



## C. U. SHAH UNIVERSITY Wadhwan City

Publisher-FACULTY OF:- Computer Science

DEPARTMENT OF: - Master of Computer Application

SEMESTER: -II

CODE: - 5CS020OC1

NAME: – OBJECT ORIENTED PROGRAMMING USING C++

### Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS020OC1	OBJECT ORIENTED PROGRAMMING USING C++	4	-	-	4	4	30	1	70	3	---	---	---	100

### Objectives:

- The C++ language most demanding language as a tool for all types of work. How this important language is to be mastered and how to use this knowledge in building efficient and flexible code is one of the prime requirements today.
- The course helps to the students to improve the object oriented programming skills.

### Prerequisite:

Knowledge of C programming

Programming concepts including algorithm designing and logic

### Course Outline:-

Sr. No.	Course Contents	Number of Hours
1	<b>Introduction to Object Oriented Concepts</b> Object Oriented Concepts, Object, Class, Keywords, Identifiers, Data types, Constants, Features of C++, Differentiate Object Oriented V/s Procedure Oriented	3
2	<b>Overview of C++ Language</b> Operators in C++, Conditional structure and looping structure, Differentiate struct v/s class, Differentiate union v/s class, Application of pointer in object oriented concepts, Pointer to objects and pointer to members of class, The local classes, Assigning objects	4
3	<b>Functions Utility in object oriented Approach</b> Function Introduction, The inline function, Default arguments to the function, Object as a	5



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	parameter, Call by reference and return by reference, Function Prototyping, Function overloading, Friend Function, utility of friend function with examples, Constant and volatile function, Static function, Private and public function, Function using pointer	
4	<b>Application of Constructors &amp; Destructors in Object oriented Concepts</b> Constructor, Application of Constructor & Rule to define the constructor, Types of Constructor, Explicit constructor, Parameterized constructor, Multiple Constructor(With Example), Dynamic Initialization, Constructor with dynamic allocation, Copy constructor	4
5	<b>Operator Overloading &amp; User define function:</b> Arithmetic operator overloading, Unary , Binary Operator Overloading, Assignment Operator Overloading, Subscript operator overloading, Operator overloading with Friend Function, The need for user defined conversion, Four different cases where user defined conversions are needed, Comparison of both the methods of conversion.	5
6	<b>Templates</b> Use of Templates, Define Function Templates, Function Templates with Generic & Non Generic Types, Define Class Templates, Specialization In templates, Define Class and Generic Data Types, Static Data Member in Templates, Export, typename Keyword	5
7	<b>Inheritance</b> Application of Inheritance, Defining derived class using single base class, Define Different Types of Derivation using Access modifiers, The implementation of inheritance in the C++ object model, The Access Control, Declaration, The multiple-inheritance, Abstract classes, Composite objects	3
8	<b>Runtime Polymorphism:</b> Difference Between Compile time and Run time polymorphism, Pointers to Objects, This pointer, Compatibility of Derived and base class pointers, The sub object concept, Virtual functions, Static invocation of virtual function, Default arguments to virtual functions, Virtual destructors, Pure virtual functions, RTTI.	4
9	<b>Exception Handling</b> Introduction, Exception Handling, Mechanism, Try, Catch and throw mechanism, Re throwing an exception , Terminate and Unexpected functions, Drawbacks of exception handling approach, The exception Class	3
10	<b>IO Streams</b>	4



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	Stream, Difference of C and C++ IO Stream, The C++ Predefined streams, Formatting IO, IOS Members, Manipulators, Creating own manipulator	
11	<b>Using Files for IO</b> Why IO is special, Different File Modes, File Handling, Create, Update, Delete, Files, Random Access using seek, IO Modes, Handling File Control Errors	4
12	<b>Namespaces</b> Introduction and need of name space, Defining namespaces, Extending the namespace	2
13	<b>The Standard Template Library</b> Introduction, Generic Programming Technique, Generic Software Designing technique, Components, Generic Algorithms, Iterators, Containers, Algorithms	2
<b>Total hours</b>		48

**Learning Outcomes:**

Students should be able to understand and appreciate the Object Oriented approach of Programming  
Students should be able to solve problems given to him/her using C++ with keeping balance between efficiency and flexibility language.

