

H.N.B. Garhwal University Srinagar Garhwal

Bachelor of Computer Application

PROGRAMME STRUCTURE

SEMESTER – I

BCA101	:	Programming in ‘C’
BCA102	:	Fundamental of Computers
BCA103	:	Mathematical foundation of Computer Sciences
BCA104	:	Business Communications
BCAP11	:	Programming in ‘C’
BCAP12	:	PC Packages (Introduction to Operating system & MS Office)

SEMESTER – II

BCA201	:	Data Structure & File Organization
BCA202	:	Programming in C++
BCA203	:	System Analysis and Design
BCA204	:	Digital Electronics
BCAP21	:	Data Structure & File Organization
BCAP22	:	Programming in C++

SEMESTER – III

BCA301	:	Computer Based Numerical Techniques
BCA302	:	Data Base Management System
BCA303	:	Theory of Computation
BCA304	:	Organization Structure and Personnel Management
BCAP31	:	Computer Based Numerical Techniques
BCAP32	:	Data Base Management System

SEMESTER – IV

BCA401	:	Operating system Organization & UNIX
BCA402	:	Visual Basic Programming
BCA403	:	Software Engineering
BCA404	:	Data Communication & Computer Networks
BCAP41	:	Operating system Organization & UNIX
BCAP42	:	Visual Basic Programming

SEMESTER – V

BCA501	:	Computer Graphics
BCA502	:	Web Programming using JAVA
BCA503	:	Management Information System
BCA504	:	Net Technology
BCAP51	:	Programming in JAVA
BCAP52	:	Net Technology

SEMESTER – VI

BCA601	:	Net Framework
BCA602	:	Network Security
BCAP61	:	Net Framework
BCASM	:	Seminar
BCAPR	:	Project

BCA101: Programming in ‘C’

Programming in C: History, Introduction to C Programming Languages, Structure of C Programs, compilation and execution of C programs. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions: built in and user defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure, And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

File: File Handling in C

References:

1. V. Rajaraman, “Fundamentals of Computers”, PHI
2. Peter Norton’s, “Introduction to Computer”, TMH
3. Hahn, “ The Internet complete reference”,TMH
4. Peter Norton’s, “DOS Guide”, Prentice Hall of India.
5. Gottfried, “Programming in C, Schaum’s Series Tata McGraw Hill

BCA102: Fundamental of Computers

Introduction to Computers: Computer Hardware Components, Disk Storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions, Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, WINDOWS, Functional knowledge of these operating systems. Introduction to Basic Commands of DOS, Managing File and directories in various operating systems, Introduction to internet, Basic terms related with Internet, TCP/IP.

Algorithm development, techniques of problem solving, character, flowcharting, stepwise refinement, algorithms, for searching, sorting (exchange and insertion), merging of ordered lists.

Programming : Representation of integer, character, real, data types, constraints and variables, arithmetic expressions, assignment statement, logical expression; sequencing, alteration and interaction, arrays, string processing sub programs, recursion, files and pointers.

Structured programming concept : Top down design, development of efficient programs; Program correctness; Debugging and testing of programs.

Element of a computer processing system : Hardware CPU, storage devices and media, VDU, input-output devices, data communication equipments, software-system software, application software.

Programming languages : Classification, machine code, assembly language, higher level languages, fourth generation languages.

References:

Raja Raman V : Fundamentals of Computers

Sanders D.H. : Computers Today

BCA103: Mathematical Foundation of Computer Sciences

Relation: Types and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, recursively defined function

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constants coefficients, Linear recurrence relation without constants coefficients, Asymptotic Behaviour of functions.

Algebraic Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Propositional Logic: Preposition, First order logic, Basic logic operations, Tautologies, Contradictions, Algebra of Preposition, Logic implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Reference:

1. Liptschutz, Seymour, "Discrete Mathematics", TMH.
2. Trembley, J.P. & R.Manohar,"Discrete Mathematical Structure with Application to Computer Science", TMH
3. **Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH.**
4. Doerr Alan and Levasseur Kenneth , "Applied Discrete Structure for Computer Science, Galgotia Pub. Pvt. Ltd.
5. Gersting "Mathematical Structure for Computer Science" , WH freeman and Macmillan.
6. Kumar Rajendra, " Theory of Automata: Languages and Computation", PPM.
7. Hopcroft J.E. Ulman J.D., "Introduction to Automata Theory, Language and Computation" Narosa Pub. House, New Delhi.
8. C.L.Liu "Elements of Discrete Mathematics", McGraw Hill.
9. Peter Grossman, "Discrete Mathematics for Computer", Palgrave Macmillan.

BCA104: Business Communications

Perception, nature and importance, perceptual organization, perceptual interpretation, social perception motivation, characteristics of needs, models of motivation, theories of motivation.

Learning and behaviouristic theories, cognitive theories, social learning theories.

Personality, theories of personality, measurement of personality.

Communication: Fundamentals, downward and upward communication, other forms of communication, Attitudes nature effects, measurement and changing attitudes.

Fundamentals of Technical Communications, Oral Communication and Written Communication, Public Speaking, negotiations, Presentation skills, Transactional Analysis and Ego-states, Role of communication in IT.

BCA201: Data Structure & File Organization

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space Trade-off.

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices and Vector. Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stack, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and processes.

Queues: Array and linked representation and implementation of queues, Operations on Queues; Create, Add, Delete, Full and Empty, Circular Queue, Dequeue, and Priority Queue. Kink List: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithm, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expression, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary tree, Traversing Threaded Binary tree, Huffman algorithm. Searching and Hashing: Sequential search, comparison and analysis, Hash Table Implementation.

Sorting: Insertion Sort, Bubble sorting, Quick Sort, Two way Merge Sort, Trees: Binary Search (BST), Insertion and Deletion in BST.

Reference:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse etal, "Data Structures and Program Design in C" Person Education
3. A.M.Tanenbaum etal, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure" TMH
5. K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors.
6. Bruno R Preiss, "Data Structure and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons , Inc.

7. Adm Frozdek , “Data Structures and Algorithms in C++” Thomson Asia.
8. Pal G.Sorenson, “ An Introduction to Data Structures with Application”, TMH

BCA202: Programming in C++

Introduction: Introduction to OOP, Basic Concept of OOP, Applications of OOP, Introduction to C++, Introduction to C++ stream I/O, declarations in C++, Creating New data types in C++, Function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, default arguments, Unary Scope, resolution operator, Linkage specifications.

Class, Constructors, Friend Class: Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators.

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary and binary operators, Converting between types, Overloading ++ and – Inheritance, Introduction, Protected members, Casting base _class pointers to derived _ class pointers, Overloading base class members in a Derived class, Public Protocols and Private inheritance, Direct base classes and Indirect base classes, Using Constructors and destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions: Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors.

