DRAVIDIAN UNIVERSITY
Centre for Off-Campus Education & Research
Syllabus for M.Phil/Ph.D Computer Science
Paper II: Broad Field

UNIT – I : ADVANCED DATA STRUCTURES AND ALGORITHMS

Lists, Stacks and Queues, Trees: The Search Tree ADT - Binary Search Trees, AVL Trees, Splay Trees, B-Trees. Priority Queues: Implementations, Binary Heap, Applications of Priority Queues, d-Heaps, Leftist Heaps, Skew Heaps, Binomial Queues. Graph Algorithms: Definitions, Topological Sort, Shortest-Path Algorithms, Network Flow Problems, Minimum Spanning, Tree, Applications of Depth-First Search, Introduction to NP-Completeness. Top-Down Splay Trees, Red-Black Trees, Deterministic Skip Lists, AA-Trees, Treaps, k-d Trees, Pairing Heaps.

UNIT – II : ADVANCED DATABASES

Distributed Data Processing, Distributed Database System, Architectural Models for Distributed DBMS, DDMBS Architecture. Distributed Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation., Query Optimization: Global query, operator tree, canonical expressions, qualified relations, Transaction Management: Definition, properties of transaction, types of transactions. Distributed concurrency control: Serializability, concurrency control Mechanisms & Algorithms, Time stamped & Optimistic concurrency control Algorithms, Deadlock Management. Object Oriented Data Model : Inheritance, Object identity, persistent programming languages, persistence of objects, comparing OODBMS and ORDBMS.

UNIT – III : ADVANCED COMPUTER NETWORKS

What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet - 5- layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - Networking Devices: Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure. Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization.

UNIT - IV : WEB TECHNOLOGIES

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, CSS, XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX. Review of Applets, Class, Event Handling, AWT Programming. Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes
– Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls
Developing a Home page using Applet & Swing. Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API. Web servers:

Tomcat Server installation & Testing. Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax servelet Package, Reading Servelet parameters, Reading Initialization parameters.

UNIT - V : OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Introduction to UML: The meaning of Object-Orientation, object identity, encapsulation, information hiding, polymorphism, genericity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture. Basic structural Modeling: Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances. Class & object diagrams: Terms, concepts, examples, modeling techniques, class & Object diagrams. Collaboration diagrams: depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages. Sequence diagrams: Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message. Behavioral Modeling: Interactions, use cases, use case diagrams, activity diagrams. Events and signals, state machines, processes & threads, time and space, state chart diagrams. Architectural Modeling: modeling techniques for component diagrams and deployment diagrams.

Text books

1. M.Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Willipse Pelagatti: Distributed Databases, McGraw Hill.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Third Edition, Pearson Education, 2007
4. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007
5. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007
6. Guide to Networking Essentials, Greg Tomsho,Ed Tittel, David Johnson,Fifth Edition, Thomson.
7. An Engineering Approach to Computer Networking , S.Keshav, Pearson Education.
8. Campus Network Design Fundamentals, Diane Teare, Catherine Paquet, Pearson Education (CISCO Press)
9. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
10. The Internet and Its Protocols, A. Farrel, Elsevier.
11. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
12. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 3,4,5)
11. Java Server Pages, Pekowsky, Pearson.
12. Java Script,D.Flanagan,O'Reilly,SPD
13. The Unified Modeling Language User Guide, Grady Booch, Rambaugh, Ivar Jacobson, PEA
14. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Addison Wesley
15. Object oriented Analysis& Design Using UML, Mahesh ,PHI

Reference Books

1. C & Data structures, N.B. Venkateswarulu, EV Prasad, S.Chand.
2. Data Structures and Algorithm Analysis in C++, 3/e, Mark Allen Weiss, PEA , 2007.

***