

**Khandesh Education Society's,  
Pratap College (Autonomous), Amalner  
Dist. Jalgaon.**



**'A+' Grade NAAC  
Reaccredited(CGPA 3.52)  
DST-FIST Assisted College  
UGC Honored "A College with Potential for Excellence"**

**Syllabus for  
S. Y. B. Sc.  
With Major in  
Computer Science  
Under New Education Policy-2020  
(With effect from June 2024)**

## S. Y. B. Sc. SEMESTER III

Sem	Course	Paper Name	Cr	Teachin g Learning Method	Total Marks	
					Max Marks	Min Marks
		<b>1. Major Core Subject Group (Select any One Group)</b>				
III	Major	CS-MJ-201 Data Structure-I	2	Theory	50	20
III	Major	CS-MJ-202 Object Oriented Programming using C++-I	2	Theory	50	20
III	Major	CS-MJP-203 Lab on Data Structure-I	2	Practical	50	20
III	Major	CS-MJP-204 Lab on OOP using C++-I	2	Practical	50	20
		<b>2. Minor Subject Group (Select any One Group)</b>				
III	Minor	CS-MN-211 Web Design	2	Theory	50	20
III	Minor	CS-MNP-212 Lab on Web Design	2	Practical	50	20
		<b>3. Vocational/Skill Enhancement course Group (Select any One)</b>				
III	VSC	CS-VSC-205 Web Development	2	Theory	50	20
III	VSC	CS-VSCP-206 Lab on Web Development	2	Practical	50	20
		<b>4. Generic/Open Elective course Group (Select any One)</b>				
III	OE	CS-OE-221 DataBase Utilities in Access	2	Theory	50	20
		<b>5. Basket of Ability Enhancement/Value Education Course/Indain Knowledge System (Compulsory Group)</b>				
III	AEC	AEC-ENG / HIN / MAR	2	Theory	50	20
		<b>6. Basket of Cocurricular Course (Select any One)</b>				
III	CC	CC- NCC/NSS/Yoga/Sports	2	Practical	50	20

## S. Y. B. Sc. SEMESTER IV

Sem	Course	Paper Name	Cr	Teachin g Learning Method	Total Marks	
					Max Marks	Min Marks
		<b>1. Major Core Subject Group (Select any One Group)</b>				
IV	Major	CS-MJ-251 Data Structure-II	2	Theory	50	20
IV	Major	CS-MJ-252 Object Oriented Programming Using C++-II	2	Theory	50	20
IV	Major	CS-MJP-253 Lab on Data Structute0-II	2	Practical	50	20
IV	Major	CS-MJP-254 Lab on OOP using C++-II	2	Practical	50	20
		<b>2. Minor Subject Group (Select any One Group)</b>				
IV	Minor	CS-MN-261 Introduction to Database Management System	2	Theory	50	20
IV	Minor	CS-MNP-262 Lab on Introduction to DBMS	2	Practical	50	20
		<b>3. Generic/Open Elective course Group (Select any One)</b>				
IV	OE	CS-OE-271 Data Analytic Tool	4	Theory	50	20
		<b>4. Basket of Ability Enhancement/Value Education Course/Indain Knowledge System (Compulsory Group)</b>				
IV	AEC	AEC-ENG/HIN/MAR	2	Theory	50	20
		<b>5. Basket of Cocurricular Course (Select any One)</b>				
IV	CC	CC- NCC/NSS/Yoga/Sports	2	Theory	50	20
		<b>6.CEP (Community Engagement and Service Correspondence to Major Course)</b>				
IV	CEP	CS-CEP- 255 Computer Literacy in Society	2	Practical	50	20

**Course Code: CS-MJ-201**  
**Course Title: Data Structure-I**

**Course Objectives:**

- To impart the basic concepts of data structures and algorithms.
- To understand basic concepts about array, stacks, queues, linked lists, trees and graphs.
- To impart knowledge of advance topics like AVL Trees, B-Trees.
- To understand concepts about searching and sorting techniques
- To understand concepts of hashing.

