLAB.

Subject Code: BMECE0-102 **L T P C** **Duration: 45 Hrs.**
                                0 0 6 3

1. Overview of Computer Graphics
 Listing the computer technologies that impact on graphical communication, Demonstrating
 knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard,
 Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs,
 Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command
 Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select
 and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. Customization & CAD Drawing
 Consisting of set up of the drawing page and the printer, including scale settings, Setting up
 of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and
 tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing
 drawings by using various coordinate input entry methods to draw straight lines, Applying
 various ways of drawing circles;

3. Annotations, Layering & other Functions
 Applying dimensions to objects, applying annotations to drawings; Setting up and use of
 Layers, layers to create drawings, Create, edit and use customized layers; Changing line
 lengths through modifying existing lines (extend/lengthen); Printing documents to paper
 using the print command; orthographic projection techniques.

.*Lab work will be performed in two parts:
 (i)   **Computer Lab (2 hours)** Computer Graphics, CAD Drawing etc.

Drawing Hall (04 hours) Manual practice on drawing sheets of theory content the relevant
theory part of Engineering Graphics & Design may also be covered in Lab work.

BASIC ELECTRICAL ENGINEERINGLAB.

SubjectCode:BELEE0-102   **L T P C**
                                 0 0 2 1

EXPERIMENTS/DEMONSTRATIONS
1. To study basic safety precautions. Introduction and use of measuring instruments –
   voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors andinductors.
2. To verify Ohm'slaw.
3. To verify Kirchhoff's voltage and currentlaws.
4. To verify SuperpositionTheorem.
5. To verify TheveninTheorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and
   verification. Observation of phase differences between current andvoltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and

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verification. Observation of phase differences between current andvoltage.

8. To study resonance phenomenon in R-L-C seriescircuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstration of cut-out sections of machines: Induction machine (squirrelcagerotorand slip ring arrangement) and single-phase induction machines.
11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase inductionmotor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

Laboratory Outcomes:
1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

DRUG ABUSE: PROBLEM, MANAGEMENT ANDPREVENTION

Subject Code: BMNCC0-004   **L T P C**   **Duration: 30Hrs.**
                                 2 0 0 0

UNIT-I

Meaning of Drug Abuse:
Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II

Consequences of Drug Abuse:
Individual: Education, Employment, Income.
Family: Violence.
Society: Crime.
Nation: Law and Order problem.

UNIT-III
Prevention of Drug Abuse:
Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.
School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV
Treatment and Control of Drug Abuse:
Medical Management: Medication for treatment and to reduce withdrawal effects.
Psychological Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental intervention.
Treatment: Medical, Psychological and Social Management.
Control: Role of Media and Legislation.

Recommended Books:
1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, **2003**.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, **2004.**
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,**1981**.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,**1985**.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,**1982**.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications,Jaipur, **1997.**
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, **2003 &2004**.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,**2013**.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi,**1991**.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar,**2009**.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra,Delhi, **2000**.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press,**2008**.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, **2017**.
14. 'World Drug Report', United Nations Office of Drug and Crime,**2016**.
15. 'World Drug Report', United Nations Office of Drug and Crime,**2017**.

CHEMISTRY-I

SubjectCode:BCHEM0-101	L T P C	Duration: 42Hrs.
	3 1 0 4	

Course Objectives:
1. To understand the atomic and & molecular nature of variousmolecules
2. To understand the bandstructures
3. To elaborate the applications of spectroscopictechniques
4. To understand the thermodynamic functions and theirapplications
5. To rationalize periodicproperties
6. To understand the concepts of stereochemistry and preparation of organicmolecules

UNIT-I

1. Atomic and Molecular Structure: (12Hrs.)

Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homonuclearandheteronucleardiatomics.Pi-molecularorbitalsofbutadieneandbenzeneand aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on bandstructures.

UNIT-II

2. Spectroscopic Techniques and Applications: (8Hrs.)

PrinciplesandselectionrulesofElectronicspectroscopyandFluorescencespectroscopyalong withtheirapplications.PrinciplesandselectionrulesofVibrationalandrotationalspectroscopy of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonanceimaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4Hrs.)

Idealgasequation,Ionic,dipolarandvanDerWaalsinteractions.Realgasequation.Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, andHCN

UNIT-III

4. Use of Free Energy in Chemical Equilibria: (6Hrs.)

Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle

UNIT-IV

6. Stereo chemistry: (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Books:

1. B.H. Mahan, 'UniversityChemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles andApplications'.
3. C.N. Banwell, 'Fundamentals of MolecularSpectroscopy'.
4. B.L.Tembe,KamaluddinandM.S.Krishnan,'EngineeringChemistry(NPTELWeb-book).
5. P.W. Atkins, 'PhysicalChemistry'.
6. K.P.C. Volhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5thEdn., http://bcs.whfreeman.com/vollhardtschore5e/default.asp.

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.
Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.The course will enable the studentto:

1. Analyzemicroscopicchemistryintermsofatomicandmolecularorbitalsandintermolecular forces.
2. Rationalize bulk properties and processes using thermodynamicconsiderations.
3. Distinguishtherangesoftheelectromagneticspectrumusedforexcitingdifferentmolecular energy levels in various spectroscopictechniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states andelectronegativity.
5. List major chemical reactions that are used in the synthesis ofmolecules.

MATHEMATICS-II (DIFFERENTIALEQUATIONS)

Subject Code: BMATH4-201	L T P C	Duration: 44Hrs.
	3 1 0 4	

UNIT–I

First Order Ordinary Differential Equations: (6 Hrs.)
Linear and Bernoulli's equations, exact equation, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.
Ordinary Differential Equations of higher Orders: (6 Hrs.):
Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Frobenius method.

UNIT–II

Partial Differential Equations: (12 Hrs.)
First order partial differential equations, solutions of first order linear and non-linear PDEs. Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method.

UNIT–III

Partial Differential Equations: (10Hrs.)
The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. one dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary-value problems for various linear PDEs in variousgeometries.

UNIT –IV

Partial Differential Equations: (10 Hrs.)
Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems), D'Alembert's solutionofthewaveequation;SeparationofvariablesmethodtosimpleproblemsinCartesian coordinates.

Recommended Books:

1. S.J. Farlow, 'Partial Differential Equations for Scientists and Engineers', Dover Publications, **1993**.
2. R. Haberman, 'Elementary Applied Partial Differential Equations with Fourier Series and Boundary Value Problem', 4thEdn., Prentice Hall,**1998**.
3. Ian Sneddon, 'Elements of Partial Differential Equations', McGraw Hill,**1964**.

4. ErwinKreyszig,'AdvancedEngineeringMathematics',9thEdn.,JohnWiley&Sons,**2006**.
5. W.E. Boyce and R.C. DiPrima, 'Elementary Differential Equations and Boundary Value Problems', 9thEdn., Wiley India,**2009**.
6. S.L. Ross, 'Differential Equations', 3rdEdn., Wiley India,**1984**.
7. E.A.Coddington,'AnIntroductiontoOrdinaryDifferentialEquations',PrenticeHallIndia, **1995**.
8. E.L. Ince, 'Ordinary Differential Equations', Dover Publications,**1958**.
9. G.F. Simmons and S.G. Krantz, 'Differential Equations', Tata McGraw Hill, **2007**.

CourseOutcomes:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

1. The mathematical tools needed in evaluating multiple integrals and theirusage.
2. The effective mathematical tools for the solutions of differential equations that model physicalprocesses.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineeringproblems.

ENGLISH

Subject Code: BHUMA0-101	L T P C	Duration: 25Hrs.
	2 0 0 2	

UNIT-I

1. Vocabulary Building:
The concept of Word Formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:
Sentence Structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:
Subject-verb agreement
Noun-pronoun agreement
Misplaced modifiers
Articles
Prepositions
Redundancies
Clichés

843

UNIT-IV

4. Nature and Style of Sensible Writing:

Describing
Defining
Classifying
Providing examples or evidence
Writing introduction and conclusion

5. Writing Practices:

Comprehension
Précis Writing
Essay Writing

Recommended Books:

1. Michael Swan, 'Practical English Usage', <u>OUP</u>, **1995**.
2. F.T. Wood, 'Remedial English Grammar', <u>Macmillan</u>,**2007.**
3. William Zinsser, 'On Writing Well', <u>Harper Resource Book</u>,**2001.**
4. Liz Hamp-Lyons and Ben Heasly, 'Study Writing', <u>Cambridge University Press</u>,**2006**.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', <u>Oxford University Press</u>,**2011**.
6. 'Exercises in Spoken English', Parts. I-III. <u>CIEFL, Hyderabad. Oxford University</u>Press.

