

G.S. College of Commerce & Economics (Autonomous)
 South Civil Lines, Jabalpur (M.P.)
Department of Computer
B.C.A. II Year Syllabus Recommended by Board of Studies
 Session : 2020-21 Onwards

Internal Max. Marks : 10
 Min. Pass Marks : 03

Main Exam Max. Marks : 40
 Min. Pass Marks : 14

BCA-21-DATA STRUCTURES USING C++

Unit-I
Introduction, OOPS languages, characteristics of OOP's languages, application of OOP's, OOP's paradigm, concepts: object, class, data abstraction, data encapsulation, inheritance, and polymorphism. Static and dynamic binding, message passing, benefits of OOP's, disadvantage of OOP's.
Unit-II
C++ Programming Concepts: input and output in C++, functions in C++- value parameters, reference parameters, Parameter passing, function overloading, arrays, pointers, new and delete operators, class and object, access specifiers, friend functions, constructors and destructor, Operator overloading, Inheritance and Polymorphism. Exceptions-throwing an exception and handling an exception.
Unit-III
Basic Concepts – Data Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data. Stack: Definition, Array implementation of stack (static stack): Operations PUSH, POP, And TRAVERSE. Applications of stack: Infix, Prefix, Postfix representation and evaluation using stack, Use of stack in recursive implementation. Queue: Definition, Array implementation of queue (static queue): Operations INSERT, DELETE and TRAVERSE. Introduction to Circular queue: Definition & implementation, Priority queue, Double ended queue, Applications of queue.
Unit-IV
Introduction to linked list: Definition, advantaged, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list. Searching and Sorting Techniques: Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.
Unit-V
Tree: Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, Introduction to B-Tree & B+ tree. Hash Table, Collision resolution technique. Graphs: Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.
Practicals:
Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 50 lab exercise covering all units with equal weightage.

Text Books:

1. Object Oriented Programming with C++, Balaguruswamy Tata Mgraw Hill (2008).
2. Object Oriented Programming in C++, Robert Lafore, Sams; 4 edition.
3. Yedidiah Langsam Moshe J. Augenstein, Aaron M. Tenenbaum, “**Data Structures using C & C++**”, PHI
4. G.S.Baluja, “**Data Structures Through C++**”,Dhanpat Rai & Co.,4th Edition
5. Fundamentals of Data Structures By Sartaj Sahani.

Reference Books:

1. Seymour Lipschutz,“**Data Structures**”, Schaum's Outline Series, Tata Mc GrawHill.
2. Adam Drodzsek, “**Data Structures & Algorithm in C++**”, 2nd Edition

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BCA-22-DATABASE MANAGEMENT SYSTEM & RDBMS

UNIT-I
Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, DCL, TCL, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels. Database System architecture, level of abstraction, Database users and DBA, Classification of Database Management Systems, Components of database system, Traditional File Systems vs. Modern Database Systems, Introduction and applications of DBMS, Data Independence.
UNIT-II
Entity relationship model as a tool of conceptual design: entities & entities set, relationship, relationship set & relationship types, attributes, role, participation and mapping constraints, keys, strong and weak entities, Advance ER Model Features: generalization, specialization & aggregation, reducing ER diagram to tables, Roles, Participation.
UNIT-III
Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity ,extension and intention, relational algebra: select, project, Cartesian product, different types of joins: theta, equi, natural, outer joins, set operations. Evaluation of SQL, Between clause, Distinct Clause, Order by Clause, Group by Clause, SQL Functions, Sub queries, Handling null value, Aggregate function, User Defined Function, , View. Relational Calculus, Introduction, Tuple Relational Calculus, Domain Relational Calculus. PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making, Working with Stored Procedure, Trigger, Cursor, Package, Index, Synonym and Sequence. Various Programming Examples.
UNIT-IV
Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF & BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF. Relational Database design, Features of good relational database design, Codd's Rule, Integrity constraints, Armstrong Axioms, Closure Set of Functional Dependency, Closure Set of Attributes
UNIT-V
Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses. Transaction Management, ACID properties, Serializability, Concurrency Control, Lock and types of Locks, Two Phase Locking Protocol, Check Points, Recovery Techniques, Deferred and Immediate data modification. Emerging Database Technology: Data Warehouse, Data Mining, Distributed database, Mobile Database, Object Oriented Database, Geographical Database.
Practicals
Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 25 lab. exercise covering all units with equal weightage.

Text Books-

1. Database System Concepts by Henry Korth and A. Silberschatz.
2. Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
3. Database Management System by Seema Kedar, Technical Publication

Reference Books-

1. An Introduction to Database System by Bipin Desa
2. An Introduction to Database System by C.J.Date.
3. Atul Kahate, "Introduction to Database Management Systems",
4. Raghu Ramakrishnan, "Database Management Systems",
5. G.K.Gupta, "Database Management Systems", Tata Mc Graw Hill, 2011.

