

2nd Semester:

BCA – 201: Discrete Mathematics

Total Lectures = 50

Unit – I: Set , Relation and Function: Notation, Inclusion and Equality of Sets, Power Set, Operations on set, Venn Diagram, Relation, Domain and range, Properties of binary relation in a set, relation matrix, digraph, Equivalence Relation, Partition and covering of a set. Definition and types of Functions, Composition of function, Inverse function. [22 Lect.]

Unit – II: Algebraic Structures: Definitions and illustrative examples of semi-groups, monoids, Groups, Subgroups, Ring.

Unit – III: POSET and Lattice- Partial Ordering, partially ordered set, chain, Maximal, Minimal, Lub and Glb, Hasse Diagram

Unit - IV: Lattice: Definition of lattice and its properties, Sublattice, distributive and complemented lattice [14 Lect.]

Unit – V: Graph Theory: Definition of graph and types, Directed and undirected graph, path, walk and circuit, Regular graph, Tree.

Text Books:

1. Discrete Mathematics, S.K.Sarkar, S. Chand & Co.
2. Elements of Combinatorial Math – C.L.Liu
3. Discrete Mathematics, J.K.Sharma, Trinity Publ.
4. Discrete Mathematics – Tremble

BCA – 202: Computer Architecture

Total Lectures = 50

Unit-I

- Data representation, Data Types and Number Systems, Binary Number System, Octal & Hexa-Decimal Number System, Fixed Point Representation, 1's & 2's Complement, Binary Fixed - Point Representation, Arithmetic Operation on Binary Numbers, Overflow & Underflow

Unit-II

- Boolean algebra and digital logic circuits -Logic Gates, AND, OR, NOT Gates and their Truth Tables, NOR, NAND & XOR Gates, Boolean Algebra, Basic Definition and Properties, Basic Boolean Law's, Demorgan's Theorem

Unit-III

- Sequential logic- Flip-Flops - RS, D, J K & T Flip-Flop, Registers, Counters and the memory unit, Shift registers, Ripple counters and Synchronous counters, Timings sequence digital logic families

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Unit-IV

- Input-output organizations- I/O Interface, Properties of simple I/O Devices and their controller, Isolated Vs Memory-mapped I/O, Modes of data transfer, Synchronous & Asynchronous data transfer

Unit-V

- Memory organization - Auxiliary Memory, Magnetic Drum, Disk & Tape, Semi-conductor memories, memory, Hierarchy, Associative memory, Virtual memory, Address space & memory space, Cache memory, Hit ratio, Writing into cache .

Text Books:

1. Computer System Architecture - Morris Mano, PHI Publications.
2. Modern Digital Electronics - R. P. Jain, TMH.
3. Computer Fundamentals - V. Rajaraman, PHI.
4. Digital Logic and Computer Design - Morris Mano, PHI Publications
5. Computer Architecture and Organisation, John P. Hayes, McGraw Hill Publ.

BCA – 203: Data Structure through C

Total Lectures = 50

Unit - I: Introduction:

Array, Function, Pointer and Structure.

Unit - II: Recursion:

Recursion vs Looping, Recursive Functions.

Unit - III: Sorting & Searching:

Sorting: Selection, Bubble, Insertion, Heap and Quick sorting.

Searching: Linear and Binary searching.

Unit – IV: Linked List:

Self referential structure, Dynamic memory allocation.

Single Linked List:

Addition, Deletion, Insertion, Searching of nodes.

Double Linked List:

Addition, Deletion, Insertion, Searching of nodes.

Circular Linked List:

Addition, Deletion, Insertion, Searching of nodes.

Unit – V: Stack & Queue:

Stack: Implementation using array and linked list. Push and Pop operations.

Queue: Implementation using array and linked list. Add and Delete operations.

Unit – VI: Trees & Graph:

Trees: Binary Trees, Binary Tree Representations, Binary Search Tree

Prefix, Infix and Postfix traversal of tree.

Graph: Concept and representation using matrix.

Text Books:

1. R.S.Salaria, Data Structures & Algorithms using C, Khanna Publishing
2. S.K. Srivastava, Depth in Data Structure through C- BPB Publication-
3. Seymour Lipschultz, "Data Structures with C", Schaum's outLines, Tata McGraw-Hill.
4. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education.

