

GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)

B.Sc. Semester III

COMPUTER SCIENCE

COMPUTER ARCHITECTURE

NIT-I: Data Representation:

Number Systems - Decimal, Binary, Hexadecimal, Octal. BCD, Conversion from one number system to another number system, binary arithmetic, complements (n-1's and n's), Signed and Unsigned numbers, Addition and Subtraction, Multiplication, representation of negative numbers. Fixed point representation & floating point representation.

NIT-II: Logic gates, Boolean algebra & Switching functions:

Fundamental postulates of Boolean algebra, Basic theorems and properties, Canonical and Standard forms, Truth Tables, OR, AND, NOT, XOR, Universal (NOR and NAND Gates, Multilevel NAND/NOR realizations, properties of logic gates, Algebraic simplification digital logic gates. DeMorgan's theorem. Standard representation of logic function (SOP and POS), Minimization techniques - Map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method.

NIT-III: Combinational & Sequential Circuits:

Design using conventional logic gates, Encoder, Decoder, Full Adders, Half Adders, Subtractors, Multiplexer, De-Multiplexers. Basic flip-flops- SR FF, JK-FF, T and D Type FF, Master slave FF, clocked Flip Flop; Triggering and excitation tables.

UNIT-IV: Basic Computer Organization & Design:

Instruction Codes, Computer registers, Common Bus system, instruction cycle, I/O & interrupt,

Programming The Basic Computer

Machine language, Assembly language, One pass and Two pass assemblers, Instruction format, Addressing modes, Type of interrupts, RISC versus CISC architectures.

UNIT-V : Input-Output and Memory Organization:

Peripheral devices, I/O interfaces, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processor. Memory hierarchy, Main and auxiliary memory, Associative memory, cache memory, virtual memory.

TEXT BOOKS:

1. "Computer System Architecture", M. Morris Mano, 3rd Edition, PHI / Pearson, 2006.
2. "Computer Organization and Architecture", William Stallings 7th Edition, PHI/Pearson, 2006.
3. "Switching & Finite Automata theory", Zvi Kohavi, TMH, 2nd Edition.
4. "Digital Design", Morris Mano, PHI, 3rd Edition, 2006.

REFERENCE BOOKS:

1. "Computer Organization", Car Hamacher, Zvonks Vranesic & Safwat Zaky, 5th Edition, TMH, 2002.
2. "Computer Architecture and Organization", John P. Hayes, TMH International Editions, 1998.
3. "Computer Architecture and Organization", Raj Kamal, Nicholas Carter, 2nd Edition, TMH Education, 2009
4. "Introduction to computer architecture", Stones S. Galgotia Publication
5. "Computer Organization and Architecture design for Performance", 4th edition - W. Stallings, PHI
6. "Computer Engineering - Hardware Design", M. Morris Mano, PHI
7. "Computer Architecture and parallel processing", Kai Hwang & Faye Briggs, McGraw hill, 1985
8. An Engineering Approach To Digital Design - Fletcher, PHI.
9. Malvino A.P, Digital Principles and Applications, Tata McGraw Hill.

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GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)

B.Sc. Semester IV COMPUTER SCIENCE

INTRODUCTION TO DATA STRUCTURE AND OOPS

I-I
Introduction, Procedure-Oriented Programming paradigm, Object-Oriented Programming paradigm, Basic characteristics of OOP's: object, class, encapsulation, inheritance, reusability, polymorphism and loading, static and dynamic binding, message passing, benefits of OOP's and application of OOP's.

I-II
Basics: Overview, Syntax, Comments, Basic Data types, Tokens, identifiers, Keywords, Constants/Literals, Variables, Variable Scope, Modifier Types, Storage Classes, Operator, array, Strings, Pointer, References, Date & Time, I/O statements, namespace, Program structure, typecasting, control statements: if statement, if-else statement, nested if-else statement, ladder if-else, switch statement, for loop statement, while loop statement, do-while loop statement.

IT-III
Structures and classes : Basics of object and class and abstract class in C++, private and public members, static members and function members, function prototype, inline functions.
Introduction to : function overloading, friend functions, default arguments, constructors and destructors, inheritance and polymorphism.

NIT-IV
Linear and Non linear data structures, Data structure operations, Algorithmic notations, Complexity of algorithms, Control structures. Memory representation and operations on:
Arrays- One dimensional, Multidimensional arrays.
Linked List- Singly and Doubly Linear link lists, circular linked list
Stack: PUSH, POP, TRAVERSE, implementations using array and linked list,
Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack, use of stack in recursion, Polish notation.
Queues: Priority Queue, Deques

UNIT V
Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Definition of Binary Search Trees, AVL Trees, B trees, multi way search trees.
Sorting: Sequential Sort, Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort.
Linear or sequential search, Binary search.