C++ Stream I/O: Streams, Stream Input, Stream Output, Unformatted I/O, Stream manipulators, Stream format states, Stream error, States.

References:

1. Deitel H.M. & Deitel P.J. – “ How to Program C++” – PHI – 2003
2. Al stevenes – “C++ Programming” – Wiley dreamtech – 2003
3. Herbert Scheldt, “Complete Reference”.
4. E. Balagurusamy “Object Oriented Programming with C++.
5. Yashwant Kanetkar, “Let Us C++”.
6. C++ Programming by Herbert Scheeldt – 2004

BCA203: System Analysis and Design

System Concepts and Information System Environment: The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed System and closed system, Formal & Informal Information Systems, Computer Based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal communicational System.

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post Implementation & Maintenance.

The Role of the System Analyst: Role of the Analyst, Analyst/User Interface, Behavioral issues.

Systems Planning and Initial Investigation: Strategies for determining Information Requirement, Problem Definition & Project Initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: Kind of Information needed. Information about the firms, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DEF), Data Dictionary, Decision Trees and Structured English.

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input design, CRT Screen design, Output Design, Requirements form Design.

References:

1. Elias M. Awad, "Systems Analysis & Design", Galgotia Publication.
2. Hoffer, "Modern Systems Analysis & Design", Addison. Wesley.
3. Kendall, "Introduction to System Analysis & Design" McGraw Hill.

BCA204: Digital Electronics

Representation of information & Basic Building Blocks: Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer.

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Hardwired and micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk & its performance, magnetic Tape etc.

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication, I/O Controllers, Asynchronous data transfer.

Reference:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia.
2. Mono Morris, "Computer System Architecture" PHI
3. Zaky & Hamacher, "computer Organization" McGraw Hill.
4. B. Ram, " Computer Fundamental Architecture & Organization" New Age.
5. Tannenbaum, "Structured Computer Organization" PHI.

BCA301: Computer Based Numerical Techniques

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Rophson method, secant method, Rate of convergence of iterative methods.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, III conditioned system of equations, Refinement of solution, Gauss Seidal iterative method, Rate of Convergence.

Interpolation and approximation: Finite Differences, Difference tables.

Polynomial Interpolation: Newton's forward and backward formula Central

Difference Formulae: Gauss forward and backward formula, stirling's Bassek's Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapazoidal rule, Simpon's rules, Boole's Rule Euler- Maclaurin Formula Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta Methods.

References:

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI.
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
3. Jain, Lyengar and Jain, "Numerical Methods for scientific and Engineering Computation", New Ager Int.
4. Grewal B.S., "Numerical Methods in Engineering and Science", Khanna Publishers, Delhi.
5. T. Veerarajan, T. Ramchandran, " Theory and Problems of Numerical Methods", TMH

BCA302: Data Base Management System

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction, of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts.

Integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views, indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL, PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD and JDs, alternative approaches to database design.

References:

1. Date C.J. "An Introduction to Database System", Addison Wesley
2. Korth, Silbertz, Sudarsha, " Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database systems", Addison Wesley.
4. Paul Beynon Davis, Database systems" Palgrave Macmillan.
5. Bipin C. Desai, "An Introduction to Database Systems", Galgotia Pub.

BCA303: Theory of Computation

A brief review of finite Automata, Regular expressions, Regular languages, Deterministic and non-deterministic computations, Pumping Lemma for Regular languages, Context free languages, Pushdown automation, Pumping Lemma for Context free languages, Grammar types and Chomsky Hierarchy, Turing Machines (TM), Variations of TMs, Universal Turing Machines (UTM) , Church-Turing Thesis, Relation of Languages to Automata, Turing computable functions, Halting problem, Solvability, Undecidability, and Computability.

References:

1. J.E. Hopcraft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages, and Computation", Pearson Education.
2. Cohen, "Introduction to Computer Theory", John Wiley.
3. M. Sipser, "Introduction to Theory of Computation", PWS Publishing Corporation.
4. J.E. Hopcroft, J.D.Ullman, "Introduction to Automata Theory, Languages and computation", Addison-Wisley, 1979.
5. T.C. Martin, "Theory of Computation" Tata McGraw Hill.
6. H.R. Lewis, C.H. Papadimitrou, "Elements of the Theory of Computation", PHI.

BCA304: Organization Structure and Personnel Management

Organization Structure: Classical theories of Management, Scientific management theory, Fayol's 14 principles of Management, Weber's Bureaucratic theory, Definition of Organization and Organization Structure.

Some Concepts Regarding Organization Structure: Line and Staff Authority, Centralization and Decentralization, Span of control, Formal and Informal Organization. Forms of Organization Structure and Feature: function bases, Product bases, Geography based, Project based (Matrix). Organization Design: Mechanistic and Organic Structure, Virtual and Network Organization Structure.

Motivation: Definition of Motivation, Importance of Motivation, Motivation and Behaviour, Theories of Motivation- Maslows need Hierarchy, Two-Factor Theory, McClelland's Need Theory, Theory X and Theory Y.

Nature and Scope of Human Resources Management: scope of HRM, HRM functions and objectives, HRM Model.

Personnel Function: Personnel policies and principles, duties and responsibilities of personnel manager, differences between HRM and PM Emerging trends of personnel management in India.

Human Resource Planning: Meaning, definition and importance of HRP. Job Analysis: Meaning and definition, process of job analysis, Recruitment: Meaning, definition, importance, sources of recruitment. India scenario. Selection: Meaning and definition, selection process, types of interview.

Training and Development: Nature of training and Development, Inputs in training and Development, importance of training and Development, training process, training and International assignment.

References:

1. L.M. Prasad “Organizational Behaviour”, S. Chand.
2. V.S.P. Rao, P.S. Narayana, “Organizational Theory and Behaviour” Konark Publishers Pvt. Ltd.
3. Tripathi, Reddy, “Principles of Management” TMH.
4. Koontz, Weihrich, “Essentials of Management” TMH.
5. Fred Luthans, “Organizational Behaviour”, McGraw Hill.
6. K. Aswathappa, “Human Resources and Personnel Management”, TMH.
7. L.M. Prasad, “Human Resource Management”, S. Chand.

BCA401: Operating system Organization & UNIX

Operating system-definition, simple batch system, Time sharing system, Real time system, storage hierarchy, operating system service.

Process concept, Process scheduling, operating on process, co-operating process.

CPU Scheduling concepts, Scheduling algorithms, process synchronization, critical section problem, synchronization hardware, semaphores.

Deadlocks, deadlock characterization, deadlock prevention, avoidance detection and recovery.

Storage management Resident monitor, Logical versus physical address space, swapping, and segmentation, SCM.

Virtual memory, Demand paging, page replacement and page replacement algorithms, allocation of frames, thrashing.

File System: File supports, access methods, allocation methods-contiguous, linked and index allocation, directory system – single level, tree structured, acyclic graph and general graph directory, file protection.

