DATA STRUCTURES & C++

I - M.Sc(Computer Science) / I- Semester

Choice Based Credit System(CBCS)

- By

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I- M.Sc(Computer Science)

PAPER - I : DATA STRUCTURES & C++

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Introduction: The Abstract Data Type- A Model for an Abstract Data Type-Algorithm Efficiency.

UNIT-II

Stack: Basic Stack Operation-Stack Linked List Implementation-Stack Applications – Stack ADT –Array Implementation.

UNIT-III

Introduction to Trees: Binary Trees –Binary Tree Traversal-Expression Trees-General Trees.

Heaps: Heaps Definition –Heap Structure-Basic Heap Algorithm-Heap Data Structure-Heap Algorithm-Heap Applications.

UNIT-IV

Multi way Trees: m-way Search Trees-B-Trees –Simplified B-Tress –B-Tree variation-Lexical Search Tree.

Advanced Sorting Concepts: General Sort Concepts-Insertion Sorts –Selection Sorts-Exchanges Sorts.

Graphs: Terminology –Operation –Graph Storage Structure-Graph Algorithms.

TEXT BOOKS

1. Data Structure a Pseudocode Approach with C++ by Richard F.Gilberf.Behrouza. Forouzan(Thomson Press).

Notes

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

I - M.Sc(Computer Science) / I- Semester

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I - M.Sc(Computer Science)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

UNIT-I

Fundamentals of Object Oriented Programming: Basic concepts, benefits OOPs, Applications of Oops, Java differs from C and C++ -Java and internet, Java and world wide web, web browsers, Overview of java language, Simple Java program, Java program structure , Java Tokens Statements, Java Virtual Machine, Constant, Variables and Data Types, Declaration of variables, Scope of Variables, Type casting, Operators and expressions, operator precedence and associatively, mathematical functions.

UNIT-II

DECISION MAKING AND BRANCHING: Simple if statement, If....Else statements, Switch statement , The While, do and for statements.

Classes OBJECTS AND METHODS: Defining a class and creating objects, constructors, static members , inheritance, overloading methods, Final classes and Finalizer methods, public, private and protected access, Array, Strings and Vectors, two dimensional arrays, wrapper classes, enumerated types.

UNIT- III

MULITPLE INHERITANCE: Defining Interfaces, extending interfaces, implementing interfaces Packages: Putting classes together — Java API Packages — Naming conventions – creating Packages— Using a Package.

MULTITHEREADED PROGRAMMING: Greeting Threads — Extending the Thread Class — Stopping and blocking a Thread — Life Cycle of a Thread — Thread Priority — Synchronization — Implementing a Runnable interface.

MANAGING ERRORS AND EXCEPTIOSN —Types of Errors — Exceptions— Multiple Catch statements — Throwing our own Exceptions.

UNIT- IV

APPLET PROGRAMMING: Local and Remote Applets — Applets and Applications —Applet Life Cycle — creating an Executable Applet — Designing a web page — Passing parameters to Applets.

GRAPHIC PROGRAMMING: The Graphic class — Line and Rectangles — Circles and ellipses — Line graphs — Bar Charts.

Managing Input/output FILES IN JAVA: Stream Classes — Byte Stream Classes —Character Stream Classes Using Streams — Creation of Files — Reading/Writing Characters and Bytes — handling primitive data types, concentrating and Buffering Files —Random access files — interactive input and output, Other Stream Classes.

TEXT BOOK

1. E. Balaguruswamy, Programming with Java, A primer, 3e, TATA Mc Grew —Hill Company (2008).

COMPUTER NETWORKS

I - M.Sc(Computer Science) / I- Semester

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First Year - M.Sc(Computer Science)

PAPER - III: COMPUTER NETWORKS

UNIT – I

COMPUTER NETWORKS AND THE INTERNET: What is the Internet? What is a Protocol? The Network edge, The Network Core, Access Networks and Physical, Delay and Loss in Packet – Switched Networks, Protocol Layers and Their Service Models, Internet Back bones, NAPs and ISPs, A Brief History of Computer Networking and the Internet.

APPLICATION LAYER: Principles of Application Layer Protocols, The World Wide Web: HTTP, File Transfer: FTP, Electronic Mail in the Internet, DNS – The Internet's Director Service.

Unit – II

TRANSPORT LAYER: Transport – Layer Services and Principles, Multiplexing and Demultiplexing Applications, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection – Oriented Transport: TCP, Principles of Congestion Control.

Unit – III

NETWORK LAYER AND ROUTING: Introduction and Network Service Models – Routing Principles – Hierarchical Routing – Routing in the Internet – What's Inside a Router?

