Course Code	Course Name	Load Distribution (LT P C)
DTCS-301	Object Oriented Programming	3 0 0 3

Learning Outcome:

1. Understand the features of object oriented programming and basic constructs of c++.
2. Understand and design programs related to classes and objects.
3. Comprehend and implement function and operator overloading and inheritance.
4. Comprehend and design programs related to pointers, pointers to objects and functions.
5. Understand and implement dynamic polymorphism and file handling.

UNIT-I **8 Hours**

Introduction: Concept of Object Oriented Programming. History & features:It's need & requirement, procedure oriented programming versus object oriented programming, basic concepts object oriented programming, object oriented languages.Beginning with C++: Concepts & structure of C++ programming, concepts of structure.

UNIT-II **9 Hours**

Clsses and Objects

Syntax :Specifying a class, Defining member functions, Arrays within a class, Creatingobjects, memory allocation for objects, static data & member function, Arrays ofobjects, objects as function argument.Constructors and Destructors:Concept of Constructor (Default, Parameterized, copy), Overloaded Constructors,Constructor with default argument, Destructors.

UNIT-III **8 Hours**

Function overloading, Operator overloading (overloading unary & binary operators), rulesfor overloading operators.**Inheritance:** Concepts of inheritance, Derived classes, Member declaration (Protected), Typesof inheritance (Single, multilevel, multiple, hierarchical, Hybrid inheritance),Virtual base classes, Abstract classes, Constructors in derived classes, Member classes.

UNIT-IV

Pointers in C++ **8 Hours**

Concepts of pointer (Pointer declaration, pointer operator, address operator,pointer expressions, and pointer arithmetic), Pointers & functions (Call by value,call by reference, pointer to functions, passing function to another function),Pointers in arrays (Searching, insertion & deletion), Pointers & objects (Pointersto objects, this pointer, and pointer to derived classes).

UNIT-V **9 Hours**

Polymorphism: Concepts of polymorphism, types of polymorphism, Overloading & overriding,

Virtual function, Static & dynamic binding.**Basic function of I/O system basics & File Processing:**Stream classes, using formatted& unformatted functions, using manipulator to format I/O, Basics of file system, opening & closing a file, reading & writing character from a file (get, put, getline, write), Command line arguments.

Text Books:

1. B. Stroustrup, " C++ Programming Language", 4th Edition,Pearson Education.

Reference Books:

1. Herbert Schildt, "C++ The complete reference", 4 thEdition,Tata McGraw Hill.
2. Balgurusamy, "Object oriented programming with C++", 4 thEdition,Tata McGraw Hill.

Course Code	Course Name	Load Distribution (LT P C)
DTCS-302	Digital logic	3 0 0 3

Learning Outcome:

After completing this course students will be able to:

1. Understand number system and binary codes.
2. Study Boolean algebra theorem and their implications to minimize Boolean expression
3. Analyze combinational circuits and design adders, subtractor, multiplier and comparators.
4. Differentiate between latches and flip flops and design counters using flip flops.

Study logic family and realization of gates using MOS and introduction to various memories

UNIT 1 **8 HOURS**

Introduction To Digital Techniques: Digital circuit, Digital signal, Use of digital circuit and digital signal, Advantages and Disadvantages of Digital circuits, Generation of digital signal, Introduction to digital ICs, Characteristics of digital ICs, Logic families comparison of TTL, CMOS and ECL logic Families, Number System - Introduction to Binary, Octal, Decimal, Hexadecimal number system Conversion of number systems, 1's complement and 2's complement, Binary arithmetic (addition, subtraction), BCD code, BCD arithmetic (addition, subtraction).

UNIT 2 6 **HOURS**

Logic Gates And Boolean Algebra: Logical symbol, logical expression and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates, Universal gates – NAND and NOR gates, Logical circuits of basic gates using universal gates, Gates using more than two inputs, Basic laws of Boolean algebra, Duality theorem, De Morgan's theorems

UNIT 3 **10 HOURS**

Combinational Logic Design / Circuits: Simplification of Boolean expression using Boolean algebra, Construction of logical circuits forms Boolean expressions, Boolean expressions using Sum of products and product of sums forms, K-map representation of logical functions, 3.5 Minimization of logical expressions using K-map (2, 3, 4 variables), Standardization of SOP & POS equations Concept of Adders / Subtractors, Half adder and full adder, Half subtractor and full subtractor, Block diagram, Truth table, Logical expression and logic diagram of Multiplexers (4:1 and 8:1), Multiplexer IC. Block diagram and Truth table of Demultiplexer (1:4; 1:8; 1:16), Demultiplexer IC.