Secondary storage Structure: Disk structure, disk scheduling, disk management, allocation methods, free space management.

Case study of the UNIX system: Design principles, programmer and user interface, process, memory and file management.

References:

1. Peterson Abraham & Silbesschatz, Peter Galvin: “Operating System Concepts”.
2. Mandnick and Donovan: “Operating System” McGraw Hill 1996
3. Tanenbaum A.S.: “Modern Operating System”, PHI 1998.
4. Growley,,: “Operating System a Design Approach.

BCA402: Visual Basic Programming

Introduction: What is Visual Basic; Feature of Visual Basic; Visual Basic Editions; The Visual Basic Philosophy; The Controls; he Properties; Events; Methods; Developing an Application; Design the User Interface; Write Code to Respond to User Input/Events

Creating an Application: The Tool Box; Project Explorer; The Properties Window; The Form Window; Saving The Project; Understanding Projects; What does Visual Basic 6 have for you to create applications; Customizing this Toolbar; Text Box Control; The Picture Box; Label Box; Option Button; Frame; List Box; Combo Box; Data; Command Button; Check Box; The Drive; Directory and File List Controls; The Line and Shape Controls; The Image Control; OLE (Object linking and Embedding); Other Tools For Software Development; Menu Bar; Context Menus; Tool Bars; Tool Box; Project Explorer Window; Properties Windows; Object Browser; Form Designer; Code Editor Window; Form Layout Window; Immediate; Locals; and Watch Windows IDE, Forms and Controls: The Form; The Anatomy of a Form; Setting Form Properties; Working with the Properties Window; Name; Caption; Picture; Background color; The Control Box; Min Button and Max button; Movable; Border Style; Font Properties; Form Methods; Move; Graphic Methods; Show Methods; Initialize; Load; Activate; Deactivate; Unload Event; Terminate; Show Method; Show Style; Hide Method; How Do You Put or Create The Control on the Form; Working with a Control; More work on a Control; The Code Window; Opening the Code Window; Anatomy of the Code Window; Now Entering the Code.

Variables: What is a Variables; Declaring Variables; Data types; The Null Value; The Error Value; The Empty Value; The Scope of a Variable; Module Level Variable; Declaring Variable; Constants; Circular References; Converting Data Types; Arrays, How do you define them; Declaring Fixed Size Arrays; Multidimensional arrays; Dynamic arrays; The Preserve Keyword.

Writing Code in Visual Basic: The Code Window; Opening the Code Window; Parts of the code Window; Object Box; Procedures/Events Box; Split Bar; Margin Indicator Bar; Procedure View Icon; Full Module View Icon; The Procedure Separator; The Anatomy of a Procedure; Subroutine or Function; Editor Features; Automatic Word Completion; Auto List Members; Color Cueing; Line Continuation Character; Commenting and Uncomment Statements; The For. Next Statement; The Decision Maker. If; The Loop; the While Loop; Select Case.....End Select.

Menus: Building the User Interface. The First Step; Overcrowding; Important Information Must be Given Prominence; Consistency; The Fonts; Consistency Across Forms and the Application; Affordances; Simplicity; Usability; Images; Colors; Interacting with the user; All about Menus; The Menu system; Menu Conventions; The Menu Editor; Using The Menu Editor; Making the Menu better; Coding the Menu Items; Adding the Toolbar; Toolbar Conventions; Pasting Icons on Buttons.

Multiple Document Interface Applications: Why MDI Forms; Features of a MDI Form; Loading MDI Forms and Child Forms; The Active Form Property; Changing the Caption of the new Forms; Listing Open Forms; Saving your work; Specifying the Active Child Form or Control; Maintaining State Information for a Child Form; Unloading MDI Forms with Query Unload.

Additional Controls Available in Visual Basic 6.0 :Objectives; The Image List Control; Working with the Image List Control; Adding Images to the Image List; Tab strip Control; Creating Tabs at Design Time or Run Time; Associating the Image List Control with the Tab Strip Control; MS Flex Grid Control; The Status Bar Control; The Panel Object and the Panels Collection; Tree View Control; Creating a Tree View Control; Working with the Tree View Control; Displaying Data Form a Database; Populating the

Tree View Control; Slider Control; Active X Data Object: Objectives; Why ADO; OLEDB; ADO; Establishing a Reference; The Data Source; The ODBC Data Source Administrator; Using the Data Source name in Our Control; Table or Stored Procedure; Using Bound Controls; Updating the data in the Data Source; what is a Cursor
Crystal and Data Reports: Crystal Reports; Prerequisites for working with Crystal Reports; Creating a Report through a Wizard; Creating a Report without a Wizard; The Design/ Preview Window; Data Report; Getting acquainted with the Data Report Designer; arts of the Data Report; Data Report Controls; Extracting the Data; Creating Multiple Reports.

BCA403: Software Engineering

Introduction: Introduction to software engineering; Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirement Specification: Analysis, Principles, Water fall Model, The Incremental Model, Prototyping Spiral Model, Role of management in software development, Role of Matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design: Design principles, Problem partitioning, Abstraction, Top down and bottom up-Design, Structured approach, Functional versus object oriented approach, Design specification and verification, Monitoring and control, Cohesiveness, Coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transform mapping, Component level Design, Forth generation techniques.

Coding: Top down and Bottom-up Programming, Structured programming, Information hiding, Programming style and internal documentation.

Testing principles, Levels of testing, Functional testing, Structural testing, Test plane, Test case specification, reliability assessment, Software testing strategies, Verification and validation, Unit testing, Integration testing, Alpha & Beta testing, System testing and Debugging.

Software Project Management: The Management Spectrum (The people, the product, the process, the project), cost estimation, Project scheduling, Staffing, Software configuration management, Structured Vs. Unstructured Maintenance, Quality assurance, Project monitoring, Risk management.

Software Reliability and Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 Certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM. CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach" Ed. Boston: McGraw Hill, 2001.
2. Jalote, Pankaj, "Software Engineering ED.2" New Delhi, Narosa 2002
3. Schaum's Series, "Software Engineering" TMH

4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI.
5. Alexis, Leon and Mathews Leon, "Fundamentals of Software Engineering"
6. Sommerville, Ian, "Software Engineering" AWL.
7. Fairly, "Software Engineering" New Delhi, TMH.
8. Pfleerger. S., "Software Engineering" Macmillan 1987.

BCA404: Data Communication & Computer Networks

Introduction to Computer Networking: Use, advantage, structure of the communications network topologies the telephone network, analog to digital communication.

Communication Between Analog computers & Terminals Layered Protocols, Network & The OSI Models, Traffic control and accountability wide area and local area networks, connection oriented and connectionless networks, classification of communication protocols, polling/selection systems, non priority system, priority system, rotation for layered protocols, foals of layered protocols, network design problems, communication between layers, A parametric illustration, introduction to standard organizations and the ISO standard.