**Course Outcomes:**

At the end of the course, students will be able to

- Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
- Understand basic data structures such as arrays, linked lists, stacks and queues.
- Describe the hash function and concepts of collision and its resolution methods
- Solve problem involving graphs, trees and heaps

**Course Content:**

**Unit 1. Introduction to Data Structure & Algorithm Notations**

**L:06 M:08**

- 1.1 Introduction to Data Structure
- 1.2 Types of data structure 1.Primitive 2.Non Primitive 3.Linear 4. Non linear
- 1.3 Need of data structure
- 1.4 Algorithm Notations: a. Format Convention b. Name of Algorithm c. Introductory Comment
- 1.5 Data Structure : a. Arrays b. Dynamic Storage allocation c. Functions d. Procedures

**Unit 2. Stacks**

**L:04 M:06**

- 3.1 Definition and concept
- 3.2 Representations – static
- 3.3 Operations – push, pop, peep, change
- 3.4 Applications – infix to postfix & prefix, postfix evaluation.

**Unit 3. Queues**

**L:06 M:08**

- 4.1 Definition and Concept
- 4.2 Representation – static
- 4.3 Operations- Insert, Delete
- 4.4 Circular queue : Concept, Operations – insert, delete
- 4.5 DeQueue : Concept
- 4.6 Applications of queue

**Unit 4. Linked List**

**L:06 M:08**

- 5.1 Introduction to Linked list
- 5.2 Implementation of List – Dynamic representation.

### 5.3 Types of Linked List

- a. Singly Linked list : Operations- Insert, delete, search
- b. Circular linked list : Operations- Insert, delete, search
- c. Doubly linked linear list : Operations- Insert, delete, search

### **References:**

1. Jean-Paul Trembley, Paul. G. Soresan, An introduction to data structures with applications, McGraw Hill International Editions, ISBN-13: 978-0070651579, ISBN-10: 0070651574
2. Horowitz, Sahani, Data Structures: Galgotia publication
3. Aho, Hopcroft, Ulman, Data Structures and Algorithms, ISBN-13: 978-0201000238, ISBN-10: 0201000237
4. Niklaus wirth, Algorithms- Data Structures Programs, ISBN-13: 978-0130224187, ISBN-10: 0130224189
5. Tannenbaum, Data Structures using C and C++; PHI., ISBN-13: 978-0130369970, ISBN-10: 0130369977

**Course Objectives:**

- To understand how C++ improves C with object-oriented features.
- To learn how to write inline functions for efficiency and performance.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.

**Course Outcomes:**

At the end of the course, students will be able to

- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand dynamic memory management techniques using pointers, constructors, destructors, etc
- Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.

**Course Content:**

**Unit-1. Object oriented concepts**

**L:04 M:04**

- 1.1 What is object oriented programming
- 1.2 Features of object oriented programming
- 1.3 Object oriented programming Applications.

**Unit-2. Introduction to C++**

**L:06 M:08**

- 2.1 Basics of C++, Structure of C++ Program
- 2.2 keywords in C++, Data types hierarchy in C++
- 2.3 Operators in C++
  - a. Scope resolution operator
  - b. Insertion and Extraction operator
  - c. New and Delete operators
  - d. reference operators.
- 2.4 Manipulators: endl, setw, setfill, set precision

**Unit-3 Classes & Objects**

**L:05 M:06**

- 3.1 Classes, object, Specifying a class, Access specifiers, Class members
- 3.2 Defining member functions: Inside and Outside the class definition
- 3.3.4 Array of objects, Pointer and object

**Unit-4 .Functions in C++**

**L:06 M:08**

- 4.1 Basics of function and its need.
- 4.2 Functions Prototype.
- 4.3 Call by value, Call by reference with object.
- 4.4 function overloading
- 4.5 friend function, friend class
- 4.6 Inline function.

## **Unit-5. Operator Overloading**

**L:06 M:08**

- 5.1 Introduction to operator overloading, rules of operator overloading
- 5.2 Operator overloading:
  - 5.2.1 Unary and binary operators
  - 5.2.2 Comparison, arithmetic, assignment operator

### **Reference Books:**

1. Object oriented programming with C++, E Balgurusamy, ISBN-10: 9383286504; ISBN-13: 978-9383286508
2. Programming with C++ D Ravichandran, ISBN, 0070681899, 97800706
3. Programming in C++ by John H Hubbard, ISBN-10: 0071353461
4. Mastering C++ by K Venugopal, Rajkumar, T Ravishankar, ISBN-10/ASIN: 0074634542

**Course Code: CS-MJP-203**  
**Course Title: Lab on Data Structure-I**

**Practical's:**

- 1) Write a program to implement Stack operations : i) push    ii) pop    iii) Display
- 2) Write a program to implement Stack operations : i) Push    ii) Peep    iii) change
- 3) Write a program to convert given infix expression into postfix.
- 4) Write a program to implement Linear Queue operations : i) Insert    ii) Display
- 5) Write a program to implement following operations in a Linear Queue: i) Insert    ii) delete
- 6) Write a program to implement Circular queue with its operations: i) Insert    ii) Delete
- 7) Write a program to implement following operations in a Circular Queue :  
    i) Insert    ii) delete
- 8) Write a program to implement singly linked list with operations:  
    i) create    ii) insert
- 9) Write a program to implement singly linked list with operations:  
    i) delete    ii) find
- 10) Write a program to implement doubly linked list with operations:  
    i) create    ii) insert    iii)delete.