Course Outcomes:

1. The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BCSCE0-101	**L T P C**	**Duration: 41Hrs.**
	3 0 0 3	

UNIT-I

1. Introduction to Programming: (6 Hrs.)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)**.** Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2. Arithmetic Expressions and Precedence: (12Hrs.)

Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II

3. Arrays: (5 Hrs.)

Arrays (1-D, 2-D), Character arrays and Strings.

4. Basic Algorithms: (5 Hrs.)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required).

UNIT-III

5. Function: (4Hrs.)

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference.

6. Recursion: (4Hrs.)

Recursion, as a different way of solving problems. Example programs, such as Finding

Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.
UNIT-IV
7. Structure: (3 Hrs.)
Structures, Defining structures and Array of Structures
8. Pointers: (2Hrs.)
Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)
9. File Handling: (only if time is available, otherwise should be done as part of thelab)
Recommended Text Books:
1. Byron Gottfried, 'Schaum's Outline of Programming with C', McGrawHill.
2. E. Balaguruswamy, 'Programming in ANSI C', Tata McGrawHill.
Recommended Reference Books:
1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', Prentice Hall of India.
Course Outcomes:
The student will learn
1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in Clanguage).
3. To test and execute the programs and correct syntax and logical errors.
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conque approach.
6. To use arrays, pointers and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
8. To apply programming to solve simple numerical method problems, namelyrot finding of function, differentiation of function and simple integration.

CHEMISTRY-I LAB.
Subject Code: BCHEM0-101   L T P C 0 0 2 1

Course Objectives:
1. To learn the preparation and standardization of solutions
2. To learn the estimation of various physical properties of given liquid samples
3. To estimate various crucial parameters for water sample
4. To learn the preparation of various molecules and detection of functional groups.
Choice of 10-12 experiments from the following:
1. Preparation of a standard solution
2. Determination of surface tension and viscosity
3. Thin layerchromatography
4. Determination of total Alkalinity/ Acidity of a water sample.
5. Determination of residual chlorine in water sample
6. Estimation of total, temporary and permanent hardness of water
7. Determination of the rate constant of are action
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials andemfs
10. Synthesis of apolymer
11. Saponification /acid value of anoil
12. Detection and confirmation of organic functional groups.

13. Models of spatialorientation
14. TotestthevalidityofLambertBeerlaw/Determinationofλ_{max}/Determinationofunknown concentration of asolution.
15. Determination of the partition coefficient of a substance between twoimmiscible liquids
16. Adsorption of acetic acid bycharcoal
17. Synthesis of a drug – Acetaminophen, Aspirin

Laboratory Outcomes:

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/products asa function oftime
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a salt sample

ENGLISH LAB.

Subject Code: BHUMA0-102   **L T P C**
                                                          0 0 2 1

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)
1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

PROGRAMMING FOR PROBLEM SOLVINGLAB.

Subject Code: BCSCE0-102   **L T P C**
                                                          0 0 4 2

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

Laboratory Outcomes:

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at runtime
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self referential structures.
8. To be able to create, read and write to and from simple text files.

MANUFACTURING PRACTICES (THEORY & LAB.)

Subject Code: BMFPR0-101   **L T PC**   **Duration: 80 Hrs.**
                                       1 0 4 3

Lectures & Videos: (10 Hrs.)

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing Methods.
2. CNC machining, Additive manufacturing.
3. Fitting operations & power tools.
4. Sheet Metal Operations.
5. Electrical &Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glasscutting.
8. Metal casting.
9. Welding (arc welding & gas welding),brazing.

Recommended Text/Reference Books:

1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd.,Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4thEdn., Pearson Education India Edn.,**2002**.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson,**2008**.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4thEdn., Prentice HallIndia, **1998**.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw HillHouse, **2017**.

Course Outcomes:

1. Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice: (70 Hrs.)

1. Machine shop **(10Hrs.)**
2. Fitting shop **(8Hrs.)**
3. Carpentry **(6Hrs.)**
4. Electrical & Electronics **(8 Hrs.)**
5. Welding shop **(8 Hrs. (Arc welding 4 Hrs. + Gas welding 4Hrs.)**
6. Casting **(8Hrs.)**
7. Sheet Metal Operations **(10 Hrs.)**
8. Smithy **(6Hrs.)**
9. Plastic moulding & Glass Cutting **(6Hrs.)**
10. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:

1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. By assembling different components, they will be able to produce small devices of their interest.

INTRODUCTION TO CIVIL ENGINEERING

Subject Code: BMNCC0-011   **L T P C**   **Duration: 30 Hrs.**
2 0 0 0

NOTE: Only Basic Concepts are to be covered for all the topics.

Unit-I

1. **INTRODUCTION:** Civil Engineering, Scope of Civil Engineering, Branches of Civil Engineering, Applications of Civil Engineering to Allied Fields, Role of Civil Engineer in various Construction Activities, Applications in Industrial, Public and Residential Buildings.
2. **BUILDING TECHNOLOGY:** General Idea, Components of Sub-Structure and their Functions, Components of Super-Structure and their Functions, Foundation, Concept of Bearing Capacity, Super Structure, Building Plans and Sectional Details.

Unit-II

3. **BUILDING MATERIALS:** Basic Introduction to Stones, Bricks, Cement, Lime, Sand, Timber, Steel, Plastic, Aluminium, Glass, Roof Covering Materials, Asphalt and Bitumen, Smart and Intelligent Materials.
4. **BUILDING CONSTRUCTION:** Basic Introduction to Masonry, Stone Masonry, Brick Masonry, Mortar, Concrete, Types of Concretes, Reinforced Cement Concrete, Concrete Block Masonry, Reinforced Brick Masonry, Composite Masonry, Pre-stressed Concrete (Pre-Cast Concrete and Pre-Fabricated Construction), Steel Structures.

Unit-III

5. **TRANSPORTATION ENGINEERING:** Different Modes of Transportation, Comparison, Categories of Roads in India, Characteristics of Hill Roads, Rail Gauges used in India,

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Elements of Railway Track, Airports, Runway, Terminal Building, Ports and Harbours, Tunnels, Integration of Transport Modes in Urban Areas.

Unit-IV

6. **ENVIRONMENTAL & WATER RESOURCES:** Basic Introduction, Water and Sewerage Management, Water Supply Engineering and Sanitary Engineering.
   Basic Introduction to Hydraulic Structures, Hydrology and Water Resources, Construction Management.

Books:
1. An Introduction to Civil Engineering by R. Agor.
2. Basic Civil Engineering by G.K. Hiraskar, Dhanpat Rai Publications.

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INTRODUCTION TO CONCERENED BRANCH
(AERONAUTICAL ENGINEERING)

Subject Code – BMNCC0-012	L T P Cr	Duration:30 Hours
	2 0 0 0	

UNIT –I (09 Hrs.)

Introduction :Mankind's desire to fly, various efforts in Pre-Wright Brothers era – brief historical sketch, Wright flyer, Earlier types of flying machines, Development of aeronautical science in America and Europe. Progress in Aircraft design, aerospaceapplications

Current Status : Different types of heavier than air vehicles, along with prominent features. Airplane, Helicopter, Hovercraft, V/STOL machines, modern developments

Airplane Aerodynamics :Nomenclature used in Aerodynamics, different parts of airplane. Wing as lifting surface, Types of wing plan forms, Aerodynamic features like Aerofoil pressure distribution, Aerodynamic forces and moments, Lift and Drag. Drag polar, L/D ratio, high lift devices, Airplane performance like Thrust / Power available, climb and glide, maximum range and endurance, take off and landings. Illustrations throughsketches/plots

UNIT –II (09 Hrs.)

Airplane Stability and Control: Airplane axis system, forces and moments about longitudinal, lateraland vertical axes, equilibrium of forces developed on wing and horizontal tail, centreof gravity, its importance in stability and control. Control surfaces elevators ailerons andrudder.

Airplane Propulsion :Requirement of power : various means of producingpower. Briefdescription of thermodynamics of engines. Piston engines, Jet engines. Engine airframe combinations of varioustypes, their performance. Detailed functioning of components of a Piston-Prop engine. Use of propellers as means of producing forward thrust. Functioning of Jet engine, turbo-prop, turbo-fan, turbo-shaft, Prop-fan, Possible locations of power plant on airplane, Rocket Propulsion, Classification of rockets like liquid and solid propellantrockets.