Polling/selection, satellite and local area networks: Binary synchronous control, other BSC system, conversion using satellite communication SPUS, and the tale-port primary attribute of a LAN, IEEE LAN standards, LAN topology and protocols.

Switching and routing in Network: Telephone switching system, message switching, packet switching, packet switching support to circuit switching networks.

The X.25 & Digital Networks: Layers of x.25, feature of x.25 flow control principles, other packet type, x.25 logical channel states time out and time limits, packet formats, flow control and windows x.25 facilities, other standards layer the pad, communication networks, communication between layers, advantage of digital networks, Digital's switching, voice transmission by packet.

Personal Computer Network: Personal computer communications, characteristics, using the personal computer as server, linking the personal computer to mainframe computers, semaphores of vendor offerings, File transfer on personal computers, personal computer and local area networks, personal computer networks and the OSI models.

TCP/IP: TCP/IP and internetworking, examples of TCP/IP operations, related protocols ports and sockets. The IP address structure, major features of IP, IP datagram, Major IP services, IP source routing, value of the transport layer, TCP, Major features of TCP, passive and active operation, The transmission control block(TCB), rout discovery protocols, examples of rout discovery protocols, application layer protocols.

References:

1. Tannanbaum,A.S. "Computer Network", PHI – 1995.
2. Martin, J., "Computer Network and Distributed Processing" 19985.
3. Black, "Computer Network, Protocols, Standards and Interface" PHI – 1995.
4. Black, "Data Network, Concept, Theory and Practices" PHI.
5. Starlings, William, "Local Networks and Introduction" Mack Publishing Co.
6. Comer< "Internetworking, Principles, Protocols Architecture with TCP/IP" PHI
7. Crichlow, "Introduction to Distributed and Parallel Comp."
8. Ahuja, "Design and Analysis of Computer Communication Network" McGraw Hill Co.
9. Chorafas, "Designing and Implementing Networks" McGraw Hill Co.

BCA501: Computer Graphics

Graphics Primitives: Display Devices, Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal Display, Plotters, Printers, Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera.

Input Techniques: Positioning techniques, Potentiometers, Constraints, Scales & Guidelines, Rubber-Band techniques, Dragging Dimensioning techniques and Graphical Potentiometers, Pointing and Selection: the use of selection points defining a boundary rectangle, multiple selections, Menu selection.

Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar products of two vectors, Vector product of two vectors.

Line Drawing Algorithms: DDA Algorithms, Bresenham's Line algorithm. Segment & Display files: Segments, Function for segmenting the display file, Posting and posting a segment, segment naming schemes, Default error conditions, Appending to segments, Refresh concurrent with reconstruction, Free storage allocation, Display file structure.

Graphic Operations: Clipping, Point Clipping, Line Clipping, Polygon Clipping, Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid, Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications, Bezier curves and surfaces.

Transformation: 2D transformations, Basic transformation, Composite transformations, Reflection, Shearing, Transformation between coordinate systems. 3D Graphics: 3D Display Methods, 3D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal.

Animation: Introduction to Animation, Principles of Animation, Types of Animation, Types of Animation Systems, scripting, Procedural, Representational, Stochastic, etc. Animation Tools: Hardware SGI, PC's Amiga etc.

References:

1. Donald Hearn and M Pauline Baker, "Computer Graphics" PHI
2. Steven Harrington, "Computer Graphics: A Programming Approach" TMH.
3. Prajapati, A.K. "Computer Graphics" PPM Ed2.
4. Foley James D, "Computer Graphics" AW Ed2
5. Newman and Sproul, "Principles of Interactive Computer Graphics" McGraw Hill.
6. Rogers, "Procedural Elements of Computer Graphics" McGraw Hill.
7. Rogers and Adams, "Mathematical Elements of Computer Graphics" McGraw Hill

BCA502: Web Programming Using JAVA

Internet-Beginning and current state, hardware and software requirements, ISP and Internet accounts, Web Home page, URI, Browser, Security on Web, Plums and helpers, Searching tools and search engine FTP, Gopher, Telnet and e-mail.

Web Authoring Using HTML: Creating a Web page, Methods of Linking, Publishing, HTML, Text formatting and alignment, Font control, Arranging text in lists, Images on a web page, Backgrounds and colour control, Interactive layout with Frames.

History of the web, growth of the web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber Laws, Web project, Web team, Team dynamics.

Communication issues, the client, Multi-departmental and large scale websites, Quality Assurance and testing, Technology advances and Impact on the Web Teams.

HTML: Formatting Tags, Links, Lists, Table, Frames, Forms, Comments in HTML, DHTML. Java Script: Introduction, Documents, Forms, statements, functions, objects in Java Script, Events and Events Handling, Arrays, Forms, Buttons, checkboxes, Text fields and Text areas.

XML: Introduction, Display and XML Documents, Data Interchange with an XML Document, Document types definitions, Parsers using XML, Client-side usage, Server Side usage.

Common Gateway Interface(CGI) PERL, RMI, COM/DCOM, VBScript, Active Server Pages(ASP)

References:

1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Sharma & Sharma, "Developing E-commerce Sites", Addison Wesley.
3. Iva Bayross, "Web Technologies Part-II" BPB Publications
4. Shishir Gundavarma, "CGI Programming on the World Wide Web" O'Reilly & Associate
5. DON Box, "Essential COM" Addison Wesley.
6. Gerg Buczek, "ASPDeveloper's Guide" TMH

BCA503: Management Information System

Fundamentals of Management systems, Systems approach to problem solving, Developing information system solutions, Levels of MIS(Top, Middle, Lower). Corporate Databases and Database Management, Data Organization, Data models, Data Security and Information Quality.

Transaction Processing Systems, Executive Information Systems, Decision Support Systems, Expert Systems, Information Systems in Marketing, Manufacturing, HRM, Accounting and Finance.

Information Resource Management, Planning, Implementing and controlling Information Systems, Computer Crime, Ethics & Society.

References:

1. Brein James,O, "Management Information Systems"
2. Murdick & oss, "Information Systems for Modern Management"
3. Parker, C.S. "Management Information Systems" Strategy & Action.
4. Aktas A.Ziya, "Structured Analysis and Design of Information Systems"

BCA504: Net Technology

Introduction to NET: Writing Window Applications, Windows Graphical User Interface, Programming Languages – Procedural, Event Driven, and Object Oriented, The Object

Model, Microsoft's visual Studio, NET, Writing Visual Basic Projects, Three-Step Process, Visual Basic Application Files.

Visual Studio Environment: IDE Start Page, New Project Dialog, IDE Main Window, Toolbars, Document Window, Form Designer, Solution Explorer Window, Properties Window, Toolbox, Design Time, Run Time and Break Time.