**Course Code: CS-MJP-204**  
**Course Title: Lab on OOP using C++-I**

**Practical's:**

1. Write a program to demonstrate all manipulators in C++.
2. Demonstrate the memory management operators: new, delete
3. Write a C++ program to demonstrate Scope Resolution Operator.
4. Write a C++ program to demonstrate Different kinds of Access Specifiers.
5. Write a program to create student class (Define function inside the class)
6. Write a program to create Employee class (Define function outside the class)
7. Write a C++ program to demonstrate the array of objects.
8. Write a C++ program to demonstrate inline function
9. Write a C++ program to demonstrate friend function
10. Write a C++ program to demonstrate Function overloading.
11. Write a C++ program to demonstrate Unary Operator overloading.
12. Write a C++ program to demonstrate Binary Operator overloading.

**Course Code: CS-MN-211**  
**Course Title: Web Design**

**Course Objectives:**

- To use their learned skills, knowledge and abilities to develop web sites for the internet
- To apply basic design principles to present ideas, information, products, and services on websites
- To apply basic programming principles to the construction of websites Effectively manage website projects using available resources
- Demonstrate communication skills, service management skills, and presentation skills

**Course Outcomes:**

At the end of the course, students will be able to

- Explain the history of the internet and related internet concepts that are vital in understanding web development.
- Discuss the insights of internet programming and implement complete application over the web.
- Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

**Unit I:**

**L:06 M:08**

Introduction to Internet, Advantages of Internet, Working of Internet, World Wide Web (WWW), Hypertext Transfer Protocol (HTTP), Universal Resource Locator (URL), Introduction to Web Browser and Web server, Introduction to Web page, Static and Dynamic Web page

**Unit II:**

**L:08 M:12**

Introduction to HTML, Basic structure of HTML document, Formatting Text, Font Tags and Attributes, Headings Tags, Image Tag and Attributes, Background Color and Background Images, Inserting Audio and Video Files, Marquee Tag and Attributes.

**Unit III:**

**L:06 M:08**

List Tag - Ordered List, Unordered List, Definition List, Introduction to Hyperlink, Internal and External Hyperlink, Image Link, Table Tags & Attributes, Cell Spacing, Cell Padding, Row Span, Col Span.

**Unit IV:**

**L:08 M:12**

Frame, Frameset, Creating Framesets, Target Frameset, Form Tag and Attributes, Form Elements - Textbox, Text Area, List Box, Radio Button, Checkbox, Submit and Reset Button, Introduction to CSS.

**Reference Books:**

1. Textbook of Web Designing By Joel Sklar, Cengage Learning Publication 2009  
Web designing in Nut Shell (Desktop Quick Reference) by Jennifer Niederst Publication
2. Designing web navigation by James Kalbach Publication – O'Reilly publication  
Web Designing By Joel Sklar, Cengage Learning Publication 2009 ISBN, 1423901940

**Course Code: CS-MNP-212**

**Course Title: Lab On Web Design**

### **Practical's:**

1. Create web page using basic HTML tags
2. Create web page using Different Formatting tag.
3. Create Web page with different Images
4. Create web page using Marquee Tag
5. Create a web page using different List tag
6. Create web page using Anchor Tag (Internal Link and External Link )
7. Create web page to design time table of your college using Table tag
8. Create web page inserting audio and video files.
9. Design a web page using Frames and Frameset Tag.
10. Design webpage of College Admission Form.