UNIT 4 **10 HOURS**

Flip Flops And Sequential Logic Design: One-bit memory cell, clock signal, Symbol and Logic diagram using NAND gates, working and truth table of R S flip-flop, Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of Clocked R S flip flop, Triggering: edge triggering and level triggering, Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of J-K flip flop. Block diagram and truth table of Master slave J-K flip flop. Symbol, working and truth table of D- flip flop and T-flip flop. Applications of flip flops, Concept, Modulus, Working, truth table, timing diagram of a counter. Asynchronous counter (3 bit, 4 bit) Design of mod N-counter: working, truth table and timing diagram,3-bit Synchronous counter: working, truth table and timing diagram

UNIT 5 **7 HOURS**

Memories: Classification of memories, RAM, ROM, PROM, EPROM, E2PROM. **A-D And D-A Converters,** Circuit diagram and working of R-2R Ladder DAC and Weighted resistor DAC. DAC specifications

Text Books:

1. Mano M. Morris and Ciletti M. D. ,'Digital Design' Pearson Education 4th Edition.
2. Malvino Leach, Saha, Digital Principles and applications' , TMH
3. Jain R.P.,Digital Electronics', PHI.
4. Floyd L. Thomas, 'Digital Fundamentals', Pearson, 10th Edition

Reference Books:

1. SedraA.S. & Smith K.C., 'Microelectronic Circuits', (5/e), Oxford, 2004.
2. Switching & Finite Automata theory - ZviKohavi, TMH,2nd Edition
3. Taum &Shcilings, Digital Electronics, TMH

Course Code	Course Name	Load Distribution (LT P C)
DTCS-303	Relational Database Management Systems	3 0 0 3

Learning Outcome:

After completing this course students will be able to:

1. Understand, describe and effectively explain the underlying concepts of database technologies and implement a database schema for a given problem-domain.
2. Implement normal forms and Normalize a database.
3. Populate and query a database using SQL DML/DDL commands.
4. Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling and designing.
5. Implementing a DBMS.

UNIT1

Database System Concept & Data Modeling: Basic concepts, Advantages of a DBMS over file processing system, Data Abstraction, Database Languages, Data Independence. Components of a DBMS and overall structure of a DBMS. Data Models:Network Model,Hierarchical Model,E-R Model, Client Server Architecture

UNIT 2

Relational Data Model and Security and Integrity Specification: Relational Model: Basic concepts, attributes and domains, Keys concept : Candidate and primary key, Integrity constraints: Domain ,Entity Integrity constraints and On delete cascade. Security and Authorization. Query Languages:Relational Algebra, Relational Calculus,Views.

UNIT 3

SQL and PL-SQL: Introduction to SQL queries, Creating, Inserting, Updating and deletingtables and using constraints, Set operations & operators, Aggregate functions ,string functions and date ,time functions, Null values, Nested sub queries, Complex queries, Join concepts. PL/SQL Introduction, PL/SQL block structure, variables, SQL statements in PL/SQL, PL/SQL control Structures, Cursors, Triggers, Functions, Packages, procedures. Error handling in PL/ SQL

UNIT 4

Relational Database Design, Storage and File systems: Purpose of Normalization, Data redundancy and updating anomalies, Functional Dependencies and Decomposition, Process of Normalization using 1NF, 2NF, 3NF, multivalued dependencies and BCNF. E-R Model details. File Organization, Organization of records in files, Storage of Object Oriented databases, Basic concept of Indexing and Hashing

UNIT 5

Query Processing and Transaction Processing: General strategies for query processing, Equivalence expressions, Selection & join operation. Concept of transaction, States of transactions, Concurrent Executions, Serializability Recoverability, Transaction Definition in SQL. Lock based protocols: share & exclusive models, Protocols:2 phase locking, Time-Stamp based, Validation based,Multiple granularity. Deadlock handling,Deadlock prevention,
detection & recovery.

Text Books:

1. Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Pearson Education.

Reference Books:

1. Silberschatz, Korth and Sudharshan: Data base System Concepts, *6*th Edition, Mc-GrawHill, 2010.
2. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill.

Course Code	Course Name	Load Distribution (LT P C)
DTCS-304	Software Engineering	3 0 0 3

Learning Outcome:

After Completing this course students will be able to learn:

1. Wangle skills for developing and testing new software by using multiple approaches that are practiced in software engineering.
2. Design a SRS document which include the introduction, goals of implementation, functional, non-functional requirement and structural behavior.
3. Access structured model of any software by making the DFDs and UMLs.
4. Attain good module decomposition by low coupling and high cohesion.
5. Learn different type of testing to make software technically error free and bug free