Writing Visual Basic Project: Workspace Setup, Plan the Project, Define the User Interface, Set Properties, Coding, Testing, Maintenance, Printing.

Finding and Fixing Errors: Syntax Errors, Run-Time Errors, Logic Errors, Project Debugging, Naming Rules and Conventions for Objects.

VARIABLES, CONSTANTS, AND CALCULATIONS: Data: Variables and Constants, Formatting Data, Handling Exceptions, Displaying Messages in Message Boxes, Counting and Accumulating Sums, Decisions and Conditions, Menus, Sub Procedures and Functions, Lists, Loops and Printing, Graphics, Animations and Additional topics in Visual Basic.

BCA601: Net Framework

Introduction: .NET Lesson Introduction, Characterize the .NET Paradigm, Web Services, Framework Components, Common Language Runtime (CLR), Compare the .NET Class Framework to a Language Class-Specific Library, .NET Windows Forms, Console Applications.

Managing .NET: Common Language Runtime Components, Components of the CLR, Microsoft Intermediate Language (MSIL), .NET Compilers, Multiple Language Support in .NET Cross-Language Interoperability, Garbage Collection, Structured Error-Handling.

Unifying .NET: The Class Framework, .NET Class Framework, Purpose of Namespaces, Inheritance, Interface and Inheritance-Based Polymorphism, Overloading, .NET Applications, Component Deployment, DLL Hell, Assembly, simple .NET Applications, Compile and Debug.

BCA602: Network Security

Introduction to Security: Attacks, Services & Mechanism, Security, Attacks Security Services, Conventional Encryption: Classical Techniques, conventional Encryption Model, and steganography, Classical Encryption Techniques, Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RC5, CAST-128, CR2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Hash Function: Message Authentication & Hash functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DSS) Proof of Digital Signature Algorithm.

Network & System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S/MIME

Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management.

References:

1. William Stallings, "Cryptography and Network Security: Principle and Practice" Prentice Hall, New Jersey
2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH

H.N.B. Garhwal University Srinagar Garhwal

B.Sc. (Information Technology) PROGRAMME

SEMESTER – I

BS101	:	Fundamental of Computers and Information Technology
BS102	:	Programming in 'C'
BS103	:	Mathematical Foundation
BS104	:	Financial Accounting
BSP11	:	Programming in 'C'
BSP12	:	PC Packages (Introduction to Operating system & MS Office)

SEMESTER – II

BS201	:	Data Structure
BS202	:	Object Oriented Programming using C++
BS203	:	System Analysis and Design
BS204	:	Probability & Statistical Techniques
BSP21	:	Data Structure
BSP22	:	Object Oriented Programming using C++

SEMESTER – III

BS301	:	Computer Based Numerical Techniques
BS302	:	DBMS
BS303	:	Digital Electronics
BS304	:	Web Technology
BSP31	:	DBMS
BSP32	:	Web Technology

SEMESTER – IV

BS401	:	Operating system
BS402	:	Advance RDBMS
BS403	:	Management Information System
BS404	:	Multimedia Technology and Application
BSP41	:	Operating system
BSP42	:	Advance RDBMS

SEMESTER – V

BS501	:	Programming in JAVA
BS502	:	Data Communication and Networks
BS503	:	Network Security
BS504	:	Software Engineering
BSP51	:	Programming in JAVA
BSP52	:	Data Communication and Networks

SEMESTER – VI

BS601	:	E-Governance
BS602	:	Advance Programming in JAVA
BSP61	:	Advance Programming in JAVA
BSSM	:	Seminar
BSPR	:	Project

BS101: Fundamental of Computers and Information Technology

Computer system concept, computer system characteristics, capabilities and limitations, types of computers – analog, digital, hybrid, general, special purpose, micro, mini, mainframe, super. Generation of computers, personal computer (PC) – IBM PC characteristics, PC / PCXT / PCAT – configurations, Pentium and newer PC specifications and main characteristics, types of PC – desktop, laptop, notebook, palmtop, workstations etc, their characteristics, add on cards on PC: sound card, video card, network card etc.

Basic Component of a Computer System - Control Unit, ALU, Input / Output functions and characteristics, Memory – RAM, RO, EPROM, PROM and other types of memory.

Input devices – Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanner, Digital Camera, MICR, OCR, OMR, Bar-code Reader, voice Recognition, Light Pen, Touch Screen – Working Principles, Areas of use & characteristics.

Output Devices – Monitors, Characteristics and Types of Monitor – Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non-Interlaced, Dot Pitch, Video Standard – VGA, SVGA, XGA etc.

Printers – Daisy Wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter

Storage Devices – fundamentals, Primary Vs Secondary, Data Storage and Retrieval Methods – Sequential, Direct and Index Sequential, Various Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drives.

Need, Types of Software – System Software, Application Software, System Software – Operating Systems, Utility Program, Programming Languages, Assemblers, Compilers and Interpreter, Operating Systems – Functions, Types –Batch, Single, Multiprogramming, Multiprocessing, Programming Languages – Machine Assembly, High Level, 4GLs, Their merits and demerits, Application Software – Word Processing, Spreadsheet, Presentation Graphics, Data Base Management Software, Characteristics, Uses and examples and area of application of each of them.

Virus, Types of Viruses – virus detection and prevention, Virus on Network. Introduction to Multimedia.

References:

1. “Introduction to computers and Information Technology” by Anurag Seetha, Ram Prasad & Sons, Bhopal.
2. “Computers Today” by S.K.Basandra, Galgotia Publications.
3. “Fundamentals of Information Technology” by Alexis Leon & Mathews Leon, Vikas Publishing House, New Delhi.

BS102: Programming in ‘C’

Programming in C: History, Introduction to Programming Languages, Structure of C Programs, compilation and execution of C programs. Debugging Techniques, Data Types and Sizes, Declaration of Variables, Modifiers, Identifiers and keywords, Symbolic Constants, Storage classes (automatic, external, register and static) Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & Logical operators, Bit wise operators, Assignment operators and expressions. Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the coma operator, go to statement.

Loops: for, while, do-while.

Functions: built in and user defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, arrays of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of computers", PHI.
2. Peter Norton's, "Introduction to computers", TMH.
3. Hahn, "The Internet complete reference", TMH.
4. Peter Norton's, "DOS Guide" Prentice Hall of India.
5. Gottfried, "Programming in C", Schaum's Series, Tata McGraw Hill

BS103: Mathematical Foundation

Relation: Types and composition of relations, Pictorial presentation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function.

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions. Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions.

Algebraic Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism, and Automorphism of groups.

Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Lattices: Introduction, Ordered set, Hasse diagram of Partially ordered set, Consistent enumeration, Isomorphic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Distributive lattices, and Complemented lattices.

Classification and Presentation of Data including diagrammatic presentation.

Measures of central tendency – Mean, Mode, Median, Geometric & Harmonic.