Unit – IV

LINK LAYER AND LOCAL AREA NETWORKS: The Data Link Layer: Introduction, Services, Error Detection and Correction Techniques – Multiple Access Protocols and LAN's LAN Addresses and ARP – Ethernet, Hubs, Bridges and Switches – IEEE 802.11 LANs, PPP: The Point – to – Point Protocol – asynchronous Transfer Mode (ATM), X.25 and Frame Relay.

Text Book

1. Computer networking a top – down approach featuring the internet by – James F. Kurose and Keith w. ross (pearson)

Reference Books

1. Business data communication & networks by – Fitz Gerals (John wiley)
2. Data & computer communications – W Stallings (Pearson, phi)
3. Computer communications & networking topologies – Ma gallo, V.M.Hancock (Thomson)
4. Data communications & computer networks – R.Agarwal, BB Tiwari (vikas)
5. Computer networks – AS Tanenbaum (PHI)
6. Computer networks – Black (PHI)

Notes

COMPUTER ORGANIZATION & OPERATING SYSTEMS

I - M.Sc(Computer Science) / I- Semester

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I - M.Sc(Computer Science)

COMPUTER ORGANIZATION & OPERATING SYSTEMS

Unit-1

Logic Circuits: Basic Logic functions, Synthesis of logic functions using AND,OR, and NOT gates, Minimization of logic expressions, Synthesis with NAND and NOR gates, Practical Implementation of Logic gates, Flip-Flop, Registers and Shift Registers, Counters, Decoders, Multiplexers, Programmable Logic devices (PHD's), field programmable Gate Arrays, Sequential Circuits.

Basic Structure of Computer Hardware and Software: Functional Units, Basic Operational Concepts, Bus Structures, Software Performance.

Addressing Methods: Basic Concepts, Memory Locations, Main Memory Operations, Addressing modes, Assembly Language, Basic I/O Operations, Stacks and Queues Subroutines.

Unit-II

Processing Unit: Some fundamental concepts, Execution of a complete instruction, Hardwired Control, Performance Considerations, Macro Programmed Control, Signed Addition and Subtraction, Arithmetic and Branching Conditions, Multiplication of Positive Numbers, signed Operand Multiplication, Fast Multiplication. Integer Division, Floating Point Numbers and operations.

Unit-III

Operating Systems Functions: What is an Operating System?-Different services of the Operating System—Uses of System Calls- The Issue of portability –User's View of the Operating System – The Macro Facility –Graphical User Interface (GUI) –Virtual machine.

Information Management: Introduction –The File System-Device Driver (DD)

Process Management: Introduction –what is process –Evolution of multiprogramming – Content Switching –Process States – Process State transitions-Process Control Block a Process –Dispatch a Process –Time Up a process –Wake Up a process-Suspend/ Resume Operation –Process –Scheduling.

Unit-IV

Memory Management: Introduction-Single Contiguous Memory Management-Fixed Partitioned Memory Management –Variable Partitions-Non Contiguous Allocation General Concepts –Paging-Segmentation-Combined Systems-Virtual Memory Management Systems.

UNIX -A Case Study: Introduction

The History of UNIX-Overview of UNIX-UNIX File System- Data Structures for Process/Memory Management –Process States and State Transitions –Executing and Terminating a Program in UNIX-Using the System (Booting and Login)-Process Scheduling –Memory Management.

Text Book

1. Computer Organization by V.C. Hemacher-TMH, V Edition.
2. Operating systems by Achyut S Godbole, TMH.

DISCRETE MATHEMATICS

I - M.Sc(Computer Science) / I- Semester

Choice Based Credit System(CBCS)

- By

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I- M.Sc(Computer Science)

PAPER - V: DISCRETE MATHEMATICS

Unit-I

FUNDAMENTALS: Sets, Relations and functions, Fundamentals of logic, Logical interferences, First order logic. Quantified proportions, Mathematical induction

ELEMENTARY COMBINATORICS: Combinations and Permutations, Enumeration-With repetitions, with constrained repetitions, the principle of Inclusion-Exclusion

Unit-II

RECURRENCE RELATIONS: Generating functions, Coefficients of generations functions, Recurrence relations, Inhomogeneous Recurrence Relations

Unit-III

RELATIONS AND DIAGRAMS: Relations and diagrams, Binary relations, Equivalence relations, Ordering relations , Lattices, Paths and Closures, Directed graphs, Adjacency matrices, Recurrence relations, Inhomogeneous Recurrence Relations

Unit-IV

GRAPHS: Graphs, Isomorphism, Trees, Spanning trees, Binary trees, Planar graphs, Eler Circuits, Hamilton graphs, Chromatic numbers, Four colour problem, Network flows.

