



SEMESTER 1

BS528T101: DISCRETE MATHEMATICS		
Course Requisite: 1. An introduction to logic and proofs 2. Sets and functions in discrete math		
Course Objective: 1. The course objective is to provide students with an overview of discrete mathematics. 2. Students will learn about topics such as logic and proofs, sets and functions, probability, recursion, graph theory, matrices, Boolean algebra and other important discrete math concepts.		
Course Outcome: After completion of the course students must be able to 1. Use logical notation 2. Perform logical proofs 3. Apply recursive functions and solve recurrence relations 4. Determine equivalent logic expressions 5. Describe useful standard library functions, create functions, and declare parameters		
	DISCRETE MATHEMATICS	L
Unit-1:	Sets, Relations and Functions: Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan's law Cartesian products, Relations, relational matrices, properties of relations, equivalence relation, functions ,Injection, Surjection and Bijective mapping, Composition of functions, the characteristic functions and Mathematical induction.	9
Unit-2:	Proportions & Lattices : Proposition & prepositional functions, Logical connections Truth-values and Truth Table, the algebra of prepositional functions-the algebra of truth values-Applications (switching circuits, Basic Computer Components).Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity , distributive inequality, Lattice homomorphism, lattice isomorphism ,complete lattice ,complemented lattice distribution lattice .	9
Unit-3:	Groups and Fields: Group axioms ,permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem,fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications.	9
Unit-4 :	Graphs: Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk,paths, and circuits Eulerian graphs ,tree properties of trees, pendant vertices in tree, center of tree,spanning trees and cut vertices, binary tree ,matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.	9
Unit-5:	Discrete Numeric function and Recurrence relation: Introduction to discrete numeric functions and generating functions introduction to recurrence relations and recursive algorithms, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions	9
Text Books: 1. J.P.Trembley&R.P.Manohar "Discrete Mathematical Structure with applications to Computer Science". 2. Kenneth H. Rosen-203 "Discrete Math & its Applications" 5th ed.		
References: 1. K.A. Ross and C.R.B. Writht "Discrete Mathematics ". 2. Bernard Kolman& Robert C. Busby "Discrete Mathematical Structures for Computer Science".		



DC528T102: DATA STRUCTURES USING C		
Course Requisite: Abstract data structures, algorithm analysis, strings, lists, trees, binary search trees, priority queues, hashing, graphs, object oriented programming.		
Course Objective: 1. To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. 2. In addition, another objective of the course is to develop effective software engineering practice, emphasizing such principles as decomposition, procedural abstraction, and software reuse.		
Course Outcome: After completion of the course students must be able to 1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms 2. Implement common applications for arrays, records, linked structures, stacks, queues, trees, and graphs 3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs 4. Demonstrate different methods for traversing trees 5. Compare alternative implementations of data structures with respect to performance .		
	DATA STRUCTURES USING C	L
Unit-1:	Stack and Queue: contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue- operations	9
Unit-2:	General List: list and it's contiguous implementation, it's drawback; singly linked list- operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.	9
Unit-3:	Trees: definitions-height, depth, order, degree, parent and child relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals- preorder, in order and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.	9
Unit-4 :	Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, chaining; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.	9
Unit-5:	Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskals&dijkstras algorithm. Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations; basic idea of B-tree- definition, order, degree, insertion & deletion operations; B+-Tree- definitions, comparison with B-tree; basic idea of string processing.	9
Text Books: 1. Kruse R.L. Data Structures and Program Design in C; PHI 2. Aho "Data Structure & Algorithms".		
References: 1. Trembly "Introduction to Data Structure with Applications". 2. Tennenbaum A.M. & others: Data Structures using C & C++; PHI		



