

# **B. Voc. in Computer & Information Technology Skills**

## **Semester Fourth**

### **Software Design**

#### UNIT-1

Introduction, software life-cycle models, software requirements specification, formal requirements specification, verification and validation.

#### UNIT-2

Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling.

#### UNIT-3

Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary, Finite State Machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification

#### UNIT-4

Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation.

#### UNIT-5

Object Oriented Analysis: Object oriented Analysis Modelling, Data modelling. Object Oriented Design: OOD concepts, Class and object relationships, object modularization, Introduction to Unified modelling language.

# **Object Oriented Programming**

## **UNIT-1**

Introduction to different programming paradigm, characteristics of OOP, Class, Object, data member, member function, structures in C++, different access specifiers, defining member function inside and outside class, array of objects.

## **UNIT-2**

Concept of reference, dynamic memory allocation using new and delete operators, inline functions, function overloading, function with default arguments, constructors and destructors, friend function and classes, using this pointer.

## **UNIT-3**

Inheritance, types of inheritance, multiple inheritance, virtual base class, function overriding, abstract class and pure virtual function

## **UNIT-4**

Constant data member and member function, static data member and member function, polymorphism, operator overloading, dynamic binding and virtual function

## **UNIT-5**

Exception handling, Template, Stream class, File handling.

# Database Management System

## UNIT-1

**Introduction:** Objective, scope and outcome of the course.

## UNIT-2

Introduction to database systems: Overview and History of DBMS. File System v/s DBMS. Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Structure of a DBMS. Entity Relationship model: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model- Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base

## UNIT-3

Relationship Algebra and Calculus: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joins, Division, Relation Calculus, Expressive Power of Algebra and Calculus. SQL queries programming and Triggers: The Forms of a Basic SQL Query, Union, and Intersection and Except, Nested Queries, Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases.

## UNIT-4

Schema refinement and Normal forms: Introductions to Schema Refinement, Functional Dependencies, Boyce-Coded Normal Forms, Third Normal Form, Normalization- Decomposition into BCNF Decomposition into 3-NF.

## UNIT-5

Transaction Processing: Introduction-Transaction State, Transaction properties, Concurrent Executions. Need of Serializability, Conflict vs. View Serializability, Testing for Serializability, Recoverable Schedules.

# Technical Communication

## UNIT1

**Introduction:** Objective, scope and outcome of the course.

## UNIT-2

Introduction to Technical Communication- Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading)

## UNIT-3

Comprehension of Technical Materials/Texts and Information Design & development- Reading of technical texts, Reading and comprehending instructions and technical manuals, Interpreting and summarizing technical texts, Note-making. Introduction of different kinds of technical documents, Information collection, factors affecting information and document design, Strategies for organization, Information design and writing for print and online media

## UNIT-4

Technical Writing, Grammar and Editing- Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.

## UNIT-5

Advanced Technical Writing- Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals, Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.

# Theory of Computation

## UNIT-1

**Introduction:** Objective, scope and outcome of the course.

## UNIT2

Finite Automata & Regular Expression: Basic machine, Finite state machine, Transition graph, Transition matrix, Deterministic and nondeterministic finite automation, Equivalence of DFA and NFA, Decision properties, minimization of finite automata, Mealy & Moore machines.

## UNIT3

Context Free Grammars (CFG), Derivations and Languages, Relationship between derivation and derivation trees, leftmost and rightmost derivation, sentential forms, parsing and ambiguity, simplification of CFG, normal forms, Greibach and Chomsky Normal form, Problems related to CNF and GNF including membership problem.

## UNIT-4

Nondeterministic PDA, Definitions, PDA and CFL, CFG for PDA, Deterministic PDA, and Deterministic PDA and Deterministic CFL, the pumping lemma for CFL's, Closure Properties and Decision properties for CFL, Deciding properties of CFL.

## UNIT-5

Tractable and Untraceable Problems: P, NP, NP complete and NP hard problems, Undecidability, examples of these problems like vertex cover problem, Hamiltonian path problem, traveling sales man problem.