**Books Recommended:**

1. Object Oriented programming with C++, **E. Balagurusamy**, Publisher-TMH
2. Complete Reference C++ , **Herbert Schildt**, Publisher-McGraw Hill Publications
3. Computer Science- A Structured approach using C++”, **Forouzan ,Gilburg**, THOMSON Books
4. Object Oriented programming in C++, **Robert Lafore**, Publisher-Pearson Education
5. C++ Primer, **Stanley Lippmann**, Publisher-Pearson Education
6. The C++ Programming Language, **Bjarne Stroustrup**, Publisher-Pearson Education
7. Effective C++, **Scott Mayer Addison Wesley**
8. OOP with C++, **S .Sahay**, Publisher-Oxford Higher Education.
9. C++ and OOP Paradigm, **D.Jana**, 2nd Edition, Publisher-PHI.



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**FACULTY OF:-** Computer Science

**DEPARTMENT OF:-** Master of Computer Application

**SEMESTER:-** -II

**CODE:-** - 5CS02DST1

**NAME:-** DATA STRUCTURES

**Teaching and Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS02DST1	DATA STRUCTURES	4	-	-	4	4	30	1	70	3	-	-	---	100

**Objectives**

- To develop proficiency in the specification, representation, and implementation of Data Structures.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced computer science study

**Prerequisites**

Any programming language like C

**Course Outline**

Sr. No.	Course Contents	Number of Hours
1	<b>Introduction to Data Structures :</b> Primitive Data Structures, Non Primitive Data Structure, String Manipulation & Pattern Matching, Storage Representation of Strings, Text Handling , KWIC Indexing	06
2	<b>Linear Data Structures :</b> Arrays, Storage Structure for Arrays, Structures & Arrays of Structures , Stack, Applications of Stacks, Polish Notation Conversion, Operation of Stacks, Queues, Circular Queue, Double Ended Queue, Simulation, Priority Queues, Pointers & Linked Allocation , Linked Linear Lists , Circularly Linked Linear Lists , Doubly Linked Linear Lists, Applications of Linked Linear Lists	17
3	<b>Nonlinear Data Structures :</b> Trees , Binary Tree, Operations on Binary Trees , Storage Representation & Manipulation	17



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	of Binary Trees, Conversion of General Tree to Binary Trees, Sequential & Other Representation of Trees , Manipulation of Arithmetic Expression , Sparse Matrices , Matrix Representation of Graphs , Graphic Representation of List Structures , Other Representation of Graphs ,Breadth First Search (BFS) , Depth First Search (DFS) , Spanning Trees, Prim's Algorithm, Dijkstra's Algorithm	
4	<b>Sorting Techniques :</b> Introduction , Insertion Sort, Selection Sort , Bubble Sort , Merge Sort , Heap Sort , Quick Sort , Radix Sort , Shell Sort	4
5	<b>Searching Techniques :</b> Introduction, Sequential Searching , Binary Searching , Search Trees – Height Balanced , 2-3 Trees , Weight Balanced	4
<b>Total hours</b>		48

**Books Recommended:**

1. An Introduction to Data Structures with Applications, **Jean-Paul Tremblay, Paul G. Sorenson**, 2<sup>nd</sup> Edition, Publisher-Tata McGraw-Hill (2007)
2. Introduction to Algorithm, **Cormen, Leiserson, Rivest, Stein**, 2nd Edition, Publisher-PHI(2003)

**Reference Books :**

1. Classic Data Structures, **Debasis Samanta**, Publisher-PHI
2. Data Structures Using C++, Oxford, **Varsha H. Patil**.
3. Expert Data Structures With C, **Dr. R.B. Patel**, Publisher-Khanna Publications
4. Data Structure Using C and C++, **Y kanitkar**, Publisher-PHI
5. Data Structures Using C and C++, **Tenenbaum**, Publsiher-PHI



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**FACULTY OF:-** Computer Science

**DEPARTMENT OF:-** Master of Computer Application

**SEMESTER:-** -II

**CODE:-** - 5CS02SMS1

**NAME:-** STATISTICAL METHODS

**Teaching and Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS02SMS1	STATISTICAL METHODS	4	-	-	4	4	30	1	70	3	-	-	-	100

**Objectives:**

- To develop the skills for data interpretation and representation in excellent fashion.
- To understand the Measure of Central Tendency, Probabilities, Regression, and Correlation methods and its real life applications.
- To understand time series analysis and its application to forecasting