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING .. 9 HOURS

Basics of Software Engineering : Need for Software Engineering –Definition – Software Characteristics – Software Myths – Program versus Software Products **Software Development Life Cycle Models:** Introduction –- Waterfall Model – Prototyping model – Spiral Model – Iterative Enhancement model **Software Requirement Analysis (SRS) :** Value of good SRS – Requirement Process – Requirement Specification – Desirable characteristics of an SRS – Components of an SRS – Structures of a requirements documents - Problems in SRS – Requirements gathering

UNIT – II SOFTWARE DESIGN AND PLANNING 8 HOURS

Software Design : Definition of software design – Objectives of software design – Process of software design – Architectural design – Modular design – Structure chart – Coupling and Cohesion –**Software Planning:** Software metrics - Definition – Types of metrics – Product and Project metrics – Function point and feature point metrics – Software project estimation – Steps for estimation – Reason for poor and inaccurate estimation – Project estimation guidelines – Models for estimation – COCOMO Model - Introduction

UNIT – III SOFTWARE MAINTENANCE AND RISK MANAGEMENT 8 HOURS

Software Maintenance: Software as an evolution entity – Software configuration management activities – Change control process – Software version control – Software configuration management – Need for maintenance – Categories of maintenance – Maintenance cost – Factors affecting the effort

Risk management : Definition of risk – Basics for different types of software risks – Monitoring of risks – Risk management – Risk avoidance – Risk detection – Risk control – Risk recovery – Sources of risks – Types of risks

UNIT – IV SOFTWARE TESTING 8 HOURS

Software Testing : Introduction to testing – Testing principles – Testing objectives Basic terms used in testing – Fault – Error – Failure - Test cases – Black box and white box testing – Advantages and disadvantages of above testing Testing activities – Test plan. **Levels of testing:** Unit testing -

Integration tests – System testing – Types. **Software Testing strategies:** Static testing strategies – Formal technical reviews – Code walkthrough – Code inspection - Debugging – Definition – Characteristics of bugs – Life cycle of a Debugging task – Debugging approaches.

UNIT – V SOFTWARE RELIABILITY AND QUALITY ASSURANCE 7 HOURS

Software Quality Assurance : Verification and validation – SQA – Objectives and Goals – SQA plan - Definition of software quality – Classification of software qualities - Software quality attributes Five levels – ISO 9000 – Need for ISO Certification – Benefits of ISO 9000 certification – Limitation of ISO 9000 certification – Uses of ISO - Salient features of ISO 9000 Requirements – Introduction to ISO 9126

Text Books:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGrawHill, Seventh Edition, 2010.
2. P. K. J. Mohapatra, Software Engineering (A Life cycle Approach), New Age International Publishers, First Edition, 2009.

Reference Books:

1. K.K. Aggarwal, Yogesh Singh, Software Engineering (3rd Edition), New Age International Publishers, Third Edition, 2007.
2. Ian Sommerville, Software Engineering, Addison Wesley, Ninth Edition, 2010.

Semester: III	DTMA 305: Applied Mathematics	L T P C 2 1 0 3

Course Outcomes:	
CO 1:	Understand and apply basic integration techniques, including substitution and partial fractions.
CO 2:	Solve definite integrals using standard properties and advanced methods like parts and trigonometric transformations.
CO 3:	Form and solve first-order differential equations with real-life applications.
CO 4:	Apply Binomial, Poisson, and Normal distributions to solve probability-based problems.

Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	**INTEGRATIONS:** Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by substitution Integration of rational functions. Integration by partial fractions.	**08**
2	Integration by trigonometric transformation. Integration by parts. **Definite Integration:** Definition of definite integral. Properties of definite integral with simple problems.	**08**
3	**DIFFERENTIAL EQUATION:** Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. **Applications of Differential equations.** **Rectilinear motion (motion under constant and variable acceleration):** Simple Harmonic Motion.	**08**
4	**PROBABILITY DISTRIBUTION:** Binomial distribution. Poisson's distribution. Normal distribution Simple examples corresponding to production process.	**07**
5	**NUMERICAL METHODS** **Solution of algebraic equations:** Bisection method. Regulafalsi method. Newton – Raphson method. **Solution of simultaneous equations containing 2 and 3 unknowns:** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**08**
	TOTAL	**39**

Sr. No.	Name of Authors/Books/Publishers	Year of Publication
1	Calculus: single variable Robert T. Smith Tata McGraw Hill	2002
2	Advanced Mathematics for Engineers and Scientist Murray R Spiegel Schaum outline series McGraw Hill	2009
	Higher Engineering Mathematics B. S. Grewal Khanna Publication, New Delhi.	2009
	Introductory Methods of Numerical analysis S. S. Sastry Prentice Hall Of India New Dehli.	2017
References:		
1	Numerical methods for Engg. 4th ed. Chapra Tata McGraw Hill.	2020
2	Numerical methods for scientific & engineering computations M. K. Jain & others Wiley Eastern Publication.	2021