DC528T103: OBJECT ORIENTED PROGRAMMING USING C++		
Course Requisite: 1. Programming basics		
Course Objective: 1. Program using objects and data abstraction, class, and methods in function abstraction. 2. Analyze, write, debug, and test basic C++ codes using the approaches introduced in the course. 3. Analyze problems and implement simple C++ applications using an object-oriented software engineering approach.		
Course Outcome: After completion of the course students must be able to 1. Articulate the principles of object-oriented problem solving and programming. 2. Apply the concept of the overloading in C++ programming language. 3. Implement inheritance to solve various problems associated to reusability. 4. Apply the concepts of data abstraction, and polymorphism. 5. To use the stream class hierarchy & templates in C++.		
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Unit-1:	C++ basics, loops and decisions, structures and functions, object and classes, object arrays, constructor and destructor functions, object as a function argument, pointer to object.	9
Unit-2:	Overloading: Operator overloading, pitfalls of operator overloading, function overloading, constructor overloading, this pointer, static data members & member functions.	9
Unit-3:	Inheritance: Basics, various types of inheritance, private, public & protected inheritance, ambiguity in multiple inheritance, derived class constructor and destructor.	9
Unit-4 :	Polymorphism: virtual functions, abstract base classes and pure virtual function, friend function, friend acting as a bridge between the classes, assignment & copy initializations, new & delete operators.	9
Unit-5:	C++ stream class hierarchy, class template & function template, standard template library: containers, iterators & algorithms, exception handling in c++, command line arguments in c++.	9
Text Books: 1. Lafore R. "Object Oriented Programming in C++", Galgotia Pub. 2. Lee "UML & C++ a practical guide to Object Oriented Development 2 ed, Pearson.		
References: 1 .Balagurusawmy "Object.Orienter Programming with C++". 2.B.G., Boach "Object Oriented Analysis & Design with Applications", AddisonWesly.		



DEPARTMENTAL ELECTIVE-1DE528T104: OPERATIONS RESEARCH		
Course Requisite: Candidates should have passed graduate level with basic knowledge of mathematics at plus two level and develop understanding of mathematical models of Quantitative Techniques in first semester.		
Course Objective: <ol style="list-style-type: none"> 1. Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively. 2. Knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry. 3. Skills in the use of Operations Research approaches in solving real problems in industry. 		
Course Outcome: After completion of the course students must be able <ol style="list-style-type: none"> 1. To understand the Basic concepts of OR and frame a LP Problem with solution. 2. To Evaluate Transportation and Assignment problems using appropriate method. 3. To solve the problems of Game Theory, Inventory & prepare sequence of operations in Industry. 4. To construct project network diagram and carry out PERT & CPM analysis. 5. To understand the concept of queuing system and simulating the real time situations. 		
	OPERATIONS RESEARCH	L
Unit-1:	Introduction to Operations Research, Linear programming problems - Mathematical formulation, graphical method, simplex method.	8
Unit-2:	Transportation problems, North west corner method, Vogel's approximation method, Test for optimality - MODI method Assignment problems, Traveling salesman Problem.	8
Unit-3:	Game theory Introduction, two-person zero-sum games, the minimax maximin principle, games without saddle points-mixed strategies, Principle of dominance Inventory control Models:- Deterministic models, Purchasing models with and without shortages, Manufacturing models with and without shortages Sequencing Problems- n jobs through two machines, n jobs through three machines	9
Unit-4 :	Project Management- Introduction to PERT & CPM, critical path calculations, Probability in PERT & CPM	8
Unit-5:	Queuing theory -basic structure of queuing systems, , classification of queuing models, single channel queuing theory, poisson arrivals with exponential service time, infinite population (M/M/1). Simulation: simulation concepts, Generation of random numbers, , basic ideas of Monte-Carlo simulation, Applications of simulation.	9
Text Books: <ol style="list-style-type: none"> 1. 'J K Sharma', Operations Research: Theory & Applications, Trinity Press, 05th Edition. 2. 'Taha.H.A' ,Operation Research : An Introduction, McMilan publishing Co., 1982. 7 th ed. 3. 'Ravindran A, Philips D.T &Solbery.J.J', Operations Research: Principles and practice, John Wiley & Sons, New York, 1987. 4. Frank S. Budnick, Dennis Mcleavey and Richard Mojena, Principles of Operations Research for Management. All India Traveler Book seller, Delhi 		
References: <ol style="list-style-type: none"> 1. Gillet.B.E.,Introduction to Operations Research - A Computer oriented algorithmic approach, McGraw Hill, 1987. 2. Joseph.G.Ecker& Michael KupperSchimd, Introduction to operations Research, John Wiley & Sons, 1988. 3. Hillier.F.S&Liberman.G.J, operation Research, Second Edition, Holden Day Inc, 1974. 		