Text Book

1. Discrete Mathematics for Computer Scientists by -JL. Moti, a Kandel and TP Baker

Notes

CRYPTOGRAPHY AND NETWORK SECURITY

I - M.Sc(Computer Science) / II- Semester

Choice Based Credit System(CBCS)

- By

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Dr. G.V. Ramesh Babu

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I- M.Sc(Computer Science)

PAPER - VI: CRYPTOGRAPHY AND NETWORK SECURITY

UNIT – I

INTRODUCTION:- Attacks, Services, and Mechanisms, Security Services.

CONVENTIONAL ENCRYPTION: CLASSICAL TECHNIQUES: Steganography, Classical Encryption Techniques.

CONVENTIONAL ENCRYPTION: MODERN TECHNIQUES:- Simplified DES. The Data Encryption Standard, Differential and Linear Cryptanalysis, Block Cipher Modes of Operation.

UNIT – II

CONFIDENTIALITY USING CONVENTIONAL ENCRYPTION:- Traffic Confidentiality, Random Number Generation.

PUBLIC-KEY CRPTOGRAPHY:- Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography.

INTRODUCTION TO NUMBER THEORY:- Prime and Relatively Prime Numbers, Fermat's and Euler's Theorem, Euclid's Algorithm, The Chinese Remainder Theorem, Discrete Logarithms.

UNIT – III

MESSAGE AUTHENTICATION AND HASH FUNCTIONS:- Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs.

DIGITAL SIGNATURES AND AUTHENTICATION PROTOCOLS:- Digital Signatures, Authentication Protocols, Digital Signature Standard.

UNIT – IV

ELECTRONIC MAIL SECURITY: S/MIME

IP SECURITY: IP Security Overview, IP Security Architecture, Encapsulating Security Payload, Key Management. FIREWALLS: Firewall Design Principles, Trusted Systems.

TEXT BOOK:

CRYPTOGRAPHY AND NETWORK SECURITY principles and Practice FOURTH Edition by William Stallings (Pearson Asia) –(Chapters 1,2,4,5,6,7,8,10, 12,13 and 16).

Notes

ADVANCED DATABASE MANAGEMENT SYSTEMS

I - M.Sc(Computer Science) / II- Semester
Choice Based Credit System(CBCS)

- By

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I- M.Sc(Computer Science)

Paper – VIII Advanced Database Management Systems

UNIT – I

Database Application Development: SQL: QUERIES, CONSTRAINTS, TRIGGERS: Nested Queries – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Database.

Database Application Development: Accessing Database from Applications – JDBC Classes and Interfaces – SQLJ.

UNIT – II

Object – Database Systems: Structures Data Types – Operations on Structured Data – Encapsulation and ADTs – Inheritance – Objects, OIDs, and Reference Types – Database Design for an ORDBMS – ORDBMS Implementation Challenges – OODBMS. (Chapter 23).

UNIT – III

Data Warehousing and Deductive Database: Data Warehousing and Decision Support: Introduction to Decision Support – OLAP: Multidimensional Data Model – Multidimensional aggregation Queries – Window queries in SQL: 1999 – Finding Answers Quickly – Implementation Techniques for OLAP – Data Warehousing – Views and Decision Support – View materialization – Maintaining Materialized Views.

Deductive Databases: Introduction to Recursive Queries – Theoretical Foundations – Recursive Queries with Negation.

UNIT – IV

Data Mining and Distributed Databases: Data Mining: Introduction to Data Mining – Counting Co-occurrences – Mining for Rules – Tree-Structured Rules – Tree-Structured Rules – Clustering – similarity Search over Sequences – Incremental Mining and Data Streams – Additional Data Mining Tasks.

Parallel and Distributed Databases: Introduction – Architectures for Parallel Databases – Introduction to Distributed Databases – Distributed DBMS Architectures – Storing Data in a Distributed DBMS – Distributed Catalog Management – Updating Distributed Data.

TEXT BOOK

1. Database Management Systems by – Raghu Ramarishnan. Gehrike Third edition (TMH).

Notes

SOFTWARE ENGINEERING

I - M.Sc(Computer Science) / II- Semester

Choice Based Credit System(CBCS)

- By

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I - M.Sc(Computer Science)

PAPER -VIII : SOFTWARE ENGINEERING

UNIT – I

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A Generic View of Process: Software Engineering – A Layered technology – A Process frame work – The capability Maturity Model Integration (CMMI) – Process Patterns – Process Assessment – Personal and Team Process Models – process Technology – Produce and Process.

Process Models: Prescriptive Models – T he waterfall Model – Incremental Process Models – Evolutionary Process Models – Specialized Process Models – The Unified Process.

UNIT – II

Software Engineering Practice: Software engineering Practice – Communication Practice – Planning Practices – Modeling Practices – Construction Practice – deployment.