TEXT/REFERENCE BOOKS:

1. "Data structures using C", Tenenbum, PHI, 1996
2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press, 1978
3. "Data structures and Algorithms", Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman.
4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985
5. "Data Structures and Program Design in C", R. Kurse, Leung & Tondo, 2nd Edition, PHI publication
6. Data Structures, Seymour Lipschutz, Schaum's Outlines, TMH.

REFERENCE BOOKS:

- "Object-Oriented Programming with C++", E. Balaguruswamy, TMH
- "C++ The Complete Reference", Herbert Schildt, Osborne, TMH, latest
- "Object-oriented programming with C++", Robert Lafore, Macmillan computer
- "Teach yourself C++", Herbert Schildt, Osborne, TMH
- "C & C++ Complete reference", Herbert Shieldt, Osborne, TMH
- "Object-Oriented programming in C++", NabajyotiBarkakati, PHI
- "C++ Primer Plus", Stephen Prata, Galgotia Publications, 1996
- "Object-Oriented analysis and Design with applications", Grady Booch

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~~Programming Lab~~ Programming Lab in c++ and Data Structure

C++ Lab

1. Write a c++ program for finding greatest of three numbers.
2. Write a c++ program for solving the quadratic equation.
3. Write a c++ program to print all the prime numbers in the given range.
4. Write a c++ program for displaying the Fibonacci series.
5. Write c++ function for swaping two numbers without using third variable.
6. Write your own function for string reverse, string palindrome, string comparison.
7. Write a c++ program for sorting the number in ascending and descending order.
8. Write a c++ program for matrix addition and multiplication.
9. Write a c++ program for copy constructor and dynamic initialization of constructor.
10. Write a c++ program for array of pointers to objects.
11. Write a c++ program operator overloading using friend function.
12. Write a c++ program different types of inheritance using virtual base class.
13. Write a c++ program for run time polymorphism.
14. Write a c++ program to perform sorting using generic function(template).

Data Structure Lab

Linked List

1. Implementation of Linked List menu driven Program.
2. Representation of Sparse matrix using multi Linked Structure. Implimentation of Sparse matrix multiplication.
3. Implementation of polynomials operations(addition, subtractions) using Linked List.
4. Implementation of Double Ended Queue using Linked List.
5. Implementation of priority queue program using Linked List.

stack

1. Implementations of stack menu driven program.
2. implementation of multistack in one array.
3. Implementation of infix to post fix transformation and its evaluation program.
4. Implementation of infix to prefix transformation and its evaluation program.
5. Simulation of recursion.

queue

1. Implementation of circular queue menu driven program.
2. Implementation of queue menu driven program.
3. Implementation of priority queue program using array.

tree

1. Implementation of binary tree menu driven program.
2. Implementation of binary tree traversal program.
3. Implementation of construction of expression tree using postfix expression.
4. Implementation of B tree menu driven program.
5. Implementation of B+ tree program.
6. Implementation of preorder traversal of a threaded binary tree.

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Session 2021-22

GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)

B.Sc. Semester V
COMPUTER SCIENCE

SYSTEM ANALYSIS AND DESIGNING

UNIT-I
System concept, Characteristics of a system, Elements of a system, types of system. Introduction to system development life cycle, Recognition of need, Skills and Role of system Analyst, Introduction to system analysis, Initial Investigation, determining the users information requirements, problem definition.

UNIT-II
Introduction to structured analysis, fact-finding, the tools of structured analysis, Feasibility study, Cost/benefit analysis.

UNIT-III
Introduction to system designs, The process of design (logical and physical design), Design methodology, structured design, structured walkthrough, Major development activities, Data validation, Introduction to input design, output design, forms design, File structure, File organization, Data Base design, and the role of DBA.

UNIT-IV
The Test Plan, Quality assurance, System Conversion, Software maintenance, Procedure for hardware/software selection, Project Management and Control, Project Control, Gantt Chart, PERT and CPM, System Security.

UNIT-V
Abstract view of components of computer system, Functions of operating system, Evolution of operating system, Batch, Time sharing, Real time operating system, Multiprogramming, Multiprocessing, Multiuser, Multiaccess. Introduction to UNIX.

TEXT BOOKS:

1. System Analysis and Design, Elias. M. Awad, Galgotia Publication.
2. Fundamentals Of Computers, V. Rajaraman, PHI.
3. "Operating Systems: Concepts & design" Milan Milenkovic, , TMH
- 4.

REFERENCE BOOKS:

- Kendall and Kendall, System analysis and Design, PHI.
- Igor Hawryszkiewicz, Introduction to System analysis and Design, PHI

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GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)

B.Sc. Semester VI
COMPUTER SCIENCE

DATA BASE MANAGEMENT SYSTEMS & WEB TECHNOLOGY

UNIT-1

INTRODUCTORY CONCEPTS: Database system concepts and architecture, Database System applications, Database systems versus File system, View of data, Data Models, Database Languages (Data Definition language and Data Manipulation Language), Database Users and Administrators (Database Users and User Interface), Database Administrator, Database System Structure (Storage Manager, Query Processor), Application Architectures, History of Database Systems.