Measures of dispersion – Range, Quartile Deviation, Average & Standard deviation.

Type of sampling: Probability Vs. Non Probability, Sampling, Random, Non Random, Sampling, Size of sample. Probability theory – Baye’s Probability. Simple Bivariate, Correlation & regression. Only concept of partial & multivariate correlation & regression. Index numbers – Aggregative & average of price relative methods.

References:

1. Liptschutz, Seymour, “Discrete Mathematics” TMH.
2. Trembley, J.P. & R. Manohar, “Discrete Mathematical Structure with Application to Computer Science”, TMH.
3. Kenneth H. Rosen, “Discrete Mathematics and its Applications”, TMH.
4. C.L.Liu, “Elements of Discrete Mathematics” McGraw Hill.
5. Peter Grossman, “ Discrete Mathematics for Computer”, Palgrave Macmillian.

BS104: Financial Accounting

Accounting: Principles, concepts and Conventions, double entry system of accounting, Ledger posting and Trial balance, Final Accounts: Trading profit and loss accounts and balance sheet of sole proprietary concern with normal closing entries. Introduction to manufacturing account of partnership firms, limited company.

Capital Budgeting: Meaning, importance, difficulties, Introduction to evaluation techniques – Traditional techniques (ARR Payback method). Discounting cash flow techniques(Present value, NPV, IRR) Ratio Analysis: Meaning, advantages, limitations of ratio Analysis, Types of ratios and their usefulness.

Costing: Nature, importance and Types of cost. Marginal costing: Nature, scope and importance of marginal costing, Break-even analysis its uses and limitations, construction of break-even charts, practical applications of marginal costing. Inventory Control System: The need cost of inventory, methods of inventory costing.

References:

1. S.N. Maheshwari & S.K. Maheshwari, “Introduction of Financial Accountancy”, Vikas Publication.
2. S.N. Maheshwari & S.K. Maheshwari, “Advance Accountancy” Vikas Publication.
3. S.N. Maheshwari & S.K. Maheshwari, “Financial Management”, Vikas Publication.

BS201: Data Structures

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.

Arrays: Arrays Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, character string operation, Array as Parameters, ordered list, Spares Matrices, and vector. Stacks: Array Representation and Implementation of Stack, Operations and Stacks, push and POP, Array Representation of Stack, Linked Representation of stacks, Operations Associated with Stacks, Application of Stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes.

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queue, Dequeue and Priority queue. Link Lists: Representation and implementation of Singly linked lists, Two-way

Header list, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, insertion and deletion Algorithms, Doubly linked lists, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary tree, Binary tree representation Algebraic Expressions, complete Binary Tree, Extended Binary Tree, Array and linked Representation of Binary trees, Traversing Binary tree, Threaded Binary trees, Traversing Threaded Binary tree, Huffman algorithm, Searching and Hashing: Sequential search, comparison and analysis, Hash Table, hash Function, Collection Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble sorting, Quick sort, Two-way Merge Sort, Trees: Binary Search (BST), Insertion and deletion in BST.

References:

1. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia
2. R. Kruse et al , "Data Structures and Program Design in C", Person Education.
3. A.M. Tenenbaum et al, "Data Structures and Program Design in C", Person Education.
4. Lipschutz, "Data Structure", TMH.
5. K. Loudon, "Mastering Algorithms with C", Shroff Publishers and Distributors.
6. Bruno R. Preiss, "Data Structure and Algorithms with Object Oriented Design Pattern in C++", John Wiley & Sons, Inc.
7. Adm Frozdek, "Data Structure and Algorithms in C++", Thomson Asia.
8. Pal G. Sorenson, "An Introduction to Data Structure with Application", TMH.

BS202: Object Oriented Programming using 'C++'

Introduction: Introduction to OOP, Basic Concept of OOP, Applications of OOP, Introduction to C++, Introduction to C++ stream I / O, declarations in C++, Creating new data types in C++, Function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, defaults arguments, Unary Scope resolution operator, Linkage specifications.

Class, Constructors, Friend Class: Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators.

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --.Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members, in a Derived class, Public Protocols and Private inheritance, Direct base classes and Indirect base classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions: Introduction, Type fields and switch statements, virtual functions, Abstract base classes, and concrete classes, Poymorphism, Dynamic binding, Virtual destructors.

C++ Stream I / O: Streams, Stream Input, Stream Output, Unformatted I / O, Stream manipulators, Stream format states, Stream error, States.

Files: File Operations – File pointers – Error Handling during file operations

References:

1. Deitel H.M. & Deitel P.J. “How to Program C++”, PHI-2003.
2. Al stevenes, “C++ Programming”, Wiley Dreamtech- 2003.
3. Herbert Scheldt, “ Complete Reference”
4. E. Balagurusamy, “Object Oriented Programming with C++”.
5. Yashwant Kanetkar, “Let Us C++”.
6. “C++ Programming” by Herbert Scheldt – 2004.

BS203: System Analysis and Design

System Concepts and Information System Environment: The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed system, Formal & Informal Information System, Computer based Information Systems, Management Information Systems, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post Implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, Academic & Personal Qualifications, the multifaceted role of the Analyst, the Analyst/User Interface, Behavioral issues.

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: Kind of Information needed. Information about the firms, Information Gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Data Flow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Feasibility Study: System Performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input / Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements from Design.

References:

1. Elias M. Awad, “Systems Analysis & Design” Galgotia Publication.
2. Hoffer, “Modern Systems Analysis & Design” Addison Wesley.
3. Kendall, “Introduction to Systems Analysis & Design” McGraw Hill.

BS204: Probability & Statistical Techniques

Data representation, Histogram, Frequency distribution, Ogive, Arithmetic mean and Geometric mean, Harmonic mean, Medium quadrates.

Probability Theory: Sample space & events, the axioms of probability, some elementary theorem, mathematical expectation.

Probability Distribution: Random variables, binomial distribution, hyper geometric distribution, chebyshev distribution, Poisson distribution, geometric distribution, Erlang distribution.

Probability Densities: Continuous random variables, normal distribution, uniform distribution.

Example of Least square, fitting of curves. Correlation and regression.

Theory of Sampling: Sampling, sampling of attributes, Mean of standard deviation of sample, Sampling distribution, Distribution of the means.

Chi square test as a goodness of fit, Chi square test as test of independence.

References:

1. Bernstein: "Element of Statistics" PHI.
2. Hogg, "Introduction Mathematical Statistics", Pearson Education
3. Lipschutz, "Introduction to Probability & Statistics" PHI.

BS301: Computer Based Numerical Techniques

Floating Point Arithmetic: Representation of floating point numbers, Operations, Generalization, Pitfalls of floating point representation, Errors in numerical computation.

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula- Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, III conditioned system of equations, Refinement of solution, Gauss Seidal iterative method, Rate of Convergence.

Interpolation and Approximation: Finite Differences, Difference Tables.