**Course Code: CS-VSC-205**  
**Course Title: Web Development**

**Course Objectives:**

- To use their learned skills, knowledge and abilities to develop web sites for the internet
- To apply basic design principles to present ideas, information, products, and services on websites
- To apply basic programming principles to the construction of websites Effectively manage website projects using available resources
- Demonstrate communication skills, service management skills, and presentation skills

**Course Outcomes:**

At the end of the course, students will be able to

- Explain the history of the internet and related internet concepts that are vital in understanding web development.
- Discuss the insights of internet programming and implement complete application over the web.
- Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

**Course Content:**

**Unit I: The Basics of PHP**

**L:08 M:10**

Introduction to PHP, How PHP Works?, Version of PHP Lexical Structure of PHP, Structure & Syntax of PHP, PHP with HTML, Comments, Data Types and Variables, Operator, Flow Control Statements, Conditional Statements, Looping Statements, Exit, Return, Die, Include and Require Statements.

**Unit II: Arrays, Function and String**

**L:08 M:12**

Introduction to Array, Multidimensional Array, Different array function in PHP, Traversing arrays, Introduction to Function, Defining and Calling a function, Scope of variables in function, Function Parameters , Types of strings in PHP, Comparing strings, Manipulating and Searching strings

**Unit III: Object-Oriented PHP**

**L:06 M:08**

Introduction and Benefits of OOPs, Creating a Class, Creating an Object, Adding a Method, Adding a Properties, Visibility (Public, Private and Protected), Constructor and Destructors, Inheritance (Extending a class)

**Unit IV: Web Techniques**

**L:06 M:10**

Introduction, HTTP Basics, Processing Forms, Methods (Get and Post Method), Parameters (\$\_GET and \$\_POST), Self Processing Pages, File Uploads, Maintaining State, Cookies, Sessions

**References Books:**

1. RasmusLerdorf and Kevin Tatroe, “ Programming PHP” ,ISBN: 978-1-56592-610-3, O'Reilly publication,2002
2. Dave W. Mercer, Allan Kent, “Beginning PHP 5” ,ISBN: 978-0-7645-5783-5, Wrox publication , July 2004.
3. W. Jason Gilmore , “Beginning PHP and MySQL”,ISBN: 978-1-4302-3115-8, 3rd edition, Apress Publication.
4. Ivan Bayross and Sharnam Shah , “PHP 5.1 for Beginners”, ISBN: 9788184040753 SPD Publication 2007

**Course Code: CS-VSCP-206**  
**Course Title: Lab on Web Development**

**Practical's:**

1. Design web pages using HTML that will contain online admission forms.
2. Write PHP scripts that demonstrate fundamentals PHP.
3. Write PHP script that will display grade based on criteria given below using the marks obtained in T.Y.Bsc. Examination.
  - a. Distinction (70 and above)
  - b. First Class (60 - 69)
  - c. Pass (40 - 59)
  - d. Fail (below 40)
4. Write a PHP script to demonstrate different String functions.
5. Write a PHP script to demonstrate array.
6. Write a PHP script to use Functions (Call by Value, Call by reference).
7. Write a PHP script to Demonstrate OOPS Concept in PHP.
8. Write a PHP script to demonstrate Form Data Handling using Get and Post methods.
9. Write a PHP script to store, retrieve and delete cookies on your local machine.

**Course Code: CS-OE-221**  
**Course Title: Database Utilities in Access**

**Course Objectives:**

- Course applies database concepts for designing and manipulating data files and formatting output as complex documents and reports using Microsoft Access.
- The software used for this class is Access 2016 (more on that later).
- Demonstrate MS Access features, Services related to database applications.

**Course Outcomes:**

After completion of the course student will be able to:

- Manipulate database files, and format complex documents and reports.
- Design and create a database using specific criteria.
- Demonstrate file management techniques.
- Create, format, preview, and print reports..

**Course Content:**

**UNIT I:**

Introduction to database -What is a Database, Need Of Database, Flat Database, Relational Database, Database Elements, Tables, Query ,Form, Report, Macros and Modules. Why use a Relational Database, Concept of primary key why to use characteristics.

**UNIT II:**

Introduction to MS Access: Opening and Closing, Access Interface Window, Title bar, status bar, Menu bar ,Help Button, Search Pane. Database, Windows Toolbar. Creating a New database in Access Using Wizard, save new database .Objects Types of Objects, Navigation, Opening a database through Tool bar, Menu bar and task pane, Object Bar etc.

**UNIT III:**

Create a Table in MS Access Database view and Design View. - Data Types, Field Properties, Fields: names, types, properties--default values, format, caption, validation rules Data Entry, Add record, delete record, Record Button, Edit a Tables- copy, delete, import, modify table structure, find, replace. Short cut keys.