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BCA-23-SOFTWARE ENGINEERING

Unit-I
Introduction : Software Engineering-Software Process- Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process- Extreme Programming- Other agile Process models-Software engineering Knowledge-core Principles-Principles that guide each framework Activity.
Unit-II
Requirements : Requirements Engineering-Establishing the Groundwork-Eliciting Requirements- Developing use cases-Building the requirements model-Negotiating, validating Requirements-Requirements Analysis-Requirements Modelling Strategies.
Unit-III
Design Modeling With Uml: Modeling Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams - Activity Diagrams - Package Diagrams - Component Diagrams – Deployment Diagrams - Diagram Organization- Diagram Extensions. Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements .
Unit-IV
Software Implementation : Structured coding Techniques-Coding Styles-Standards and Guidelines- Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction-Exception Handling- Concurrency Mechanism.
Unit-V
Testing And Maintenance Testing: Software Quality- Software Quality Dilemma- Achieving Software Quality- Testing: Strategic Approach to software Testing- Strategic Issues- Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging. Maintenance: Software Maintenance-Software Supportability- Reengineering- Business Process Reengineering- Software Reengineering- Reverse Engineering- Restructuring- Forward Engineering- Economics of Reengineering.

TEXT BOOKS :

1. Roger S, “Software Engineering – A Practitioner’s Approach”, seventh edition, Pressman, 2010.
2. Pearson Edu, “Software Engineering by Ian Sommerville”, 9 th edition, 2010.
3. Ugrasen Suman , “Software Engineering: Concepts and Practices” , Cengage Learning India, 2013

REFERENCES :

1. Hans Van Vliet, “Software Engineering: Principles and Practices”–, 2008.
 2. Richard Fairley, “Software Engineering Concepts”, 2008.
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BCA-25- ACCOUNTING AND FINANCIAL MANAGEMENT

<u>Unit-I</u>
Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.
<u>Unit-II</u>
Conceptual Frame work: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, brief review of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.
<u>Unit-III</u>
Recording of transactions: Voucher system; Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Bank Reconciliation Statement, Trial Balance. Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation.(WDV & SLM).
<u>Unit-IV</u>
Preparation of final accounts: Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business. Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a Company.
<u>Unit-V</u>
Computerised Accounting: Computers and Financial application, Accounting Software packages. An overview of computerized accounting system - Salient features and significance, Concept of grouping of accounts, Codification of accounts, Maintaining the hierarchy of ledger, Generating Accounting Reports.

Recommended Books:

1. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)
 2. Financial accounting: By Jane Reimers (Pearson Education)
 3. Accounting Made Easy: By Rajesh Agarwal & R Srinivasan (Tata McGraw –Hill)
 4. Financial Accounting for Management: By Amrish Gupta (Pearson Education)
 5. Financial Accounting for Management: By Dr. S. N. Maheshwari (Vikas Publishing House)
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BCA-26-COMPUTER ORIENTED NUMERICAL METHODS

Unit-I
NUMERICAL COMPUTATIONS : Computer Arithmetic: Floating Point Number Operations, Normalization and their consequences. Iterative Methods : Bisection Methods, False Position Methods, Newton Raphson Method, Secant Method, Graffes Root Squaring Method, Convergence of Solution
Unit-II
Simultaneous Liner Equation : Solution of Simultaneous Liner Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, Triangularization Method & Pivoting Condensation, III Conditioned Equation & Refinement of solution Curve Fitting : Curve Fitting Method, Least Curve Fitting, Non Linear Curve Fitting.
Unit-III
Difference Operators And Interpolation: Definition Of Forward, Backward, Shifting, Divided, Difference Central and Averaging Operators and their Relationships. Newton’s Forward Interpolation Formula, Newton’s backward Interpolation Formula Newton’s divided Interpolation Formula. Lagrange’s Interpolation Formula.
Unit-IV
Numerical Differentiation: Numerical Differentiation using Newton’s Forward Interpolation Formula, Newton’s Backward Interpolation Formula Newton’s divided Interpolation Formula. Numerical Integration : General Quadrature Formula, Newton- Cote’s Formula, Trapezoidal Rule, Simpson’s one Third Rule, Simpson’s Three Eight Rule.
Unit-V
Numerical Solutions of Ordinary Differential Equations : Euler’s Method , Euler’s Modifies Method. Tailor’s Series Method, Picard’s Method, Runga Kutta Second Order and Fourth order Method.

TEXT BOOK:

1. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.

REFERENCE BOOKS:

1. S. S. Sastry, Introductory Methods of Numerical Analysis. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.
2. H. C. Saxena, Finite Differences and Numerical Analysis.
3. Modes A., Numerical Analysis for Computer Science.
4. Numerical Analysis by gupta and malik . (TEXT)
5. Numerical Analysis by Shastri
6. Computer based Numerical Algorithm by Krishnamurthy.