**Prerequisites:** None

**Course Outline:**

Sr. No.	Course Contents	Number of Hours
1	<b>Statistics What and Why</b> Introduction to Statistics; Origin and growth of Statistics Statistics Defined, Function of Statistics, Scope of Statistics Limitations of Statistics, Statistics Methods vs. Experimental Methods	10
2	<b>Measures of Central Tendency</b> Average defined, Objective of Average, Requisites of Good Average Types of Average Arithmetic Mean: Calculation of Simple Arithmetic Mean, Calculation of Weighted Arithmetic Mean	10



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	<p>Median</p> <p>Mode</p> <p>Geometric Mean</p> <p>Harmonic Mean</p> <p>General Limitations of an Average</p>	
3	<p><b>Measure of Dispersion</b></p> <p>Introduction</p> <p>Dispersion Defined</p> <p>Range: Definition, merits and demerits.</p> <p>Semi-interquartile range (Quartile deviation).</p> <p>Mean deviation: Definition, merits and demerits, minimalists property (without proof).</p> <p>Mean square deviation: Definition, minimalists property of mean square deviation (with proof),</p> <p>Variance and standard deviation: Definition, merits and demerits, effect of change of origin and scale, combined variance (derivation for 2 groups), combined standard deviation, generalization for n groups.</p> <p>Measures of dispersion for comparison: coefficient of range, coefficient of quartile Deviation and coefficient of mean deviation, coefficient of variation (C.V.)</p>	10
4	<p><b>Correlation Analysis</b></p> <p>Introduction</p> <p>Significance of the study of Correlation</p> <p>Correlation and Causation</p> <p>Types of Correlation: Positive and Negative Correlation , Simple, Partial and Multiple Correlations, Linear and Non-Linear Correlation,</p> <p>Methods of Studying Correlation</p> <p>Scatter Diagram Method Graphics Method: Direct Method of Finding out Correlation: Coefficient of Correlation and Probable Error, Conditions for Use of Probable Error, Coefficient Determination</p>	9
5	<p><b>Regression Analysis</b></p> <p>Uses of Regression Analysis</p> <p>Difference between Correlation and Regression Analysis</p> <p>Regression Lines</p>	9



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Regression Equations Regression Equation on Y on X Regression Equation on X on X Deviation taken from Arithmetic Means of X and Y Deviation taken from Assumed Means Graphing Regression Lines Standard Error of Estimate Limitations of Regression Analysis	<b>Total hours</b>	<b>48</b>
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**Learning Outcomes:**

- Ability to apply statistical techniques in decision making in solving real-world problems
- Ability to use computers to analyze the data

**Books Recommended:**

1. Statistics for Business and Economics, **Anderson, Sweeney & Williams**, 11<sup>th</sup> Edition, Publisher-Cengage Learning
2. Statistics Concepts and Applications, **Nabendu Pal & Sahadeb Sarkar**, Publisher-PHI.
3. Statistical Methods, **S P Gupta, S Chand**.





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**FACULTY OF:-** Computer Science

**DEPARTMENT OF:-** Master of Computer Application

**SEMESTER:-** II

**CODE:-** 5CS02ERP1

**NAME:-** ENTERPRISE RESOURCE PLANNING

**Teaching and Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS02ERP1	ENTERPRISE RESOURCE PLANNING	4	-	-	4	4	30	1	70	3	---	---	---	100

**Objectives:**

- The objective of this course is to provide awareness about the ERP concepts and the technologies, which bridges gap between person, business and customer.
- The fitting requirements of ERP packages in different industrial domains are also emphasized.
- The course also helps the business to implementing ERP in the Corporate house and companies..