**UNIT IV:**

Add a relationship, set a rule for Referential Integrity, Creating and Deleting Relationship between Tables. Change the join type, delete a relationship, save relationship Queries & Filter - difference between queries and filter, filter using multiple fields.

**Reference Books:**

1. MS OFFICE XP COMPLETE BPB PUBLICATION- ISBN 8 1-7656-564-4.
2. MS ACCESS FAST & EASY BY FAITHE WEMPEN- PHI .

# ***SEMESTER IV***

**Course Code: CS-MJ-251**  
**Course Title: Data Structure-II**

**Course Objectives:**

- To develop skills to apply appropriate data structures in problem solving.
- To solve problems using data structures such as binary trees, binary search trees, and graphs and writing programs for these solutions.
- To efficiently implement the different data structures and solutions for specific problems.

**Course Outcomes:**

At the end of the course, students will be able to

- Implement basic operations on binary trees.
- Demonstrate the representation and traversal techniques of graphs and their applications.
- To apply various Searching Techniques.
- To apply various Sorting Techniques.

**Course Content:**

**Unit 1. Tree**

**L:06 M:08**

- 1.1 Definition and Concept
- 1.2 Binary tree
- 1.3 Storage representation and Manipulation of Binary trees
  - a. Sequential Storage representation of Binary Tree
  - b. Linked Storage representation of Binary Tree
- 1.4 Operations on Binary tree - Traversing
- 1.5 Operations & Algorithms on BST – Create, Insert, Delete

**Unit 2. Graph**

**L:06 M:08**

- 2.1 Definition and Concept
- 2.2 Matrix representation of graph
- 2.3 List Structures
- 2.4 Traversal of graph : Breadth First Search and Depth First search
- 2.5 Applications of graph

**Unit 3. Sorting**

**L:08 M:12**

- 3.1 Introduction
- 3.2 Sorting Techniques :
  - 3.2.1 Selection Sort
  - 3.2.2 Insertion sort
  - 3.2.4 Merge Sort
  - 3.2.5 Heap Sort
  - 3.2.6 Sorting Method Comparison on Time and space Complexity attribute

**Unit 4. Searching Techniques**

**L:06 M:08**

- 4.1 Sequential Searching
- 4.2 Binary searching
- 4.3 Hash Table Method
  - 4.3.1 Introduction
  - 4.3.2 Hashing Function



**References:**

1. Jean-Paul Trembley, Paul. G. Soresan, An introduction to data structures with applications, McGraw Hill International Editions, ISBN-13: 978-0070651579, ISBN-10: 0070651574
2. Horowitz, Sahani, Data Structures :Galgotia publication
3. Aho, Hopcroft, Ulman, Data Structures and Algorithms, ISBN-13: 978-0201000238 ,ISBN- 10: 0201000237
4. Niklaus wirth, Algorithms- Data Structures Programs, ISBN-13: 978-0130224187, ISBN- 10: 0130224189
5. Tannenbaum, Data Structures using C and C++; PHI., ISBN-13: 978-0130369970, ISBN-10: 0130369977

**Course Code: CS-MJ-252**  
**Course Title: Object Oriented Programming Using C++-II**

**Course Objectives:**

- To learn how containment and inheritance promote code reuse in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to design and implement generic classes with C++ templates.
- To learn how to use exception handling in C++ programs.

**Course Outcomes:**

At the end of the course, students will be able to:

- Use template classes and the STL library in C++
- Understanding of the concepts of OOPs including inheritance and polymorphism
- Overload operators in C++
- Understanding of the difference between function overloading and function overriding

**Course Content:**

<b>Unit- 1. Constructors and Destructors</b>	<b>L:06 M:08</b>
1.1 Concept of Constructor.	
1.2 Types of Constructor: Default Constructor, Parameterized Constructor, Copy Constructor.	
1.3 Overloaded Constructors in a class.	
1.4 Constructor with default arguments.	
1.5 Destructors	
<b>Unit-2. Inheritance</b>	<b>L:06 M:08</b>
2.1 Introduction to Inheritance	
2.2 Types of Inheritance	
2.3 Benefits of inheritance in C++	
2.4 virtual function , Abstract class, pure virtual function.	
2.5 this pointer.	
<b>Unit- 3. Exception Handling</b>	<b>L:06 M:08</b>
3.1 Concept of Exception Handling mechanism	
3.2 Concept of try, throw and catch	
3.3 Multiple catch statements	
3.4 Standard Exception in C++	
<b>Unit-4. Overview of Template</b>	<b>L:08 M:10</b>
4.1 Basic of templates	
4.2 Function templates, Class templates	
4.3 Templates with multiple parameter	
4.4 Introduction to STL components	
4.5. STL Containers: Vector, Deque, Set, Multiset, Map, Multimap	
4.6 STL Iterators: Input iterators, Output iterators, Forward iterators, backward iterators.	