UNIT –III (06 Hrs.)

Airplane Structure, Materials and Production : Structural arrangement of earlier airplane, developments leading to all metal aircraft. Strength to weight ratio - choice of aircraft materials for different parts. Detailed description of wing, tail and fuselage joints. Stress-Strain diagrams, Plane and Space, Trusses, loads on airplane components, V – ndiagram.

Mechanical properties of mate rials. Materials for different components, use of composites. Aircraft production methods and equipment.

Aircraft Instruments : Flight instruments : Air speed indicators, Altimeters, Rate of climb/descent meter, Gyro based instruments. Engine Performance measuring instruments.

Basic instruments in Avionics.

Aircraft Systems : Elementary ideas about Hydraulic and pneumatic systems, pressurization, temperature control and oxygen system. System Integration, accessories.

UNIT –IV (06 Hrs.)

Aircraft Electrical System: Generation and distribution of Electricity on board the airplane. Flight Control System temperature / Environment, Aircraft Fuel System, Fire Protection, Ice and Rain Protection System.

Airplane Design, type Centrification and Airworthiness : Basic steps in airplane design, airplane specification part/component wise specification, design and testing for certification, Airworthiness requirements, Air safety requirements and standards.

RECOMMENDED BOOKS

Text Books :

1. R S Shevell, Fundamentals of Flight, PrenticeHall

2. E H J Pallet, Aircraft Instruments, HimalayanBooks

3. John Anderson Jr., Introduction to Flight, McGrawHill

Reference Books :

1. E H J Pallet, Aircraft Electrical Systems, HimalayanBooks

2. E W Somerset Maugham, Jet Engine Manual, BIPPublications

3.Fundamentals of Flight; By Dr. O. P. Sharma and Lalit Gupta (underprint

INTRODUCTION TO CONCERENED BRANCH
(AEROSPACE ENGINEERING)

Subject Code – BMNCC0-013   **L T P Cr**   **Duration:30 Hours**
                                  2 0 0 0

UNIT –I (09 Hrs.)

INTRODUCTION AND HISTORY: what is space, Uses of space, History of Spaceflight, Manned space flight, Unmanned space flights, Commercial satellites, military satellites, The future

AIRCRAFT CONFIGURATIONS :Early flying vehicles – hot air balloons – heavier than air flying machines - Classification of flight vehicles, airplanes and Helicopters – Components of an airplane and their functions.

UNIT –II (09 Hrs.)

BASICS OF AERONAUTICS: International StandardAtmosphere, Temperature, pressure and altitude relationships, lift, drag and moment, Basic characteristics of airfoils, NACA

nomenclature, propagation of sound, Mach number, subsonic, transonic, supersonic, hypersonic flows.

AIRCRAFT STRUCTURES

General types of construction, Monocoque and Semimonocoque - construction, Typical wing and fuselage Structures - Materials used inAircraft.

UNIT –III (06 Hrs.)

SYSTEMS AND INSTRUMENTS

Conventional control, Powered controls, Basic instruments for flying, typical systems for controlactuation.

UNIT –IV (06 Hrs.)

POWER PLANTS USED IN AIRCRAFTS

Basic ideas about piston, turboprop and jet engines – comparativemerits, Principle of operation of rocket, types of rocket and typical applications, Exploration intospace.

TEXT BOOKS

1. Kermode,A.C., 'Flight without Formulae', McGrawHill,1987.

2. Shevell,R.S., Fundamentals of flights, Pearson education2004.

REFERENCES

1. Anderson.J.D., Introduction to Flight, McGraw Hill,1995. 2. McKinley.J.L. and R.D. Bent, Aircraft Power Plants, McGraw Hill1993.

3. Pallet.E.H.J. Aircraft Instruments & Principles, Pitman & Co 1933.

GROUP-A
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	15	3	10	540	360	900	19

Note:
1. There will be Induction Programme of 3 weeks before start of normalclasses.
2. Drug Abuse: Problem, Management and Prevention and Introduction toConcerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.

* As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
	Total	12	2	12	400	400	800	20

Note:
1. Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester

GROUP-B
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	14	2	12	500	400	900	20

Note:
1. There will be Induction Programme of 3 weeks before start of normalclasses.
2. Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.
   * As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
	Total	13	3	10	440	360	800	19

Note:
1. Drug Abuse: Problem, Management and Prevention is a non-credit Course; however, it is necessary to secure at least E grade in it.
2. Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester

PHYSICS (SEMICONDUCTORPHYSICS)

Subject Code: BPHYS1-101 | **L T PC** | **Duration: 38Hrs.**
3 1 0 4

UNIT-I

Quantum Theory: (10 Hrs.)

Need and origin of Quantum Concept, Wave-particle duality, Matter waves, Group and Phase velocities, Concept of Uncertainty Principle and its application: nonexistence of electron in the nucleus, wave function & its significance, normalization of wave function, Schrodinger wave equation: time independent and dependent, Eigen functions & Eigen values, particle in a box in 1-D. Concept of scattering from a potential barrier and tunneling.

UNIT-II

Electronic Materials: (8 Hrs.)

Free electron theory, Density of states and energy band diagrams, Introduction to band gap theory, Direct and in direct and gaps. Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level, Effective mass, phonons.

UNIT-III

Semiconductors and Light- Semiconductor Interactions: (12 Hrs.)

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices. Optical transitions in bulk semiconductors: absorption, spontaneousemission, and stimulated emission; Lasers: principles and working of laser: population inversion, pumping, types of lasers with emphasis on the semi-conductor Lasers.

UNIT-IV

Fibre Optics Communication: (8 Hrs.)

Introduction and importance of use of optical fibres in data transmission, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, applications of optical fibres.

Recommended Books:

1. Satayaparkash, 'QuantumMechanics'.
2. A. Ghatak and Lokanathan, 'QuantumMechanics'.
3. J.Singh,'SemiconductorOptoelectronics:PhysicsandTechnology',McGrawHillInc., **1995.**
4. S.M. Sze, 'Semiconductor Devices: Physics and Technology', Wiley,**2008**.
5. A. Yariv and P. Yeh, 'Photonics: Optical Electronics in Modern Communications', Oxford University Press, New York,**2007**.
6. P. Bhattacharya, 'Semiconductor Optoelectronic Devices', Prentice Hall of India,**1997**.
7. M R Shenoy, 'Online Course: Semiconductor Optoelectronics',NPTEL.
8. MonicaKatiyarandDeepakGupta,'OnlineCourse:OptoelectronicMaterialsandDevices', NPTEL.
9. Ben. G. Streetman, 'Solid State Electronics Devices', Pearson PrenticeHall.

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MATHEMATICS-I (CALCULUS, LINEARALGEBRA)

Subject Code: BMATH1-101   **L T P C**   **Duration: 46Hrs.**
                                       3 1 0 4

UNIT–I

Calculus: (12 Hrs.)
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L' Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT –II

Sequences and Series: (10 Hrs.)
Convergence of sequence and series, tests for convergence (Comparison test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test, Cauchy's Integral test, series of positive and negative terms); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT –III

Multivariable Calculus: (12 Hrs.)
Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT –IV

Linear Algebra: (12 Hrs.)
Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Recommended Books:
1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9thEdn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9thEdn, John Wiley & Sons,**2006**.
3. T.Veerarajan,'EngineeringMathematicsforFirstYear',TataMcGrawHill,NewDelhi, **2008.**
4. B.V. Ramana, 'Higher Engineering Mathematics', 11thReprint, Tata McGraw Hill, New Delhi,**2010**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2ndEdn., Brooks/Cole,**2005**.
6. B.S. Grewal, 'Higher Engineering Mathematics', 36thEdn., Khanna Publishers, **2010**.

CourseOutcomes:
The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students withstandard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in theirdisciplines.

The students will learn:
1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gammafunctions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineeringproblems.
3. The tool of power series and Fourier series for learning advanced EngineeringMathematics.

4. To deal with functions of several variables that are essential in most branches of engineering.

5. The essential tool of matrices and linear algebra in a comprehensive manner.

ENGINEERING GRAPHICS &DESIGN

Subject Code: BMECE0-101   **L T P C**   **Duration: 30 Hrs.**
                                     2 0 0 2

1. Introduction

   Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.