**Prerequisites:** None

**Course outline:**

Sr. No.	Course Contents	Number of Hours
1	<b>ERP Introduction</b> The role of Enterprise, Business Modeling, Myths about ERP, Basic ERP Concepts, Intangible benefits of ERP, Justifying ERP investment, Risks of ERP, Benefits of ERP	4
2	<b>Business Process Reengineering</b> , Data ware Housing, Data Mining, Online Analytic Processing(OLAP), Product Life Cycle Management(PLM),LAP, Supply chain Management.	6
3	<b>ERP Marketplace and Marketplace Dynamics:</b> Market Overview, Marketplace Dynamics, The Changing ERP Market.  ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications.	14



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4	<b>ERP Implementation Basics</b> , ERP Implementation Life Cycle, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees	8
5	<b>ERP &amp; E-Commerce, Future Directives-</b> in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture. Using ERP tool: either SAP or ORACLE format to case study	6
6	<b>ERP for Business</b> ERP for manufacturing Industry, Automobile Industry, Pharma, FMCG, Mining industry ERP for Service Industry: retail, healthcare, Educational, Institution, Telecom, banks, Insurance companies	10
<b>Total hours</b>		<b>48</b>

**Learning Outcomes: -**

- At the end of the course the students appreciate that Computer aided design & programming technologies provide a valuable resource tool for the futuristic design.
- Students can focus on changes brought about in the product cycles with the advent of CAD systems.
- Theoretical: Students can Learn Theoretical & practical aspect of ERP & Accounts.
- Practical: Students can able to solve problems from Journal Entries to Final Accounts.

**Books Recommended:-**

**Books Recommended:**

1. ERP Demystified, **Alexis Leon**, Publisher-Tata McGraw Hill
2. Enterprise wide Resource Planning, **Rahul V. Altekar**, Publisher-Tata McGraw Hill,
3. Enterprise Resource Planning – Concepts and Practice, **V.K. Garg and Venkitakrishnan N K**, Publisher-PHI
4. Concepts in Enterprise Resource Planning, **Joseph A Brady, Ellen F Monk, Bret Wagner**, Publisher-Thompson Course Technology



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**FACULTY OF:-** Computer Science

**DEPARTMENT OF:-** Master of Computer Application

**SEMESTER:-** II

**CODE :-** 5CS02FIT1

**NAME –** FUNDAMENTALS OF INTERNET TECHNOLOGIES

**Teaching and Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme								
		Th	Tu	Pr	Total		Theory			Practical (Marks)			Total		
							Sessional Exam		University Exam	Theory Total	Internal			University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW		Pr	
5CS02FIT1	FUNDAMENTALS OF INTERNET TECHNOLOGIES	4	-	2	6	5	30	1	70	3	100	10	-	40	150

**Objectives:**

- The internet has drastically changed the way we communicate. As web technology dissolves the world's borders, a new "global community" has emerged.
- The course will focus on methods of using interconnected networks to effectively distribute text and information.
- The course will focus on overall site design strategies, explore web usability/interface problems, and outline effective solutions.
- Students will learn and implement HTML to construct a website with consideration to course topics.
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**Prerequisites:**

Basic knowledge of computer and Internet Website surfing and its controls...

**Course outline:**

Sr. No.	Course Contents	Number of Hours
1	<b>Introduction</b> The World Wide Web (WWW) , HTML History, Hypertext and Hypertext Markup Language	6
2	<b>HTML Documents</b> Dividing the document into 2 parts: Headers, Body Tags: Format, Representing 2 types of tag (odd and even)	6



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	Elements of an HTML Document: Text Elements, Tag Elements, Special Character elements	
3	<b>Structural elements of HTML documents</b> Header tags Body tags: Paragraphs , Titles, Numbered list, Non-Numbered lists, Definition lists	4
4	<b>Formatting HTML Documents</b> Logical styles (source code, text enhancements, variables) Physical Styles (Bold, Italic, underlined, crossed)	4
5	<b>Managing images in html</b> Image format (quality, size, type, ...) Importing images (scanners) Tags used to insert images Frames	6
6	<b>Tables in HTML documents</b> Tags used in table definition Tags used for border thickness Tags used for cell spacing Tags used for table size Dividing table with lines Dividing lines with cells Cell types	6
7	<b>Hypertext and Link in HTML Documents</b> URL/FTP/HTTP, Types of links, Link Tags Links with images and buttons Links that send email messages	5
8	<b>Special effects in HTML documents</b> Text fonts , Sensitive Images, Tip tables, Page background: Variable, Fixed Rotating messages ( Marquee), Counters	3
9	<b>Multimedia</b> Audio files and acceptable formats (AIFF, AU, MIDI, WAVE) Video files and acceptable formats (MPEG, Quick Time, Video for Windows).	3



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10	<b>managing forms</b> Interactive forms, Creating data entry forms, Calling CGI scripts for modifying entered data, Calling programs that use data, Creating output documents	5
<b>Total hours</b>		48