**Reference Books:**

1. Object oriented programming with C++, E Balgurusamy, ISBN-10: 9383286504; ISBN-13: 9789383286508
2. Programming with C++ D Ravichandran, ISBN, 0070681899, 97800706
3. Programming in C++ by John H Hubbard, ISBN-10: 0071353461
4. Mastering C++ by K Venugopal, Rajkumar, T Ravishankar, ISBN-10/ASIN: 0074634542

**Course Code: CS-MJP-253**  
**Course Title: Lab on Data Structure-II**

**Practical's:**

1. Create a binary tree and Implement following Tree Traversal Techniques:
  - i) Inorder
  - ii) Preorder
  - iii) Postorder.
2. Implement following Graph Search Techniques: BFS
3. Implement following Graph Search Techniques: DFS
4. Implement Selection sort technique.
5. Implement Bubble sort technique
6. Implement Selection sort technique
7. Implement Insertion sort technique.
8. Implement Merge sort technique.
9. Implement Linear Search algorithm
10. Implement Binary Search algorithm.

**Course Code: CS-MJP-254**

**Course Title: Lab on OOP using C++-II**

**Practicals:**

1. Write a C++ program to demonstrate following constructors:
  - i) Default constructor
  - ii) Parameterized constructor
  - iii) Copy Constructor
2. Write a C++ program to demonstrate destructor.
3. Write a C++ program to demonstrate following types of Inheritances:
  - A) Single Inheritance
  - B) Multiple Inheritance
  - C) Multilevel Inheritance
  - D) Hybrid Inheritance
  - E) Hierarchical Inheritance.
4. Write a C++ program to demonstrate the concept of virtual function.
5. Write a C++ program to demonstrate exception handling mechanism.
6. Write a C++ program to demonstrate:
  - i) Function template
  - ii) Class template.
7. Write C++ program to demonstrate:
  - i) vector
  - ii) dequeue
8. Write C++ program to demonstrate list.
9. Write C++ program to demonstrate:
  - i) Set
  - ii) Multiset
10. Write C++ program to demonstrate
  - i) Map
  - ii) MultiMap

**Course Objectives:**

- To understand the types of databases.
- Detailed architecture, define objects, load data, query data and performance tune databases.
- Writing SQL queries for the given problem statement

**Course Outcomes:**

At the end of the course, students will be able to

- Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models.
- Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

**Course Content:**

**Unit– I Introduction to Databases and Transactions**

**L:06 M:08**

- 1.1 Data Models-What is Database system, purpose of database system
- 1.2 View of data
- 1.3 Relational Databases,
- 1.4 Database architecture.

**Unit- II The importance of data**

**L:04 M:06**

- 2.1 Models-Basic building blocks, Business rules
- 2.2 The evolution of data models, Degrees of data abstraction.

**Unit-III Database Design, ER-Diagram and Unified Modeling Language**

**L:08 M:12**

- 3.1 Relational Algebra and Calculus Database design
- 3.2 ER Model: overview, Constraints, ER-Diagrams, ERD Issues,
- 3.3 Weak entity sets, Codd's rules, Relational Schemas

**Unit- IV Constraints, Views and SQL**

**L:08 M:10**

- 4.1 What is a constraint, types of constraints, Integrity constraints
- 4.2 Views: Introduction to views, Data Independence
- 4.3 SQL: data definition, Use of Clauses, DDL, DML, DCL, aggregate function, Null Values, Nested sub queries

**Reference Books:**

A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", fifth Edition McGraw-Hill  
, Rob, Coronel, "Database Systems", Seventh Edition, Cengage Learning.

**Course Code: CS-MNP-262**

**Course Title: Lab on Introduction to DBMS**

### **Practical's:**

- 1) Design a Database and create required tables. For e.g. Bank, College Database.
- 2) Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3) Write sql statement for implementing ALTER,UPDATE and DELETE.
- 4) Write the query for implementing the following functions: MAX(),MIN(),AVG(),COUNT().
- 5) Write the query to implement the concept of Intergrity constrains.
- 6) Write the query to create the views.