DEPARTMENTAL ELECTIVE-1 DE528T105: PROGRAMMING METHODOLOGY		
Course Requisite: Structured Programming Approach		
Course Objective: 1. To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ programs. 2. To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences. Microsoft Visual Studio is the programming environment that will be used. 3. To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language. 4. To write reusable modules (collections of functions).		
Course Outcome: After completion of the course students must be able to 1. Apply fundamental programming constructs. 2. Illustrate the concept of packages, classes and objects. 3. Elaborate the concept of strings arrays and vectors. 4. Implement the concept of inheritance and interfaces. 5. Implement the notion of exception handling and multithreading.		
	PROGRAMMING METHODOLOGY	
Unit-1:	Introduction to Object Oriented Programming OO Concepts: Object, Class, Encapsulation, Abstraction, Inheritance, Polymorphism. Features of Java, JVM Basic Constructs/Notions: Constants, variables and data types, Operators and Expressions, Revision of Branching and looping	9
Unit-2:	OO Concepts: Object, Class, Encapsulation or information hiding, Inheritance, Polymorphism, Message communication, Abstraction, Reuse, Coupling and Cohesion, Sufficiency Completeness and Primitiveness, Meta class	9
Unit-3:	Array, String and Vector Arrays, Strings, String Buffer, Wrapper classes, Vector	8
Unit-4 :	Inheritance and Interface Types of Inheritance, super keyword, Method Overriding, abstract class and abstract method, final keyword, Implementing interfaces, extending interfaces	9
Unit-5:	Exception Handling and Multithreading Error vs Exception, try, catch, finally, throw, throws, creating own exception, Thread lifecycle, Thread class methods, creating threads, Synchronization Array, String and Vector Arrays, Strings, String Buffer, Wrapper classes, Vector	9
Text Books: 1. Herbert Schildt, JAVA: The Complete Reference, Ninth Edition, Oracle Press. 2. Sachin Malhotra and Saurabh Chaudhary, Programming in Java, Oxford University Press, 2010		
References: 1. Ivor Horton, Beginning JAVA, Wiley India. 2. Dietal and Dietal, Java: How to Program, 8/e, PHI		



DEPARTMENTAL ELECTIVE-1 DE528T106: WEB DEVELOPMENT		
Course Requisite: 1. Basic knowledge in HTML tags & skill of creating web pages should be known 2. Knowledge of basic Computer hardware & software is also necessary.		
Course Objective: 1. Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. 2. Develop skills in analyzing the usability of a web site. 3. Understand how to plan and conduct user research related to web usability. 4. Learn the language of the web: HTML and CSS. 5. Learn CSS grid layout and flexbox		
Course Outcome: After completion of the course students must be able to 1. Structure and implement HTML/CSS. 2. Apply intermediate and advanced web development practices. 3. Find and use code packages based on their documentation to produce working results in a project. 4. Create webpages that function using external data. 5. Architect solutions to programming problems by combining visual components and classes.		
	WEB DEVELOPMENT	L
Unit-1:	Web Design Principles Basic principles involved in developing a web site, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout, Design Concept	8
Unit-2:	Basics in Web Design Brief History of Internet , What is World Wide Web, Why create a web site , Web Standards , Audience requirement	8
Unit-3:	Introduction to HTML What is HTML , HTML Documents , Basic structure of an HTML document , Creating an HTML document , Mark up Tags , Heading-Paragraphs , Line Breaks 3.8 HTML Tags, Working with Text , Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia , Working with Forms and controls.	9
Unit-4 :	Introduction to Cascading Style Sheets Concept of CSS , Creating Style Sheet , CSS Properties , CSS Styling(Background, Text Format, Controlling Fonts) , Working with block elements and objects , Working with Lists and Tables , CSS Id and Class , Box Model(Introduction, Border properties, Padding Properties, Margin properties) , CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) , CSS Color , Creating page Layout and Site Designs.	9
Unit-5:	Introduction to Web Publishing or Hosting: Creating the Web Site , Saving the site , Working on the web site , Creating web site structure , Creating Titles for web pages , Themes-Publishing web sites.	9
Text Books: 1. Kogent Learning Solutions Inc., HTML 5 in simple steps, Dreamtech Press 2. Murray, Tom/Lynchburg, Creating a Web Page and Web Site, College, 2002		
References: 1. Steven M. Schafer, HTML, XHTML, and CSS Bible, 5ed, Wiley India 2. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India		