3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.

4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.

5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.

6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.

8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.

9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.

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10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books

1. N.D. Bhatt, V.M. Panchal& P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal& C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana& P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICALENGINEERING

Subject Code: BELEE0-101	L T P C	Duration: 42Hrs.
	3 1 0 4	

UNIT-1

DC Circuits: (8 Hrs.)

Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dcexcitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2

AC Circuits: (12 Hrs.)

Representation of sinusoidal waveforms, average, peak and rms values, phasorrepresentation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3

Transformers: (10 Hrs.)

Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load conditions,phasordiagrams,equivalentcircuit,calculationoflossesintransformers,regulation and efficiency, Auto-transformers, their applications and comparison with two winding transformers.

UNIT-4

Electrical Machines: (8 Hrs.)

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Direct-On-Line and Star-Delta starters. Construction and working of single-phase motors(Splitphase,shadedpole,capacitorstart,capacitorrun,capacitorstartandrunmotors).

Electrical Installations: (4Hrs.)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), Moulded Case Circuit Breaker (MCCB), Types of Wiring, Earthing.

Recommended Books:

1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', Tata McGraw Hill,**2010**.
2. D.C. Kulshreshtha, 'Basic Electrical Engineering', McGraw Hill,**2009**.
3. L.S. Bobrow, 'Fundamentals of Electrical Engineering', Oxford University Press,**2011**.
4. E. Hughes, 'Electrical and Electronics Technology', Pearson,**2010**.
5. V.D. Toro, 'Electrical Engineering Fundamentals', Prentice Hall, India,**1989**.
6. J.P.S. Dhillon. J.S. Dhillon and D. Singh, 'Principles of Electrical & Electronics Engineering', Kalyani Publishers, New Delhi, **2005**.

Course Outcomes:

1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phasetransformers.
3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electricalinstallations.

1. To understand and analyze basic DC and AC circuits.

PHYSICS (SEMICONDUCTOR PHYSICS)LAB.

Subject Code: BPHYS1-102   **L T P C**
                                      0 0 2 1

Note: Students will have to perform at least 10 experiments from the given topic/list.
Experiments based on Semiconductor Physics:
1. To study the V-I characteristic of different PN junction diode-Ge andSi.
2. To study the V-I characteristic of Zenerdiode.
3. To study the V-I characteristic ofLED.
4. To analyze the suitability of a given Zener diode as a powerregulator.
5. To find out the intensity response of a solar cell/Photodiode.
6. To find out the intensity response of aLED.
7. To determine the band gap of asemiconductor.
8. To determine the resistivity of a semiconductor by four probemethod.
9. To confirm the de Broglie equation forelectrons.
10. To study voltage regulation and ripple factor for a half-wave and a full-wave rectifier without and with different filters.
11. To study the magnetic field of a circular coil carrying current.
12. To find out polarizability of a dielectric substance.
13. To study B-H curve of a ferromagnetic material using CRO.
14. To find out the frequency of AC mains using electric-vibrator.
15. To find the velocity of ultrasound in liquid.
16. To study the Hall effect for the determination of charge current densities.
17. Distinguish between Diamagnetic material, Paramagnetic and ferromagnetic material.
18. Measurement of susceptibility of a liquid or a solution by Quincke's method:
19. AFM experiment to study the sample with the nano-scale objects and measuresurface topography with different scales, width and height of nano objects, and force-distance curves.
20. To study the temperature coefficient of Resistance of copper.

Physics Virtual Lab. Experiments:
21. To plot the characteristics of thermistor and hence find the temperature coefficient of resistance.
22. To determine the resistivity of semiconductors by Four Probe Method.
23. To study the forward and reverse biased characteristics of PNP and NPN transistors.
24. To study the B-HCurve.
25. To study the Hall effect experiment to determine the charge carrier density.
26. To determine the magnetic susceptibilities of paramagnetic liquids by Quincke's Method.
27. To study the phenomena of magnetic hysteresis and calculate the retentivity, coercivity and saturation magnetization of a material using a hysteresis loop tracer.
28. Verification and design of combinational logic using AND, OR, NOT, NAND andXOR gates.

Note: Any other experiment based on the above mentioned topics may be included.

ENGINEERING GRAPHICS & DESIGNLAB.

Subject Code: BMECE0-102　　　**L T P C**　　　　　　　　**Duration: 45 Hrs.**
　　　　　　　　　　　　　　　0　0　6* 3

1. **Overview of Computer Graphics**
Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. **Customization & CAD Drawing**
Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

3. **Annotations, Layering & other Functions**
Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

.*Lab work will be performed in two parts:
　　(i)　　**Computer Lab　(2 hours)**　Computer Graphics, CAD Drawing etc.
　　(ii)　　**Drawing Hall (04 hours)**　Manual practice on drawing sheets of theory content the relevant theory part of Engineering Graphics & Design may also be covered in Lab work.

BASIC ELECTRICAL ENGINEERINGLAB.

Subject Code: BELEE0-102   **L T P C**
                                      0 0 2 1

EXPERIMENTS/DEMONSTRATIONS

1. To study basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors and inductors.
2. To verify Ohm's law.
3. To verify Kirchhoff's voltage and current laws.
4. To verify Superposition Theorem.
5. To verify Thevenin Theorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
8. To study resonance phenomenon in R-L-C series circuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstrationofcut-outsectionsofmachines:Inductionmachine(squirrelcagerotorand slip ring arrangement) and single-phase induction machines.
11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase induction motor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

Laboratory Outcomes:
1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

DRUG ABUSE: PROBLEM, MANAGEMENT ANDPREVENTION

Subject Code: BMNCC0-004   **L T PC**   **Duration: 30Hrs.**
                                  2 0 0 0

UNIT-I

Meaning of Drug Abuse:
Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II

Consequences of Drug Abuse:
Individual: Education, Employment, Income.
Family: Violence.
Society: Crime.
Nation: Law and Order problem.

UNIT-III

Prevention of Drug Abuse:

Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.

School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV

Treatment and Control of Drug Abuse:

Medical Management: Medication for treatment and to reduce withdrawal effects.

Psychological Management: Counselling, Behavioural and Cognitive therapy.

Social Management: Family, Group therapy and Environmental intervention.

Treatment: Medical, Psychological and Social Management.

Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, **2003**.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, **2004.**
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,**1981**.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,**1985**.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,**1982**.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications,Jaipur, **1997.**
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, **2003 &2004**.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,**2013**.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi,**1991**.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar,**2009**.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra,Delhi, **2000**.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention andCessation', Cambridge University Press,**2008**.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, **2017**.
14. 'World Drug Report', United Nations Office of Drug and Crime,**2016**.
15. 'World Drug Report', United Nations Office of Drug and Crime,**2017**.

CHEMISTRY-I		

Subject Code: BCHEM0-101	L T P C	Duration: 42Hrs.
	3 1 0 4	

Course Objectives:

1. To understand the atomic and & molecular nature of variousmolecules
2. To understand the bandstructures
3. To elaborate the applications of spectroscopictechniques
4. To understand the thermodynamic functions and theirapplications
5. To rationalize periodicproperties
6. To understand the concepts of stereochemistry and preparation of organicmolecules

UNIT-I

1. Atomic and Molecular Structure: (12Hrs.)

Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homonuclearandheteronucleardiatomics.Pi-molecularorbitalsofbutadieneandbenzeneand aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II

2. Spectroscopic Techniques and Applications: (8Hrs.)

PrinciplesandselectionrulesofElectronicspectroscopyandFluorescencespectroscopyalong withtheirapplications.PrinciplesandselectionrulesofVibrationalandrotationalspectroscopy   of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonance imaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4Hrs.)

Ideal gas equation, Ionic, dipolar and vanDer Waals interactions. Realgas equation. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, and HCN

UNIT-III

4. Use of Free Energy in Chemical Equilibria: (6 Hrs.)

Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle

UNIT-IV

6. Stereochemistry: (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Books:

1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L.Tembe,KamaluddinandM.S.Krishnan,'EngineeringChemistry(NPTELWeb-book).
5. P.W. Atkins, 'PhysicalChemistry'.
6. K.P.C. Volhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5thEdn., http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyzemicroscopicchemistryintermsofatomicandmolecularorbitalsandintermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguishtherangesoftheelectromagneticspectrumusedforexcitingdifferentmolecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

MATHEMATICS-II (PROBABILITY AND STATISTICS)

Subject Code: BMATH1-201   **L T P C**   **Duration: 40Hrs.**
                                 3 1 0 4

UNIT–I

Basic Probability: (12 Hrs.)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

UNIT –II

Continuous Probability Distributions: (6 Hrs.)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate Distributions: (6 Hrs.) Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

UNIT –III

Basic Statistics: (10 Hrs.)