UNIT-2

Data Models : ER Modeling concepts, Entity Sets, Relationship Sets, Constraints, Keys, Mapping Cardinalities, ER Diagrams, Extended ER feature, Weak-entity types, Subclasses and inheritance, Specialization, Generalization and Aggregation, ER to relational mapping, Reduction of an E-R schema to tables. Composite and Multivalued Attributes.

RELATIONAL MODEL : Structure Of relational Databases, Database Schema, Keys, Schema Diagram, Query Languages,

Relational ALGEBRA : Basic Relational Algebra Operation, Select, Project, Union, Cartesian Product, Intersection, Join, Natural join, Division, Tuple and Domain Relational Calculus.

SQL: Parts and structure of SQL, Aggregate Function, Data definition in SQL, Queries and update statements,

Integrity and Security : Domain Constraints, Referential Constraints, Assertions, Triggers, Security and Violations, Authorization, Granting Of Privileges, Notion Of Roles, Audit Trails,

Authorization in SQL, Privileges in SQL, Role, Privilege to Grant Privileges, Encryption and Authentication.

UNIT-3

DATABASE DESIGN USING THE RELATIONAL MODEL: Functional dependencies: Keys in a relational model, Concept of functional dependencies, Normal forms 1NF, 2NF, 3NF, Boyce-Codd Normal Forms, Multi-values dependencies and fourth normal form, Join dependencies and fifth normal form.

UNIT-4

STORAGE AND INDEXING STRUCTURES: Storage structures Secondary storage devices, Buffering of blocks, File Organization, Heaps, Sorted Files, Hashing and overflow handling techniques, dynamic hashing, Extensible hashing, other file organization and Indexing.

TRANSACTION PROCESSING, CONCURRENCY CONTROL AND RECOVERY TECHNIQUE: Transaction Fundamentals, Transaction State, Shadow copy technique, Concurrent Execution, Serializability, ACID properties

Locks, Lock based Protocols, Two Phase Locking Protocol, Timestamp Based Protocol, Deadlocks and starvation, Two-phase locking (2PL) protocol, Deadlock prevention protocols, Wait-die and wound-wait schemes, Time-out based schemes, Deadlock recovery,

Recovery concepts, Failure classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Deferred updates technique, Immediate update technique, CheckPoints, Shadow paging.

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UNIT-5

RDBMS software ORACLE: Introduction to Oracle, Data Types, SQL, SQL Plus, Creating DDL & DML : Creating Table, Specifying Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting Deleting and Updating Rows in table, where clause, Order by , GROUP function, SQL function: JOIN, Set Operation, SQL Sub Queries.
Views : Creating, Dropping, and Retrieving data from view.
Security : Management Of roles, Granting Role & Privilege, Drawing Privilege.
PL/SQL : Block structure in PL/SQL, Variable and constants, Data Base Access, Exception Handling, Triggers.

Oracle Complete Reference : Oracle Press.

TEXT/REFERENCE BOOKS:

1. "Fundamentals of Database System", R. Elmasri & S. Navathe
2. "Data Base Management System", Henry F. Korth & Abraham Silberschats, TMH, 1991.
3. "An Introduction to Database Management System", Vol I & II, Date C.J., Addison Wesley, 1981, 1983
4. UNIT-I
5. Object Oriented Database: Persistent Programming Language, Object identity and its implementation, Clustering Indexing, Client Server Object Bases Coherence.
- 6.

TEXTBOOKS/REFERENCES:

7. 1. Database System Concepts: Korth And Silberschatz (TATA Mc-Graw Hill)
8. 2. Fundamentals of Database System: R. Elmasri & S. Navathe (Benjamin Cummings)
9. 3. Database Transaction Models for Advanced Applications: Ahmed K. Elmagramid (Morgan Kaufmann)
10. 4. Transaction Processing Concepts and Techniques: J. Gray and A. Reuter
11. 5. Introduction to Object Oriented Databases: Won Kim (MIT Press)
12. 6. Readings in Object Oriented Database System: S. Zdonik and D. Maier (Morgan Kaufmann)
13. 7. Reading in Database Systems: M. Stonebreaker
14. 8. Distributed Database Principles and System: S. Ceri and G. Pelagati (McGraw HILL)

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RDBMS & WEB Programming Lab with PHP

RDBMS Lab

1. Practical based on PL/SQL (using oracle)
2. Perform DML and DDL operations
3. Cursor, Procedure, Trigger

Web programming With PHP

Web application development using PHP

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