Polynomial Interpolation: Newton's forward and backward formula Central

Difference Formulae: Gauss forward and backward formula, stirling's Bassel's Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula, Hermite's Interpolation Approximation of function by Taylor's series and Chebyshev polynomial.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's rule, Euler-Maclaurin, Formula solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta Methods, Predictor-corrector method, Automatic error monitoring, Stability of solution.

References:

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI.
2. Gerald and Wheatley, "Applied Numerical Analysis", AW.
3. Jain, Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Ager Int.
4. Grewal B.S., "Numerical Methods in Engineering and Science" Khanna Publishers Delhi.
5. T.Veerarajan, T.Ramchandran, "Theory and Problems of Numerical Methods", TMH

BS302: DBMS

Introduction: An overview of database management system, Database system Vs file System, Database system concept and architecture, data models schema and instances, data independence and data base language and interfaces, data definition language, DDL, Overall database structure, Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second and third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD and JDs, alternative approaches to database design.

Transaction Processing Concepts: Transaction system, Testing of serializability, serializability of schedules, conflict and view serializable schedule, recoverability, Recovery from transaction failures, deadlock handling.

References:

1. Date C.J., "An Introduction to Database System" Addison Wesley.
2. Korth, Silbertz, Sudarshan, "Database concepts" McGraw Hill.
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley.
4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
5. Bipin C. Desai, "An Introduction to Database System" Galgotia Pub.

BS303: Digital Electronics

Representation of information & Basic Building Blocks: Introduction to Computer, computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry look ahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (Synchronous and asynchronous), ALU, Micro-operation. ALU-chip, Faster Algorithm and Implementation (Multiplication & Division).

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, Data transfer & manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic tape etc.

I/O Organization: Peripheral Devices, I/O Interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

References:

1. Willam Stalling, “Computer Organization & Architecture”, Pearson Education Asia.
2. Mano Morris, “Computer System Architecture” PHI.
3. Zaky & Hamacher, “Computer Organization” McGraw Hill.
4. B.Ram, “Computer Fundamental Architecture & Organization”, New Age.
5. Tanenbaum, “Structured Computer Organization” PHI.

BS304: Web Technology

History of the Web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber Laws, Web project, Web Team, Team dynamics.

Communication Issues, the client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

HTML: Formatting Tags, Links, Tables, Frames, Forms, Comments in HTML, DHTML. Java Script: Introduction, Documents, Forms, statements, functions, objects in Java Script, Events and Event Handling, Arrays, Forms, Buttons, Checkboxes, Text fields, and Text areas.

XML: Introduction, Display and XML Documents, Data Interchange with an XML Document, document types, definitions, Parsers using XML, Client-side usage, Server-side usage.

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VB Script, Active Server Pages (ASP).

References:

1. Burdman, “Collaborative Web Development”, Addison Wesley.
2. Sharma & Sharma, “Developing E-Commerce Sites”, Addison Wesley.
3. Iva Bayross, “Web Technologies Part-II” BPB Publications.
4. Shishir Gundavarma, “CGI Programming on the World Wide Web” O’Reilly & Associate.
5. DON Box, “Essential COM” Addison Wesley.
6. Greg Bucze, “ASP Developer’s Guide” TMH

BS401: Operating System

Introduction: Definition, Design Goals, Evolution, Concept of User, Job and Resources, Batch processing, Multi-programming, Time sharing, Structure and Functions of Operating System.

Process Management: Process states, State Transitions, Process Control Structure, Context Switching, Process Scheduling, Threads.

Memory Management: Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Combined Systems, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Global Vs local Allocation, Thrashing, Working Set Model, Paging.

Concurrent Processes: Process Interaction, Shared Data and Critical Section, mutual Exclusion, Busy form of waiting, Lock and unlock primitives, Synchronization, Classical Problems of Synchronization, Semaphores, Monitors, Conditional Critical Regions, System Deadlock, Wait for Graph, Deadlock Handling Techniques: Prevention, Avoidance, Detection and Recovery.

File and Secondary Storage Management: File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, Allocation Methods, Free space management: Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management, Protection & Security.

References:

1. Silberschatz and Galvin, "operating System Concepts 6/ ed" Addison Wesley.
2. William Stalling, "Operating Systems: Internal and Design Principles 5/ ed" PHI.
3. Tanenbaum, "Modern Operating Systems" PHI.
4. J.Bach, "The Design of UNIX Operating System", Pearson Education.
5. Vijay Mukhi, "The C Odyssey" BPB.
6. Peterson and Silberschatz, "Operating System Concepts", Addison Wesley.
7. P.B.Hansen, "Operating System Principles", PHI.
8. K. Christian, "The UNIX Operating System", John Wiley.
9. A.N.Haberman, "Introduction to Operating System Design", Galgotia.

BS402: Advance RDBMS

Data Processing Systems, Transaction Processing and Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict and view serializable schedule, recoverability, Recovery from transaction failures, deadlock handling.

File processing system, File Management system, Components of RDBMS. Database Architecture.

Object Oriented Databases, Distributed Databases, Client/ server database, Data Dictionary, Database Models, Normalization, The Database Administration, Database Manager responsibilities.

Monitoring Database performance, Database Machine overview.

Designing RDBMS for organization, Object modeling, Perspectives of Data Modeling.

Evolving the logical model, Transformation from Logical to Physical model.

Concurrency Control Techniques: Concurrency control, Locking Techniques for concurrency control, CODD's 12 rules for a fully relational DBMS.

Data Integrity, Redundancy, Primary and Foreign keys.

Object database management, Database design and choosing the database server.

SQL and MySql. Database access and ODBC.

Middleware: Kinds of middleware. Socket-talking to database, virtual database engine defined, web based middleware, Microsoft JET engine, Database security and recovery, Data Mining and Warehouse.

References:

1. "Adv. DBMS" by V.K.Jain, Cyber Tech Publication, 5A/13 Ansari Road, Daryagan, N.Delhi.- 110002.
2. Date C.J., "An Introduction to Database System", Addison Wesley.
3. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill.
4. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley.

5. Paul Beynon Davis, "Database Systems", Palgrave Macmillan.
6. Bipin C.Desai, "An Introduction to Database System", Galgotia Pub.

BS403: Management Information system

Fundamentals of Information Systems, System approach to problem solving, Developing information system solutions, Levels of MIS (Top, Middle, Lower).

Corporate Databases & Database Management, Data Organization, Data models, Data security & information quality.

Transaction Processing Systems, Executive Information Systems, Decision Support Systems, Expert Systems, Information Systems in Marketing, Manufacturing, HRM, Accounting and Finance.

Information Resource Management, Planning, Implementing & controlling Information Systems, Computer Crime, Ethics & Society.