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

UNIT –IV

Applied Statistics: (8 Hrs.)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Small Samples: (4 Hrs.)

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Recommended Books:

1. E. Kreyszig, 'Advanced Engineering Mathematics', <u>John Wiley & Sons</u>,**2006**.

2. P.G. Hoel, S.C. Port and C.J. Stone, 'Introduction to Probability Theory', <u>Universal Book Stall</u>, **2003**.
3. S. Ross, 'A First Course in Probability', <u>Pearson Education India</u>,**2002**.
4. W.Feller,'AnIntroductiontoProbabilityTheoryanditsApplications',Vol.-1,<u>Wiley</u>,**1968**.
5. B.S. Grewal, 'Higher Engineering Mathematics', <u>Khanna Publishers</u>,**2000**.
6. T. Veerarajan, 'Engineering Mathematics', <u>Tata McGraw Hill, New Delhi</u>, **2010**.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

1. The mathematical tools needed in evaluating multiple integrals and their usage.
2. The effective mathematical tools for the solutions of differential equations that model physical processes.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.

ENGLISH		
Subject Code: BHUMA0-101	**L T PC** **2 0 0 2**	**Duration: 25Hrs.**

UNIT-I

1. Vocabulary Building:
   The concept of Word Formation
   Root words from foreign languages and their use in English
   Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
   Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:
   Sentence Structures
   Use of phrases and clauses in sentences
   Importance of proper punctuation
   Creating coherence
   Organizing principles of paragraphs in documents
   Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:
   Subject-verb agreement
   Noun-pronoun agreement
   Misplaced modifiers
   Articles
   Prepositions
   Redundancies
   Clichés

UNIT-IV

4. Nature and Style of sensible Writing:
   Describing
   Defining

Classifying
Providing examples or evidence
Writing introduction and conclusion

5. Writing Practices:
Comprehension
Précis Writing
Essay Writing

Recommended Books:

1. Michael Swan, 'Practical English Usage', OUP, **1995**.
2. F.T. Wood, 'Remedial English Grammar', Macmillan,**2007.**
3. William Zinsser, 'On Writing Well', Harper Resource Book,**2001.**
4. Liz Hamp-Lyons and Ben Heasly, 'Study Writing', Cambridge University Press,**2006**.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', Oxford University Press,**2011**.
6. 'Exercises in Spoken English', Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress.

Course Outcomes:

1. The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BCSCE0-101	L T PC	Duration: 41Hrs.
	3 0 0 3	

UNIT-I

1. Introduction to Programming: (6 Hrs.)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)**.** Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2. Arithmetic Expressions and Precedence: (12Hrs.)

Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II

3. Arrays: (5 Hrs.)

Arrays (1-D, 2-D), Character arrays and Strings

4. Basic Algorithms: (5 Hrs.)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-III

5. Function: (4Hrs.)

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

6. Recursion: (4Hrs.)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-IV

7. Structure: (3 Hrs.)

Structures, Defining structures and Array of Structures

8. Pointers: (2Hrs.)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

9. File Handling: (only if time is available, otherwise should be done as part of thelab)

Recommended Text Books:

1. Byron Gottfried, 'Schaum's Outline of Programming with C', McGrawHill.
2. E. Balaguruswamy, 'Programming in ANSI C', Tata McGrawHill.

Recommended Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', Prentice Hall of India.

Course Outcomes:

The student will learn

1. To formulate simple algorithms for arithmetic and logicalproblems.
2. To translate the algorithms to programs (in Clanguage).
3. To test and execute the programs and correct syntax and logicalerrors.
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquerapproach.
6. To use arrays, pointers and structures to formulate algorithms andprograms.
7. To apply programming to solve matrix addition and multiplication problemsand searching and sortingproblems.
8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simpleintegration.

CHEMISTRY-I LAB.

Subject Code: BCHEM0-101   **L T P C**
                                                      0 0 2 1

Course Objectives:

1. To learn the preparation and standardization ofsolutions
2. To learn the estimation of various physical properties of given liquidsamples
3. To estimate various crucial parameters for watersample
4. To learn the preparation of various molecules and detection of functionalgroups.

Choice of 10-12 experiments from the following:

1. Preparation of a standard solution
2. Determination of surface tension andviscosity
3. Thin layerchromatography
4. Determination of total Alkalinity/ Acidity of a watersample.
5. Determination of residual chlorine in watersample
6. Estimation of total, temporary and permanent hardness ofwater
7. Determination of the rate constant of areaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials andemfs
10. Synthesis of apolymer
11. Saponification /acid value of anoil
12. Detection and confirmation of organic functionalgroups.
13. Models of spatialorientation
14. TotestthevalidityofLambertBeerlaw/Determinationofλ_{max}/Determinationofunknown concentration of asolution.
15. Determination of the partition coefficient of a substance between twoimmiscible

liquids
16. Adsorption of acetic acid bycharcoal
17. Synthesis of a drug – Acetaminophen,Aspirin

Laboratory Outcomes:
The chemistry laboratory course will consist of experiments illustrating the
principles of chemistry relevant to the study of science and engineering. The
students will learn to:
1. Estimate rate constants of reactions from concentration of reactants/products asa
   function oftime
2. Measure molecular/system properties such as surface tension, viscosity,
   conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a saltsample

ENGLISHLAB.

Subject Code: BHUMA0-102   **L T P C**
                                      0 0 2 1

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)
1. ListeningComprehension
2. Pronunciation, Intonation, Stress andRhythm
3. Common Everyday Situations: Conversations andDialogues
4. Communication atWorkplace
5. Interviews
6. FormalPresentations

PROGRAMMING FOR PROBLEM SOLVING LAB.

Subject Code: BCSCE0-102   **L T P C**
                                      0 0 4 2

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach
or algorithm to be implemented for the problem given.
Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions
Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical
integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures
Tutorial 12: File handling:
Lab 12: File operations
Laboratory Outcomes:
1. To formulate the algorithms for simpleproblems
2. To translate given algorithms to a working and correctprogram
3. To be able to correct syntax errors as reported by thecompilers
4. To be able to identify and correct logical errors encountered at runtime
5. To be able to write iterative as well as recursiveprograms
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in definingself-referential structures.
8. To be able to create, read and write to and from simple textfiles.

MANUFACTURING PRACTICES (THEORY &LAB.)

Subject Code: BMFPR0-101   **L T PC**   **Duration: 80 Hrs.**
                                     1 0 4 3

Lectures & Videos: (10 Hrs.)
1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing Methods.
2. CNC machining, Additivemanufacturing.
3. Fitting operations & powertools.
4. Sheet MetalOperations.
5. Electrical &Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glasscutting.
8. Metalcasting.
9. Welding (arc welding & gas welding),brazing.
Recommended Text/Reference Books:
1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd.,Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4thEdn., Pearson Education India Edn.,**2002**.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson,**2008**.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4thEdn., Prentice HallIndia, **1998**.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw HillHouse, **2017**.
Course Outcomes:
1. Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.
Workshop Practice: (70 Hrs.)
1. Machine shop **(10Hrs.)**
2. Fitting shop **(8Hrs.)**

3. Carpentry **(6Hrs.)**
4. Electrical & Electronics **(8 Hrs.)**
5. Welding shop **(8 Hrs. (Arc welding 4 Hrs. + Gas welding 4Hrs.)**
6. Casting **(8Hrs.)**
7. Sheet Metal Operations **(10 Hrs.)**
8. Smithy **(6Hrs.)**
9. Plastic moulding& Glass Cutting **(6Hrs.)**
10. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:
1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. By assembling different components, they will be able to produce small devices of their interest.

INTRODUCTION TO COMPUTER & COMMUNICATION ENGINEERING

Subject Code:	L T PC	Duration: 30Hrs.
	2 0 0 0	

Course Objectives:
1. To make student aware of Basic computer devices.
2. To make the students aware about the major study areas of Computer & Communication Engineering.
3. To make the students aware about the major advantages of Computer & Communication Engineering.
4. To provide some insight to the various professional opportunities/ Recruiters and higher education opportunities.