**List of Practical:**

Sr. No.	Course Contents
1	HTML Basic- A very simple HTML document HTML headings HTML paragraphs HTML links HTML images
2	HTML Headings- HTML headings Insert comments in the HTML source code Insert horizontal lines
3	HTML Paragraphs- HTML paragraphs More paragraphs The use of line breaks Poem problems (some problems with HTML formatting)
4	HTML Text Formatting- Text formatting Preformatted text (how to control line breaks and spaces) Different computer-output tags Insert contact information Abbreviations and acronyms Text direction Long and short quotations How to mark deleted and inserted text
5	HTML Styles- Style HTML elements Style background color Style font, color, and size Style alignment of text



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	<p>Set the font of text</p> <p>Set the font size of text</p> <p>Set the font color of text</p> <p>Set the font, font size, and font color of text</p> <p>Using styles in HTML</p> <p>Link that is not underlined</p> <p>Link to an external style sheet</p>
6	<p>HTML Links - How to create hyperlinks</p> <p>Use an image as a link</p> <p>Open link in a new browser window</p> <p>Jump to another part of a document (on the same page)</p> <p>Break out of a frame</p> <p>How to link to a mail message (will only work if you have mail installed)</p> <p>Another mailto link</p>
7	<p>HTML Images- Insert images</p> <p>Insert images from another folder or another server</p> <p>Aligning images</p> <p>Let the image float to the left/right of a paragraph</p> <p>Make a hyperlink of an image</p> <p>Create an image-map, with clickable regions</p>
8	<p>HTML Tables- Simple tables</p> <p>Tables without borders</p> <p>Table headers</p> <p>Table with a caption</p> <p>Table cells that span more than one row/column</p> <p>Tags inside a table</p> <p>Cell padding (control the white space between cell content and the borders)</p> <p>Cell spacing (control the distance between cells)</p>
9	<p>HTML Lists-An unordered list</p> <p>An ordered list</p> <p>Different types of ordered lists</p> <p>Different types of unordered Lists</p>



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	Nested list Nested list 2 Definition list
10	HTML Forms and Input- Create text fields Create password field Checkboxes Radio buttons Simple drop-down list Drop-down list with a pre-selected value Textarea (a multi-line text input field) Create a button Draw a border around form-data Form with text fields and a submit button Form with checkboxes and a submit button Form with radiobuttons and a submit button Send e-mail from a form
11	HTML IFrame - Inline frame (a frame inside an HTML page)
12	HTML head Elements - Specify a title for a document One default URL and target for all links on a page Provide metadata for a document

**Learning Outcomes:**

- Fluency with HTML
- Grasp the fundamentals of the client/server relationship and internet infrastructure
- Evaluate website design and information
- Interpret and assimilate audience variables into effective online communication.

**Books Recommended:**

1. HTML black book, **Holzner**
2. Web Enabled Commercial Application Development Using HTML, DHTML, PERL, Java Script, **Ivan Bayross**, Revisied Edition, Publisher-BPB Publications



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**FACULTY OF:-** Computer Science  
**DEPARTMENT OF:-** Master of Computer Application  
**SEMESTER:-** -II  
**CODE:-** 5CS02OOC2  
**NAME:-** PROGRAMMING TECHNIQUE-III (OOC2)

### Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS02OOC2	PROGRAMMING TECHNIQUE-III (OOC2)	-	-	4	4	2	-	-	-	-	20	---	80	100

### Objectives:

- The C++ language most demanding language as a tool for all types of work. How this important language is to be mastered and how to use this knowledge in building efficient and flexible code is one of the prime requirements today.
- The course helps to the students to improve the object oriented programming skills

### .Prerequisites:

Knowledge of C programming  
 Programming concepts including algorithm designing and logic.

