BCA106 Statistics

Population, Sample and Data Condensation:
Definition and scope of statistics, concept of population and simple with Illustration, Raw data, attributes and variables, classification, frequency distribution, Cumulative frequency distribution.

Measures of Central Tendency:
Concept of central Tendency, requirements of good measures of central tendency, Arithmetic mean, Median, Mode, Harmonic Mean, Geometric mean for grouped and ungrouped data.

Measures of Dispersion:
Concept of dispersion, Absolute and relative measure of dispersion, range variance, Standard deviation, Coefficient of variation. Permutations and Combinations

Sample space, Events and Probability:
Experiments and random experiments, Ideas of deterministic and non-deterministic experiments; Definition of sample space, discrete sample space, events; Types of events, Union and intersections of two or more events, mutually exclusive events, Complementary event, Exhaustive event; Simple examples. Classical definition of probability, Definition of conditional probability, Definition of independence of two events, simple numerical problems

References:
1. S.C.Gupta - Fundamentals of statistics - Sultan chand & sons , Delhi.
2. D.N.Elhance - Fundamentals of statistics - Kitab Mahal, Allahabad.
3. Montogomery D.C. – Statistical Quality Control - John Welly and Sons
4. Goon, Gupta And Dasgupta - Fundamentals of statistics - The world press private ltd Kolkata

BCA107 Data and File Structure

Introduction
Data Abstraction and Algorithm, Analysis , Data types / objects / structures, Abstract definition of data structures , Representation and implementation, Time requirements of algorithms. Space requirements of algorithms.

Array:
Representation of single and multidimensional arrays; Sprase arrays – lower and upper triangular matrices and Tridiagonal matrices with Vector Representation
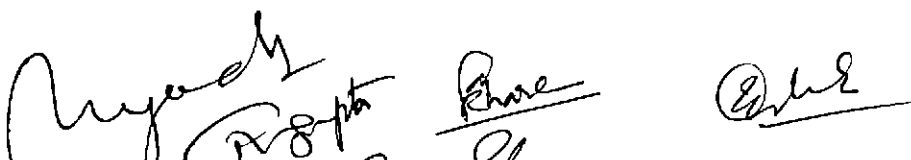
Stacks, Queues and Linked list:
Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

Linked List: Introduction, Singly linked lists, list heads, circular linked list, doubly liked lists, operations on linked list such as traversal, insertion, deletion, searching, Applications of Linked list.

Trees and Graph:
Tree: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree, AVL tree.

Graphs: Definition, terminologies and properties, Graph representations, Minimum spanning trees , Depth-first search , Breadth-first search.

Sorting, Searching and Hashing:
Internal and External Sorting algorithms, Heap sort, Merge sort, Quick-sort, General radix sort, Ssequential search and Binary search.

Hashing: Hash functions, collision resolution techniques.

References:
1. Data Structures and Program Design- Robert Kruse.
2. Data Structures- Horowitz and Sahni
3. Data Structures through C- A. Tennenbaum

BCA108 Business System

Introduction to Business Data Processing
Overview of Business systems; Management Functions, Levels of Management; Sources of Information, Applications like Payroll, Accounting, Inventory, MIS, DSS.

Business Applications
Design Analysis & Development of Computerized Financial Accounting, Payroll, and Inventory Control etc.

Introduction to fundamental design activities
Information & Information Systems; Types of knowledge; relation between knowledge and information; Characteristics of information; Information System Design; Modeling approaches; System development activities; System life cycle; System design methodology; Information system analysis approaches; Structured analysis & design

DFDs, Decision tables and Trees
Completeness of decision tables; Resolution of data access conflicts; Software design for maintainability; Decision Table; Object oriented analysis & design; Creating systems with acceptable response times, Estimation of design parameters; workload analysis of system design specifications; Context diagram and Data Flow Diagram

References:
1. Business & Information systems by Nickerson, PHI
2. Business Data Communication by Stallings, PHI
3. Business Data Network & Telecommunications, by Panko, PHI
4. Introduction to FoxPro by R. K. Taxali

BCA109 Digital Electronics

Number System and Logic Gates:
Introduction to number systems, Radix, Radix Interconversions, Radix Complement, Diminished radix complement. Basic theorem of Boolean algebra. Boolean function and minimization, Karnaugh map. cominational circuits and their analysis. Universal Gates, Realization of Primary gates using Universal gates only.

Combinational logic circuits:
Binary adder and Subtractor circuits, Magnitude comparator, Decoders, Encoders, Multiplexer and demultiplexer, Realization of switching expressions by decoders, encoders, multiplexer and Demultiplexer, Programmable logic circuits, Tri-state logic, Memory Elements.

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Sequential Logic Circuits:
Sequential circuits, latches and Flip Flops, Analysis of clocked sequential circuits. State reduction and assignment, design of synchronous circuits, shift registers, ripple counters, synchronous counters.

Digital Integrated Circuits:
Characteristics of digital ICs. Introduction to logic families- RTL, DTL, TTL, ECL, MOS and CMOS circuits and comparison.

References:
1. Digital Design: M.Morris Mano (PHI)
2. Digital circuits & logic design: S.C.Lee (PHI)
4. Digital electronics: W.H.Gothmann (PHI)
5. Switching theory: A.K Gautam (Katsons)

BCA110 Object Oriented Methodology using C++

Introduction:
Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}. Basic terms and ideas Abstraction, Encapsulation, Inheritance, Polymorphism. Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

Classes and Objects:
Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State idendity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

Inheritance and Polymorphism:
Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parameteric Polymorphism. Generic function Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

Files and Exception Handling
Streams and files, Namespaces, Exception handling, Generic Classes

References:
1. Object-Oriented Modeling and Design- Rumbaugh et al.
2. Object Oriented Design- Booch
3. Object Oriented Programming in C++ - Lafore

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