Course Outcomes:
1. Students shall be able to know about various diversified fields which they can take up as their career.
2. Students shall be able to appreciate the role of Computer & Communication Engineering in Day to Day life.
3. Students shall be able to appreciate the role of a Computer & Communication Engineer towards Nation Building.
4. Students shall be able to know the hardware and software of computer.

UNIT-I (7 Hrs)
Elementary ideas of Analog & Digital Electronics
Semiconductors and their classifications, Junction diodes and their applications, Bipolar Junction Transistor - operation and application as switch and amplifier, Analog Vs digital signals and systems, Logic gates and operations , concepts of combinational and sequential circuits, overview of microprocessors and microcontrollers.

UNIT-II (8 Hrs)
Electronics Communication fundamentals : Wired and wire-less communication, Electromagnetic model for communication, EM Spectrum, overview of optical fibre/mobile/satellite/microwave and radar communication, evolution of communication from 1G, 2G, 3G, 4G and 5G.

UNIT-III(8 hrs)
Introduction to Computer Science: Introduction to Computer Science & Engineering, Difference between science & engineering, Applications of Computer Science & engineering. Different branches/fields of Computer Science, Scope of Computer Science in industry, self-employment etc.

UNIT-IV(7 hrs)
Introduction to parts of Computer: Introduction to Computer, parts of computer system. Difference between Hardware & software, Configuration of computer systems, Types of memory-RAM, ROM, Introduction to UPS-Online and Offline, printers etc. Different types of Software- Application software and System Software, Types of Languages-High level and low level languages, Introduction to Operating System.

GROUP-A
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS2-101	Physics (Electromagnetism)	3	1	0	40	60	100	4
BMATH2-101	Mathematics-I (Calculus and Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS2-102	Physics (Electromagnetism) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	15	3	10	540	360	900	19

Note:
1. There will be Induction Programme of 3 weeks before start of normal classes.
2. Drug Abuse: Problem, Management and Prevention & Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.

* As per AICTE SIP Manual Hour Plan available at **http://fdp-si.aicte-india.org**

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH2-201	Mathematics-II (Calculus, Ordinary Differential Equations and Complex Variable)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
	Total	15	2	12	500	400	900	20

Note:
1. Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rd Semester

GROUP-B
1ST SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH2-101	Mathematics-I (Calculus and Linear Algebra)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
BMNCC0-010	Universal Human values - I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
	Total	14	2	12	500	400	900	20

Note:
1. **There will be Induction Programme of 3 weeks before start of normal classes.**
2. **Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.**
   * As per AICTE SIP Manual Hour Plan available at http://fdp-si.aicte-india.org

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS2-101	Physics (Electromagnetism)	3	1	0	40	60	100	4
BMATH2-201	Mathematics-II (Calculus, Ordinary Differential Equations and Complex Variable)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS2-102	Physics (Electromagnetism) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
	Total	13	3	10	440	360	800	19

Note:
1. **Drug Abuse: Problem, Management and Prevention is a non-credit Course; however, it is necessary to secure at least E grade init.**
2. **Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rdSemester**

PHYSICS (ELECTROMAGNETISM)

Subject Code: BPHYS2-101   **L T P C**   **Duration: 38 Hrs.**
                                3 1 0 4

UNIT-I

1. Electrostatics in Vacuum and in Linear Dielectric Medium: (10 Hrs.)
Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential. Basic idea of uniqueness theorem and method of images (plane conducting surface). Introduction to boundary conditions of electric field and electrostatic potential. Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement.

UNIT-II

2. Magnetostatics and Magnetostatics in Linear Magnetic Medium: (10 Hrs.)
Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field. Concept of magnetization and associated bound currents; auxiliary magnetic field H, Boundary conditions on B and H. Magnetic susceptibility and ferromagnetic, paramagnetic and diamagnetic materials. Qualitative discussion of magnetic field in presence of magnetic materials.

UNIT-III

3. Faraday's Laws and Maxwell's Equations: (10 Hrs.)
Introduction to Faraday's law, Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and calculating electric field due to changing magnetic fields. Continuity equation for current densities; Modifying equation for the curl of magnetic field to satisfy continuity equation; displacement current and magnetic field arising from time dependent electric field; Maxwell's equation in vacuum and non-conducting medium. Poynting vector (concept only).

UNIT-IV

4. Electromagnetic Waves: (8 Hrs.)
The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; relation between electric and magnetic fields of an electromagnetic wave; energy carried by electromagnetic waves.

Recommended Books:
1. David Griffiths, 'Introduction to Electrodynamics'.
2. Prabir K. Basu & Hrishikesh Dhasmana, 'Electromagnetic Theory'.
3. Khunita, 'Fundamentals of Electromagnetic Theory'.
4. S.P. Puri, 'Classical Electrodynamics', Tata McGraw Hill
5. Gupta & Gaur, 'Engineering Physics', Dhanpat Rai.
6. Malik and Singh, 'Engineering Physics', Tata McGraw Hill.
7. Naidu, 'Engineering Physics', Pearson.

MATHEMATICS-I

Subject Code: BMATH2-101   **L T P C**   **Duration: 40 Hrs.**
                                3 1 0 4

UNIT-I

Calculus: (12 Hrs.)
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT-II
Sequences and Series: (11 Hrs.)
Convergence of sequence and series, tests for convergence (Comparison test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test, Cauchy's Integral test, series of positive and negative terms); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT-III
Multivariable Calculus (Differentiation): (11 Hrs.)
Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT-IV
Linear Algebra: (12 Hrs.)
Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Recommended Books:
1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9ᵗʰ Edn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9ᵗʰ Edn., John Wiley & Sons, **2006**.
3. T. Veerarajan, 'Engineering Mathematics for First Year', Tata McGraw Hill, New Delhi, **2008**.
4. B.V. Ramana, 'Higher Engineering Mathematics', 11ᵗʰ Reprint, Tata McGraw Hill, New Delhi, **2010**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2ⁿᵈ Edn., Brooks/Cole, **2005**.
6. B.S. Grewal, 'Higher Engineering Mathematics', 36ᵗʰ Edn., Khanna Publishers, **2010**.

Course Outcomes:
The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:
1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
3. The tool of power series and Fourier series for learning advanced Engineering Mathematics.
4. To deal with functions of several variables that are essential in most branches of engineering.
5. The essential tool of matrices and linear algebra in a comprehensive manner.

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ENGINEERING GRAPHICS & DESIGN

Subject Code: BMECE0-101   **L T P C**   Duration: 30 Hrs.
                                  2 0 0 2

1. Introduction

Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science.Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.

3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.

4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.

5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.

6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.

8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.

9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.

10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books
1. N.D. Bhatt, V.M. Panchal& P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal& C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana& P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICAL ENGINEERING

Subject Code: BELEE0-101   **L T P C**   **Duration: 42 Hrs.**
                                          3 1 0 4

UNIT-1
DC Circuits: (8 Hrs.)
Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2
AC Circuits: (12 Hrs.)
Representation of sinusoidal waveforms, average, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3
Transformers: (10 Hrs.)
Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load conditions, phasor diagrams, equivalent circuit, calculation of losses in transformers, regulation and efficiency, Auto-transformers, their applications and comparison with two winding transformers.

UNIT-4
Electrical Machines: (8 Hrs.)
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Direct-On-Line and Star-Delta starters. Construction and working of single-phase motors (Split phase, shaded pole, capacitor start, capacitor run, capacitor start and run motors).

Electrical Installations: (4 Hrs.)
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), Moulded Case Circuit Breaker (MCCB), Types of Wiring, Earthing.

Recommended Books:
1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', Tata McGraw Hill, **2010**.
2. D.C. Kulshreshtha, 'Basic Electrical Engineering', McGraw Hill, **2009**.
3. L.S. Bobrow, 'Fundamentals of Electrical Engineering', Oxford University Press, **2011**.
4. E. Hughes, 'Electrical and Electronics Technology', Pearson, **2010**.
5. V.D. Toro, 'Electrical Engineering Fundamentals', Prentice Hall, India, **1989**.
6. J.P.S. Dhillon. J.S. Dhillon and D. Singh, 'Principles of Electrical & Electronics Engineering', Kalyani Publishers, New Delhi, **2005**.

Course Outcomes:
1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phase transformers.

3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electrical installations.

PHYSICS (ELECTROMAGNETISM) LAB.