References:

1. Brein James O, "Management Information Systems"
2. Murdick & Ross, "Information Systems for Modern Management"
3. Parker C.S., "Management Information Systems", Strategy and Action.
4. Aktas A.Ziya, "Structured Analysis and Design of Information Systems"

BS404: Multimedia Technology and Application

Evolution of Multimedia and its object, Scope of multimedia in business & work, Production and planning of Multimedia Applications, Multimedia hardware, Memory of Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools, Video, Sound, Image capturing Authoring Tools, Card & Page Based Authoring Tools.

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under windows environment, Audio & Video capture.

Macromedia Products, Basic drawing techniques, Advance animation techniques, Creating Multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

Digital Audio Concepts, Sampling variables, Loss less compression of sound, Lossy compression & Silence compression.

Multimedia monitor bitmaps, Vector drawing, Lossy graphic compression, Image file formatic animations, Image standards, JPEG compression, Zig Zag coding, Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia. Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

References:

1. Andreas Halzinger, "Multimedia Basics" Vol-I to Vol-III Firewall Media.
2. Tay Vaughan, "Multimedia Making it Work" Tata McGraw Hill.
3. Buford, "Multimedia Systems" Addison Wesley

BS501: Programming in JAVA

Java Programming: Introduction, Operators, Data types, Variables, Methods and Classes, Multi-threaded programming, I/O Java applet.

Java Library: String Handling, I/O Exploring JAVA, Networking, Applet Classes, Event Handling, Introduction to AWT, Working with windows, Graphics AWT controls, Layout manager and menu, Images, Additional Packages.

Software Development Using Java: Java Bean, Java swing, Java Servlets, Migrating C++ to Java, Application of Java, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their Applications.

References:

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH.
2. Balagurusamy E, "Programming in JAVA", TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley.
4. Mark Wutica, "Java Enterprise Edition" QUE.
5. Steven Hoizner, "Java2 Black Book" Dreamtech.

BS502: Data Communication & Networks

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, service, networks topology, Physical Layer transmission, switching methods, Integrated services digital networks, terminal handling.

Medium Access sub Layer: Channel allocation, LAN protocols, ALOHA protocols-Pure Aloha, slotted ALOHA Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Linked Layer, elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control.

Network Layer: Point to Point networks, routing algorithms, Congestion control algorithms, internetworking, TCP/IP packet, IP addresses, Ipv6.

Transport Layer: Design issues, connection management, TCP Window Management, User Datagram Protocol, Transmission Control Protocol.

Application Layer: Network Security, DES, RSA algorithms, Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol, Cryptography and compression Techniques.

References:

1. A.S. Tanenbaum, "Computer Networks, 3rd Edition", PHI.
2. W. Stallinsd, "Data and Computer Communication", Macmillan Press.
3. Comer, "Internetworking with TCP/IP" ,PHI.
4. Comer, "Computer Networks & Inter", PHI.
5. Forouzan, "Data Communication and Networking", TMH

BS503: Network Security

Introduction to Security: Attacks, Service & Mechanisms, Security, Attacks, Security Services, Conventional Encryption: Classical Techniques, Conventional Encryption Model, and steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithms, RCS, CAST-128, CR2 Placement and Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Hash Functions: Message Authentication & Hash Function, authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DSS), Proof of Digital Signature Algorithm.

Network & System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S/MIME Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management.

References:

1. William Stallings, "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.
2. Johannes A. Buchmann, "Introduction to Cryptography", Springer-Verlag.
3. Atul Kahate, "Cryptography and Network Security", TMH

BS504: Software Engineering

Introduction: Introduction to software engineering, Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirements Specification: Analysis, Principles, Water Fall Model, the Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and control.

Software Design: Design principles, problem partitioning, abstraction, top-down and bottom-up design, Structured approach functional versus object oriented approach, design specifications, and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transform Mapping, Component Level Design, Forth Generation Techniques.

Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The management Spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs Unstructured maintenance, quality assurance, project monitoring, risk management.

Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, reliability growth modeling, Software quality, ISO 9000 Certification for software industries, SEI capability maturity model, comparison between ISO & SEI CMM. CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software

life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 2001.
2. Jalote, Pankaj, " Software EngineeringEd.2" New Delhi, Narosa 2002
3. Schaum's Series, "Software Engineering", TMH.
4. Ghezzi Carlos and Others, "Fundamentals of Software Engineering" PHI.
5. Alexis, Leon and Mathews Leon, "Fundamental of Software Engg."
6. Somerville, Ian, "Software Engineering", AWL

BS601: E-Governance

Introduction: E-Governance- Technology and Prospects, definition of E-Governance, Economic potential of E-Governance, Incentives for engaging in E-Governance, Forces behind E-Governance, Advantages and Disadvantages, Architectural framework, Impact of E-Governance.

Network Infrastructure of E-Governance: Internet based E-Governance Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Mobile Commerce: Introduction, Wireless Application Protocol, WAP Technology, Mobile Information devices, Mobile Computing Applications.

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging Client Server, Security Threats, Network Security, Factors to Consider in Firewall Design, Limitation of Firewalls.

Encryption: Encryption techniques: Symmetric Encryption-Keys and data encryption standard, Triple encryption. Asymmetric encryption-secret key encryption, public and private pair key encryption, Digital Signature, Virtual Private Network

Electronic Payments: Overview, The SET protocol, payment Gateway, certificate, digital tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online banking, EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. Policies and Agenda.

References:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce" Addison Wesley.
2. Bajaj and Nag. "E-Commerce the Cutting Edge of Business" TMH.
3. P. Loshin, John Vacca, "Electronic Commerce", Firewall Media, N.Delhi.
4. "E-Business & Commerce", Brahm Cazner, Wiley Dreamtech.

BS602: Advance Programming in JAVA

Core Java: Introduction Operator, Data types, Variables, Arrays, Control statements, Methods & classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String Handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout manager, Menus, Images, Graphics.

Java Swing: Creating a Swing Applet and application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box Progress Bar,

Menus and Tool Bars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner Frame. JDBC: The connectivity Model, JDBC/ODBC Bridge, java. Sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Java Beans: Application Builder tools, The bean developer kit (BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entry Beans, Introduction to Enterprise Java beans (EJB).

Introduction to RMI (Remote Method Invocation): A simple client server application using RMI.

Java Servlets: Servlet API basic, Life cycle of a servlet, Running Servlet, Debugging Servlets, Thread-safe servlets HTTP Redirects, Cookies, Introduction to Java Server Pages (JSP).

References:

1. Margarel Leving Young, "The Complete Reference Internet" TMH.
2. Naughton, Schidt, "The Complete Reference JAVA2" TMH.
3. Balagurusamy E, "Programming in JAVA" TMH.
4. Dustin R. Calway, "Inside Serviets", Addison Wesley.
5. Mark Wutica, "Java Enterprise Edition" QUE.
6. Steven Hoizner, "Java2 Black Book" Dreamtech.