### Course outline:

Sr. No	Course Contents	Number of Hours
1.	Write a C++ program to find the sum of individual digits of a positive integer.	2
2.	A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.	2
3.	Write a C++ program to generate all the prime numbers between 1 and n ,where n is a value supplied by the user.	2
4.	Write C++ programs that use both recursive and non-recursive functions a. To find the factorial of a given integer. b. To find the GCD of two given integers. c. To find the nth Fibonacci number.	2
5.	Write a C++ program that uses functions	2





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	a. To swap two integers. b. To swap two characters. c. To swap two real. Note: Use overloaded functions.	
6.	Write a C++ program to find both the largest and smallest number in a list of integers.	2
7.	Write a C++ program to sort a list of numbers in ascending order.	2
8.	Write a C++ program that uses function templates	2
9.	Write a C++ program to sort a list of names in ascending order.	2
10	Write a C++ program to implement the matrix using a class. a) Reading a matrix. c) Addition of matrices. b) Printing a matrix. d) Subtraction of matrices. e) Multiplication of matrices.	2
11	Write a C++ program that overloads the + operator and relational operators (suitable) to perform the following operations: a) Concatenation of two strings. B)Comparison of two strings.	2
12	Write a template based C++ program that determines if a particular value occurs in an array of values.	2
13	Write a C++ program that uses a function to reverse the given character string in place without any duplication of characters.	2
14	Write a C++ program to make the frequency count of letters in a given text.	2
15	Write a C++ program to count the lines, words and characters in a given text.	2
16	Write a C++ program to determine if the given string is a palindrome or not.	2
17	Write a C++ program to make frequency count of words in a given text.	2
18	Write a C++ program to generate Pascal's triangle.	2
19	Write a C++ program to construct of pyramid of numbers.	2
20	Write a C++ program to display the contents of a text file.	2
21	Write a C++ program which copies one file to another.	2
22	Write a C++ program to that counts the characters, lines and words in the text file.	2
23	Write C++ programs that illustrate how the following forms of inheritance are supported: a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance	2
24	Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.	2
<b>Total hours</b>		<b>48</b>



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**FACULTY OF:-** Computer Science  
**DEPARTMENT OF:-** Master of Computer Application  
**SEMESTER:-** -I  
**CODE:-** - 5CS02DST2  
**NAME –** PROGRAMMING TECHNIQUE-IV (DS)

**Teaching and Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS02DST2	PROGRAMMING TECHNIQUE-IV (DS)	-	-	4	4	2	-	-	-	-	20	-	80	100

**Objectives:**

- To develop proficiency in the specification, representation, and implementation of Data Structures.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced computer science study.

**Prerequisites:**

Any programming language like C,C++

**Course outline:**

Sr. No.	Course Contents	Number of Hours
1	Write a program to perform the following operation on stack: 1.push 2.pop 3.empty 4.full 5.peep	4
2	Write a program to convert infix arithmetic operation (parentheses/unparentheses) into postfix notation	2
3	Write a program to evaluate a postfix expression	2
4	Write a program to create simple Queue to perform following operation 1. Insert an Element 2. Remove an Element and implement queue using an array	2
5	Write a program to create Circular Queue to perform following operation 1. Insert an Element	2



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	2. Remove an Element and implement queue using an array	
6	Write a program to perform the following operation on Priority Queue 1. Insert Element 2. Delete Element	2
7	Write a Program to implement Double ended queue (Input Restricted)	2
8	Write a Program to implement Double ended queue (Output restricted)	2
9	Write a program to create a singly linked list in LIFO fashion.	2
10	Write a program to create a singly linked list in FIFO fashion.	2
11	Write program perform the following operations on a singly linked list. 1. Insert an element 2. Delete an element 3. Find the sum of elements of the list 4. Count number of the nodes in the linked list 5. Search a given elements in the linked list. 6. Reverse the linked list. 7. Make a copy of the given linked list 8. Concatenate two linked list 9. Merge two linked list. 10. Find the union of the two given linked list 11. Find the intersection of the two given linked list.	6
12	Write a program to add two polynomials in two variables.	2
13	Write a program to Subtract two polynomials in two variables.	2
14	Write a program to Multiply two polynomials in two variables.	2
15	Write a Program to implement Sparse Matrix( Using Array )	2
16	Write a program to create a binary search tree and print's its element in Inorder, Preorder, Postorder	2
17	Write a program to delete an element from a binary search tree	2
18	Write a program to create a graph in a adjacency list structure. (Node directory structure) traverse it in DFS and BFS	2
19	W.A.P to sort a given list using (1) Insertion Sort (2) Bubble Sort	4
20	W.A.P to sort a given list using (1) Selection Sort (2) Merge Sort	2
<b>Total hours</b>		<b>48</b>