BCA – 204: SYSTEM ANALYSIS & DESIGN

Total Lectures = 50

Unit – I: Importance of System Analysis and Design, Concept of System, characteristics and types of system, System Development Life Cycle - waterfall model. Prototype development strategy, Software Crisis, Audit Trail, Role and Attributes of System Analyst.

Unit – II: Sources of Project request, Project Selection, Preliminary Investigation, Feasibility Study, types of feasibility study, Cost and benefit analysis.

Systems Analysis, Requirements determination, Structured Analysis, System Requirements Specification (SRS), Analysis Tools, Data Dictionary, HIPO, Decision Tree, Decision Table, Warnier-Orr Diagram, ERD, Data Flow Design (DFD).

Unit – III: System Design, Design process, constraints, Input and control Design, Validation checks, concept and types of Form, Form Design, Output Design, File Design: Types of File-Master File, Transaction File, Table / Reference File, Report File.

Unit – IV: Software Quality and Testing: Quality concept, Testing and Testing objectives, Black Box and White Box testing, Unit testing, integration testing, system testing

Unit – V: Hardware and Software Acquisition and selection criteria, system conversion and conversion plan, Site preparation, training, Maintenance and types of maintenance.

Unit – VI: Management Information System: Definition, objectives and role in organisation and for managers. Information system at different levels of organisation/management – OAS,TPS,MIS,DSS. Components of MIS, Failure and success of MIS.

Text Books:

1. "Analysis & Design of Information System", James A. Senn, McGraw Hill Publ. Delhi
2. "System Analysis & Design", E.J.Awad, Galgotia Publ., N. Delhi
3. "System Analysis & Design", V. Rajaraman, PHI Publ.
4. "Management Information & Control System", Dr. Sushila Madan, Taxmann Publ.
5. "Information System for Modern Management", R.G.Murdick, Joel E. Ross, & J.R.Clagget, PHI
6. "System Analysis & Design", D. Richard, Irwin Inc., 1979.
7. "Introduction to System Analysis & Design", B.S.Lee, Vols. Manchester, U.K.
8. "Management Information Systems- Managing the Digital Firm", Kenneth C. Laudon & Jane P. Laudon, Pearson, 15 Ed., 2018.
9. "Systems Analysis and Design Methods", Jeffery L. Whitten, Lonnie D. Bentley, Kevin C. Dittman, TMH
10. Modern Systems Analysis and Design,Jeffrey A. Hoffer,Joey F. George,and Valacich, Pearson

BCA-205 Lab on MS-Office

Total Lab Classes = 60

Microsoft Word: Introducing Word, Entering and Editing Text, Formatting Text, Formatting Pages, Creating Tables; Special Word Techniques, Word and the Web.

Microsoft Excel: Introducing Excel, Entering Data and Formulas, Structuring the Sheet, Formatting the Sheet, Using Excel Charts, Excel Database Techniques, Special Excel Techniques, Excel.

Microsoft PowerPoint: Introducing PowerPoint, Building a Presentation, Outlining the Presentation, Creating Text Slides, Creating Chart Slides, Formatting Charts, Creating Org Chart and Tables, Customizing a Presentation, Drawing on Slides, Creating Slide Shows, Animation effects.

Text Books:

1. SteveSagman, *Microsoft Office XP for Windows*, Pearson Education.
2. IT Tools and Applications- S.K. Jain, BPB Publications
3. A First Course In Computer Based On Windows XP And Office XP, Sanjay Saxena. Vikash Publ.

BCA 206: Lab on Data Structure through C:

Total Lab Classes = 60

Programs in C related to following topics:

- i) array - one and two dimensions. ii) function - passing variable and array to a function.
- iii) pointer and function - call by address/reference. iv) structure such as structure to represent a date, point, time etc. v) Recursive functions.
- selection sorting, bubble sorting, insertion sorting, heap sorting, and quick sorting of elements of an array.
- menu based operations on single linked list, menu based operations on double linked list, menu based operations on circular linked list.
- stack and its operations, queue and its operations.
- insertion of node in binary search tree.
- traversal of binary search tree nodes in prefix, infix and postfix order.

A Mini Project