UC528T107: BUSINESS ENGLISH		
Course Requisite: NIL		
<p>Course Objective:</p> <ol style="list-style-type: none">1. Understand the role of communication in personal & professional success.2. Develop awareness of appropriate communication strategies.3. Prepare and present messages with a specific intent.4. Analyze a variety of communication acts.5. Ethically use, document and integrate sources.		
<p>Course Outcome: After completion of the course students must be able to</p> <ol style="list-style-type: none">1. Understand the role of communication in personal and professional success2. Develop awareness of appropriate communication strategies3. Prepare and present messages with a specific intent.		
	BUSINESS ENGLISH	L
Unit-1:	Communication Meaning and process of communication, importance of effective communication, communication situation, barriers to communication. Objectives of communication, types of communication, principles of communication, essentials of effective communication.	10
Unit-2:	Media of Communication Written, oral, face-to-face, visual, audio-Visual, merits and demerits of written and oral communication	10
Unit-3:	Communication Skills: Developing communication skills; Listening; Speaking; Reading-Writing (Oral & Written). Body language; Utility of aids in Communication.	10
<p>Text Books:</p> <ol style="list-style-type: none">1. Rajendra Pal and J.S. Korlahalli “Essentials of Business Communication” , Sultan Chand & Sons Publishers, New Delhi.2. U.S.Rai & S.M. Rai “Business Communications” , Himalaya Publishing House.		
<p>References:</p> <ol style="list-style-type: none">1. Menzal and D.H. Jones “Writing a technical Paper”, McGraw Hill, 1961.2. Strategy and Skill “Business Communication”, Prentice Hall New Jersey, 1987.		



DC528P108: DATA STRUCTURES USING C LAB

List of Program

- 1) WAP in C to find out largest and smallest element in an array.
- 2) WAP in C to implement stack using array.
- 3) WAP in C to implement Queue using array
- 4) WAP in C to implement single linked list.
- 5) WAP in C to implement Binary Search algorithm.
- 6) WAP in C to implement Bubble sort algorithm.
- 7) WAP in C to implement Quick sort algorithm
- 8) WAP in C to implement BFS and DFS

DC528P109: OBJECT ORIENTED PROGRAMMING USING OOP LAB

List of Program

- 1) WAP in C++ to create a class called as student. Data members are rollno, name & fees of the student. Write appropriate get () & put () functions to scan and display the student data.
- 2) WAP in C++ to create a class called as employee. Data members are eid, sal & name of the employee. Scan the data for 10 such employees & display the same by using array of objects.
- 3) WAP in C++ to create a class called as Book. Data members are name of the Book & price. Write default, parameterized & copy constructors to initialize & display Book object values.
- 4) WAP in C++ to create a class called as Distance, members are ft & in. Assign appropriate values to objects D1 & D2 and add their values by overloading binary '+' operator to store the result in D3.
- 5) WAP in C++ to create a class called as student, having member as roll_no & name of the student. Create another class Exam having members as mark1 & mark2. Finally create a class called result which is derived from student & Exam. Write a show function in it to show student info & percentage of marks scored using Multiple Inheritance.
- 6) WAP in C++ to demonstrate Derived class constructor.
- 7) WAP in C++ to implement friend function acting as a bridge between the two classes.
- 8) WAP in C++ to implement Virtual function for function overriding.
- 9) WAP in C++ to overload insertion (>>) & extraction (<<) operators for objects.
- 10) WAP to implement function Template.