System Engineering: Computer –Based systems – The System Engineering Hierarchy – business Process Engineering: An Overview – Product Engineering: An Overview – System Modeling.

Requirement Engineering: A Bridge to Design and Construction – Requirements Engineering Tasks Initiating the Requirements Engineering Process – Eliciting Requirements – Developing Use – Cases – Building the analysis Model – Negotiating Requirements – Validating Requirements.

Building The Analysis Model: Requirements Analysis – Analysis Modeling Approaches – Data Modeling Concepts – Object-oriented Analysis – Scenario-Based Modeling – Flow-Oriented Modeling – Class-Based Modeling – Creating a behaviour Model.

UNIT – III

Design Engineering: Design within the Context of Software Engineering – design Process and Design Quality – Design Concepts – The Design Model – Pattern-Based Software Design.

Creating an Architectural Design: Software Architecture – Data Design – Architectural Styles and Patterns – Architectural Design – Assessing Alternative Architectural Design – Mapping Data Flow into Software Architecture.

Modeling Component – Level Design: What is a Component? – Designing Class-Based Component –Level Design – Object Constraint Language – designing Conventional Components.

UNIT – IV

Performance User Interface Desing: The Golden Rules – User Interface Analysis and Design – Interface Analysis – Interface Design Steps – Design Evaluation.

Risk Management: Reactive Vs. Proactive Risk Strategies – Software Risks – Risk Identification – Risk Projection – risk Refinement – Risk Mitigation, Monitoring, and Management – The RMMM Plan.

Quality Managmeent: Quality Concepts – Software Quality Assurance – Software Reviews – formal Technical Reviews – formal Approaches to SQA – Statistical Software Quality Assurance – Software Reliability – The ISO 9000 Quality Standards – The SQA Plan.

TEXT BOOK

1. SOFTWARE ENGINEERING BY R.S. PRESSMAN (McGraw Hill Sixth Edition).

ARTIFICIAL INTELLIGENCE

I - M.Sc(Computer Science) / II- Semester

Choice Based Credit System(CBCS)

- By

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PAPER – IX: ARTIFICIAL INTELLIGENCE

UNIT – I

Overview of Artificial Intelligence: What is AI? – The Importance of AI – Early work in AI – AI and related Fields.

UNIT – II

Dealing With Inconsistencies and Uncertainties: Introduction – Truth Maintenance Systems – Default Reasoning and the Closed World Assumption – Predicate Completion and Circumscription – Modal and Temporal Logics – fuzzy Logic and Natural Language Computations.

Probabilistic Reasoning: Introduction – Bayesian Probabilistic Inference – Possible World Representations – Dempster – Shafer Theory – Ad – hoc Methods – Heuristic Reasoning Methods.

UNIT – III

Structured Knowledge: Graphs, Frames, And Related Structures: Introduction – Associative Networks – Frame Structures – Conceptual Dependencies and Scripts.

Search and Control Strategies: Introduction – Preliminary Concepts – Examples of Search Problems – Uniformed or Blind Search – Informed Search – Searching And – or Graphs.

Matching Techniques: Introduction – Structures Used in Matching – Measures for Matching – Matching Like Patterns – Partial Matching – Fuzzy Matching Algorithms – The RETE Matching Algorithms.

UNIT – IV

Knowledge Organization and Management: Introduction – Indexing and Retrieval Techniques Integrating Knowledge in Memory – Memory Organization Systems.

Natural Language Processing: Introduction – Overview of Linguistic – Grammars and Languages – Basic Parsing Techniques – Semantic Analysis and Representation Structures – Natural Language Generation – Natural Language Systems.

Exprt Systems Architecture: Introduction – Rule – Based System Architectures – Nonproduction System Architectures – Dealing With Uncertainty – Knowledge Acquisition – and Validation – Knowledge System Building Tools.

Text: Introduction to Artificial Intelligence and Expert Systems by Patterson PHI.

WEB TECHNOLOGIES

I - M.Sc(Computer Science) / II- Semester

Choice Based Credit System(CBCS)

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PAPER - X : WEB TECHNOLOGIES

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JAVA DATABASE CONNECTIVITY (JDBC): Introduction, Database Systems, Relational Database Model, Relational Database Overview: The Books. Mdb Database, Strctured Query Language, A First Example, Reading, Inserting and Updating a Microsoft Access Database, Transaction Processing.

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NETWORKING: Introduction, Manipulating URLs, Reading a File on a Web Server, Establishing a Simple Server (Using Stream Sockets), Establishing a Simple Client (Using Stream Sockets), Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagrams, Client/Server Tic-Tac-Toe Using a Multithreaded Server, Security and the Network.

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TEXT BOOK

JAVA how to Programming BY DEITEL & DEITEL (PEARSON Education – Third Edition – 2001).