Subject Code: BPHYS2-102   **L T P C**
                                       0 0 2 1

Note: Students will have to perform at least 10 experiments from the given topic/list.
Experiments based on Electromagnetism (Broad Area):
1. Experiments on electromagnetic induction and electromagnetic breaking;
2. LC circuit and LCR circuit;
3. Resonance phenomena in LCR circuits;
4. Magnetic field from Helmholtz coil;
5. Measurement of Lorentz force in a vacuum tube.

Experiments based on the above mentioned topics:
1. To determine unknown capacitance by flashing and quenching method.
2. To study the Characteristics of a Series RC Circuit.
3. To determine the self-inductance of the coil (L) using Anderson's bridge.
4. To study the series LCR circuit and determine its (a) Resonant Frequency, (b) Quality factor.
5. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency (b) Quality factor Q.
6. To determine self-inductance of a coil by Rayleigh's method.
7. To determine the mutual inductance of two coils by Absolute method.
8. To study the magnetic field of a circular coil carrying current.
9. To study B-H curve using CRO.
10. To find out the frequency of AC mains using electric-vibrator.
11. To find out polarizability of a dielectric substance.
12. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
13. To study the variation of magnetic field with distance along axis of a circular coil-realization of Helmholtz's coils.
14. To study the induced emf as a function of the velocity of magnet and to study the phenomenon of electromagnetic damping.
15. To study the field pattern of various modes inside a rectangular waveguide.
16. To study the field pattern of various modes inside a rectangular waveguide.

Virtual Lab Experiments:
17. To find out the horizontal component of earth's magnetic field (Bh).
18. An experiment to study the variation of magnetic field with distance along the axis of a circular coil carrying current.
19. Aim is to find the horizontal intensity of earth's magnetic field at a place and moment of the bar magnet.
20. To determine the self-inductance of the coil (L) using Anderson's bridge.
21. To calculate the value of inductive reactance (XL) of the coil at a particular frequency.
22. The temperature coefficient of resistor simulation will help the user to easily identify the change in resistivity of the resistor according to the change in temperature.

Note: Any other experiment based on the above mentioned broad topics may be included.

ENGINEERING GRAPHICS & DESIGN LAB.

Subject Code: BMECE0-102   **L T P C**   **Duration: 45 Hrs.**
0 0 6* 3

1. **Overview of Computer Graphics**
Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. **Customization & CAD Drawing**
Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

3. **Annotations, Layering & other Functions**
Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

.* Lab work will be performed in two parts:
   (i)   **Computer Lab (2 hours)** Computer Graphics, CAD Drawing etc.

Drawing Hall (04 hours)   Manual practice on drawing sheets of theory content the relevant theory part of Engineering Graphics & Design may also be covered in Lab work.

BASIC ELECTRICAL ENGINEERING LAB.

Subject Code: BELEE0-102   **L T P C**
0 0 2 1

EXPERIMENTS/DEMONSTRATIONS

1. To study basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors andinductors.
2. To verify Ohm's law.
3. To verify Kirchhoff's voltage and current laws.
4. To verify Superposition Theorem.
5. To verify Thevenin Theorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
8. To study resonance phenomenon in R-L-C series circuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstration of cut-out sections of machines: Induction machine (squirrel cage rotor and

slip ring arrangement) and single-phase induction machines.

11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase induction motor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

Laboratory Outcomes
1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-004	L T P C	Duration: 30 Hrs.
	2 0 0 0	

UNIT-I

Meaning of Drug Abuse:
Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II

Consequences of Drug Abuse:
Individual: Education, Employment, Income.
Family: Violence.
Society: Crime.
Nation: Law and Order problem.

UNIT-III

Prevention of Drug Abuse:
Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.
School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV

Treatment and Control of Drug Abuse:
Medical Management: Medication for treatment and to reduce withdrawal effects.
Psychological Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental intervention.
Treatment: Medical, Psychological and Social Management.
Control: Role of Media and Legislation.

Recommended Books:
1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, **2003**.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, **2004.**
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, **1981**.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, **1985**.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, **1982**.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, **1997.**
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, **2003 & 2004**.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, **2013**.
9. Bhim Sain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, **1991**.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, **2009**.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, **2000**.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention and Cessation', Cambridge University Press, **2008**.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, **2017**.
14. 'World Drug Report', United Nations Office of Drug and Crime, **2016**.
15. 'World Drug Report', United Nations Office of Drug and Crime, **2017**.

CHEMISTRY-I

Subject Code: BCHEM0-101	L T P C	Duration: 42 Hrs.
	3 1 0 4	

Course Objectives:
1. To understand the atomic and & molecular nature of various molecules
2. To understand the band structures
3. To elaborate the applications of spectroscopic techniques
4. To understand the thermodynamic functions and their applications
5. To rationalize periodic properties
6. To understand the concepts of stereochemistry and preparation of organic molecules

UNIT-I
1. Atomic and Molecular Structure: (12 Hrs.)
Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homonuclear and heteronuclear diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II
2. Spectroscopic Techniques and Applications: (8 Hrs.)
Principles and selection rules of Electronic spectroscopy and Fluorescence spectroscopy along with their applications. Principles and selection rules of Vibrational and rotational spectroscopy of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonance imaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4 Hrs.)
Ideal gas equation, Ionic, dipolar and van Der Waals interactions. Real gas equation. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, and HCN

UNIT-III
4. Use of Free Energy in Chemical Equilibria: (6 Hrs.)
Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)
Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle.

UNIT-IV
6. Stereochemistry: (4 Hrs.)
Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4 Hrs.)
Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Text Books:
1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L. Tembe, Kamaluddin and M.S. Krishnan, 'Engineering Chemistry (NPTEL Web-book).
5. P.W. Atkins, 'Physical Chemistry'.
6. K.P.C. Volhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5th Edn., http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

MATHEMATICS-II (CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE)

Subject Code: BMATH2-201	L T P C	Duration: 46 Hrs.
	3 1 0 4	

UNIT-I

Calculus (Integration): (10 Hrs.)

Double integrals (Cartesian & polar coordinates), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities);

UNIT-II

Multivariable Calculus (Integration): (12 Hrs.)

Triple integrals (Cartesian & polar coordinates), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes (statement only), simple applications involving cubes, sphere and rectangular parallelepipeds.

UNIT-III

First Order Ordinary Differential Equations: (6 Hrs.)

Linear and Bernoulli's equations, exact equation, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Ordinary Differential Equations of higher Orders: (6 Hrs.)

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions, Frobenius method.

UNIT-IV

Complex Variable – Differentiation: (12 Hrs.)

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Bilinear transformation and its properties, Conformal transformation, Special Conformal transformations.

Recommended Books:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9th Edn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9th Edn., John Wiley & Sons, **2006**.

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3. W.E. Boyce and R.C. DiPrima, 'Elementary Differential Equations and Boundary Value Problems', 9th Edn., <u>Wiley India</u>, **2009**.
4. S.L. Ross, 'Differential Equations', 3rd Edn., <u>Wiley India</u>, **1984**.
5. E.A. Coddington, 'An Introduction to Ordinary Differential Equations', <u>Prentice Hall India</u>, **1995**.
6. E.L. Ince, 'Ordinary Differential Equations', <u>Dover Publications</u>, **1958**.
7. J.W. Brown and R.V. Churchill, 'Complex Variables and Applications', 7th Edn., <u>McGraw Hill</u>, **2004**.
8. B.S. Grewal, 'Higher Engineering Mathematics', <u>Khanna Publishers</u>, 36th Edn.,**2010**.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

1. The mathematical tools needed in evaluating multiple integrals and their usage.
2. The effective mathematical tools for the solutions of differential equations that model physical processes.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.

ENGLISH

Subject Code: BHUMA0-101   **L T P C**   **Duration: 25 Hrs.**
                                        2 0 0 2

UNIT-I

1. Vocabulary Building:
   The concept of Word Formation
   Root words from foreign languages and their use in English
   Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
   Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:
   Sentence Structures
   Use of phrases and clauses in sentences
   Importance of proper punctuation
   Creating coherence
   Organizing principles of paragraphs in documents
   Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:
   Subject-verb agreement
   Noun-pronoun agreement
   Misplaced modifiers
   Articles
   Prepositions
   Redundancies
   Clichés

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UNIT-IV

4. Nature and Style of Sensible Writing:
   Describing
   Defining
   Classifying
   Providing examples or evidence
   Writing introduction and conclusion

5. Writing Practices:
   Comprehension
   Précis Writing
   Essay Writing

Recommended Books:
1. Michael Swan, 'Practical English Usage', OUP, **1995**.
2. F.T. Wood, 'Remedial English Grammar', Macmillan, **2007.**
3. William Zinsser, 'On Writing Well', Harper Resource Book, **2001.**
4. Liz Hamp-Lyons and Ben Heasly, 'Study Writing', Cambridge University Press, **2006**.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', Oxford University Press, **2011**.
6. 'Exercises in Spoken English', Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

Course Outcomes:
1. The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BCSCE0-101	**LTPC**	**Duration : 41 Hrs.**
	3003	

UNIT-I

1. Introduction to Programming: (6 Hrs.)

Introduction to components of computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)**.** Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2. Arithmetic Expressions and Precedence: (12 Hrs.)
Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II

3. Arrays: (5 Hrs.)
Arrays (1-D, 2-D), Character arrays and Strings

4. Basic Algorithms: (5 Hrs.)
Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-III

5. Function: (4 Hrs.)
Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

6. Recursion: (4 Hrs.)
Recursion, as a different way of solving problems. Example programs, such as Finding

Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-IV

7. Structure: (3 Hrs.)

Structures, Defining structures and Array of Structures

8. Pointers: (2 Hrs.)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

9. File Handling: (only if time is available, otherwise should be done as part of the lab)

Recommended Text Books:

1. Byron Gottfried, 'Schaum's Outline of Programming with C', <u>McGraw Hill</u>.
2. E. Balaguruswamy, 'Programming in ANSI C', <u>Tata McGraw Hill.</u>

Recommended Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', <u>Prentice Hall of India.</u>

Course Outcomes:

The student will learn

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors.
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
6. To use arrays, pointers and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

CHEMISTRY-I LAB.

Subject Code: BCHEM0-101   **L T P C**
                                   0 0 2 1

Course Objectives:

1. To learn the preparation and standardization of solutions
2. To learn the estimation of various physical properties of given liquid samples
3. To estimate various crucial parameters for water sample
4. To learn the preparation of various molecules and detection of functional groups.

Choice of 10-12 experiments from the following:

1. Preparation of a standard solution
2. Determination of surface tension and viscosity
3. Thin layer chromatography
4. Determination of total Alkalinity/ Acidity of a water sample.
5. Determination of residual chlorine in water sample
6. Estimation of total, temporary and permanent hardness of water
7. Determination of the rate constant of a reaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials and emfs
10. Synthesis of a polymer
11. Saponification /acid value of an oil
12. Detection and confirmation of organic functional groups.

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13. Models of spatial orientation
14. To test the validity of Lambert Beer law/ Determination of λ_{max} /Determination of unknown concentration of a solution.
15. Determination of the partition coefficient of a substance between two immiscible liquids
16. Adsorption of acetic acid by charcoal
17. Synthesis of a drug – Acetaminophen, Aspirin

Laboratory Outcomes:

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/products as a function of time
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a salt sample

ENGLISH LAB.

Subject Code: BHUMA0-102   **L T P C**
                                              0 0 2 1

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

PROGRAMMING FOR PROBLEM SOLVING LAB.

Subject Code: BCSCE0-102   **L T P C**
                                              0 0 4 2

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive functions
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures
Tutorial 12: File handling:
Lab 12: File operations
Laboratory Outcomes:
1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self-referential structures.
8. To be able to create, read and write to and from simple text files.

MANUFACTURING PRACTICES (THEORY & LAB.)

Subject Code: BMFPR0-101   **L T P C**   **Duration: 80 Hrs.**
                                       1 0 4 3

Lectures & Videos: (10 Hrs.)
1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing Methods.
2. CNC machining, Additive manufacturing.
3. Fitting operations & power tools.
4. Sheet Metal Operations.
5. Electrical & Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glass cutting.
8. Metal casting.
9. Welding (arc welding & gas welding), brazing.

Recommended Text/Reference Books:
1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd., Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4th Edn., Pearson Education India Edn., **2002**.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson, **2008**.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4th Edn., Prentice Hall India, **1998**.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw Hill House, **2017.**

Course Outcomes:
1. Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice: (70 Hrs.)
1. Machine shop **(10 Hrs.)**
2. Fitting shop **(8 Hrs.)**
3. Carpentry **(6 Hrs.)**
4. Electrical & Electronics **(8 Hrs.)**
5. Welding shop **(8 Hrs. (Arc welding 4 Hrs. + Gas welding 4 Hrs.)**
6. Casting **(8 Hrs.)**
7. Sheet Metal Operations **(10 Hrs.)**
8. Smithy **(6 Hrs.)**
9. Plastic moulding & Glass Cutting **(6 Hrs.)**
10. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:
1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. By assembling different components, they will be able to produce small devices of their interest.

Introduction to Mechanical Engineering

Subject Code: BMNCC0-017   **L T P C**   **Duration: 30 Hrs.**
                                 2 0 0 0

Course Objectives

- To introduce different disciplines of Mechanical Engineering
- To kindle interest in Mechanical Engineering
- To impart basic mechanical engineering applications industry and daily life.

Expected Outcome

In the vast spectrum of Mech. Engg., this subject gives a very very primitive but general information finding vide application in day to day life with emphasis upon the principles and fundamentals involved in the inter-conversion of thermal energy into mechanical energy and vice versa, viz. all Automobile, Air-Craft, Generator, pumps, turbines and other stationary Heat Engines besides cooling machinery like Refrigerators, Air-Conditioners and water-coolers etc.
At the end of the course, the students will have exposed to the different areas of Mechanical Engineering; gained idea about nature, scope and applications of Mechanical Engineering principles.

Course Plan

Unit I

Engineering Materials: Introduction and history of materials, Types and applications of Ferrous & Nonferrous metals and alloys, mechanical testing of materails like: stress, strain, yield strength, bending and torsion etc.

890

Composites: Introduction: Definition, Classification and applications (Air craft and Automobiles)
Soldering, Brazing and Welding : Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, Brazing and Welding. Description of Electric Arc Welding and Oxy-Acetylene Welding.

Unit II

Basic and Applied Thermodynamics: Introduction, Nature and scope of thermodynamics, Modes of heat transfer: Conduction, convection and radiation. Introduction to Power plant, Gas turbine and rocekt propulasion.

Refrigeration and Air Conditioning: History and scope of refrigeration, applications of refrigeration, psychometric properties and human comfort.

Fluid Mechanics and Machinery: Understand the concept of fluids and their properties, statics, dynamics and kinematics of fluids, types of flows and learn flow measurement methods. Recognize basic components of turbo machines.

Theory of Machines: Inroduction to basic concepts of machines and mechanisms.

Strength of Material: Simple, Compound Stresses and Strains: Stress and Strain and their types, Hook's law, longitudinal and lateral strain, Poisson's ratio, stress-strain diagram for ductile and brittle materials, extension of a bar due to without and with self weight, bar of uniform strength, stress in a bar, elastic constants and their significance, relation between elastic constants, Young's modulus of elasticity, modulus of rigidity and bulk modulus.

Unit III

Engineering Drawing/Engineering Graphics/Technical Drawing: a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

Mechanical Engineering Design: Meaning of design with special reference to machine design, definition and understanding of various types of design, design process, design and creativity, general design considerations, concept of tearing, bearing, shearing, crushing, bending and fracture.

Manufacturing Processes: Introduction to varioud manufacturing processes like casting, welding, metal forming, metal cutting and machine tools. Conventional and non-conventional machining processes.

Automobile Engineering: Introduction to automobile, histrory of automobile, types of automobile, Internal combustion engines and its applications.

Unit IV

Automation and Robotics: Concept and scope of automation, Definition, types –Fixed, Programmable & Flexible automation, NC/ CNC machines: Basic elements with simple block diagrams, advantages and disadvantages.

Robotics: Introduction, classification based on robots configuration; Polar, cylindrical, Cartesian Coordinate and spherical. Application, Advantages, and disadvantages Pneumatic and hydraulic circuits, introduction to CAD and its applications.

Unit V

Energy Resources: Renewable and non- renewable energy resources, Solar Radiation, Solar constant (definition only), Solar Thermal energy harvesting, solar photovoltaic principle. Wind Power: principle of operation of a typical windmill. Hydro Power: Principles of electric power generation from hydropower plants, Nuclear Power: Principles of Nuclear power plants, Bio Fuels: introduction to bio fuels, examples of various bio fuels used in engineering applications.