B.Tech COMPUTER SCIENCE Engineering (AKU Syllabus) SEMESTER- V

CS 1X06 DESIGN AND ANALYSIS OF ALGORITHMS
L-T-P : 3-0-0 Credit : 3
1. Introduction : Algorithm, performance evaluation of algorithms, space & time complexity, notion of optimality. **Lecture : 5**
2. Divide and Conquer : Finding the maximum and minimum- Quick Sort – Selection- Strassen's matrix multiplication etc. **Lecture : 4**
3. Greedy Algorithm : Knapsack Problem, (Knapsack, Fractional Knapsack), Activity selection problem, Huffman's Codes, Minimum Spanning Tree, Kruskal's Algorithm, prim's Algorithm, dijkstra's Algorithm, etc. **Lecture : 6**
4. Dynamic Programming : Knapsack problem DP solution, Activity selection problem DP solution. All pairs shortest paths, Travelling salesman problem. **Lecture : 4**
5. Randomized Algorithms and Amortized Analysis : Basics ideas of randomized Algorithms (Las Vegas and Monte Carlo types), Simple examples (Randomized Quick sort and its analysis, Min-cut algorithm and its analysis), Amortized analysis and its significance (Illustration through examples). **Lecture : 6**
6. Graph Algorithms : Breadth First Search (BFS), Depth First Search (DFS), Strongly Connected Components. Euler Tour, Minimum Spanning Tree, Kruskal's Algorithm. Prim's algorithm. Single Source Shortest Path. **Lecture : 14**
7. Introduction to NP-Completeness : Basic concepts. **Lecture : 3**
Text Books:
1. Introduction to Algorithm, 2e, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, PHI.
2. Beginning Algorithms by Simen Harris, James Ross, Wiley India.
3. Fundamentals of Computer Algorithms by E. Horowitz and S. Sahni, Galgotia.
4. Algorithms by Richard Johansonbaugh and Marcus Schaefer, Pearson Algorithm.
Reference Books :
1. The design and analysis of computer algorithms by A.V. Aho, J.E. Hopcroft and J.D Ullman, Pearson Education.
2. Algorithms – Introduction to Design & Analysis by S.Basse, Pearson Education
3. Algorithms and Complexity by H.S.Wilf, PHI.
.
CS 1X09 DATABASE SYSTEMS
L -T – P: 3–0–3 Credit : 5
1. Introduction : Purpose of database systems, View of data, data models, & interface, database language, transaction management, storage management, database administrator, database users, overall systems structure, Classification of Database Management System, Three-Schema Architecture. **Lecture : 3**
2. Data Modeling: Entity-Relationship Model, Basic concepts, design issues, mapping constraints, keys, E-R features, design of an E-R database schema, reduction of an E-R schema to tables. **Lecture : 5**
3. Relational Model: Structure of relational database, relational algebra, tulip relational calculus, domain relational calculus, extended relational-algebra operations, modification of the database and view, SQL and Other. **Lecture : 5**
4. Relational Languages: Background, basic structure, set operations, aggregate functions, null values, nested sub-queries, derived database, joined relations, DOL embedded SQL and other SL features, query-by-example. **Lecture : 5**
5. Integrity Constraints: Domain constraints, referential integrity, assertions, triggers and functional dependencies. **Lecture : 3**
6. Relational Database Design: Pitfalls in relational database design, decomposition, normalization using functional, multi-valued and join dependencies, domain key normal form and alternative approaches to database design. **Lecture : 5**
7. Query Processing: Overview, catalog information for cost estimation, measures of query cost, selection operation, other operations, evaluation of expressions, Translating SQL query into Relational Algebra, transformation of relational expressions, query optimization. **Lecture : 8**

8. Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability. **Lecture : 8**

Text Books:
1. Database System Concepts, 3rd edition by A. Silberschatz, H.F .Korth,& S. Sudhatshan, McGraw Hill,
2. Fundamental of Database System by Elmasri, Navthe, Somayajulu, and Gupta, Pearson Education.
3. Introduction to Database Management system by ISRD Group, Tata McGraw Hill.
4. An Introduction to database system by C.J. Date, A. Kanana, S.Swamynathan, Pearson Education.
Reference books:
1. Database management System by Rajesh Narang, PHI
2. Database Systems by Rob Coronel, Galgotia Publication.
.

CS 1x13 COMPUTER NETWORKS
L–T– P : 3–0–0 Credit : 3
1. Introduction : Network Hardware & Software, OSI Reference Model, TCP/IP Model, Comparison of the OSI & TCP/IP model. **Lecture : 2**
2. The Physical Link layer : Guided Transmission Media, Physical Layer Standard. **Lecture : 2**
3. The Data Link Layer : Need for Data Link Control, Service provided by the Data Link Layer, Frame Design Consideration, Flow control Mechanism, Data Link Error control, Error Control in Stop-and-wait Mechanism & Sliding Window Mechanism, Sequence numbering, Piggybacking Acknowledgements, Data Link Management. **Lecture : 8**
4. MAC Protocols : Random access Protocols – ALOHA. **Lecture : 2**
5. IEEE 802.3 Ethernet : Contention Access, CSMA/CD, Physical Topology of Ethernet, Ethernet Repeater, Types of Ethernet. **Lecture : 5**
6. Bridges and Layer-2 Switches : LAN Bridge, Transparent Bridges, Spanning tree algorithm. Source routing bridge, route discovery in source routing, layer 2 Ethernet switches. **Lecture : 5**
7. The network layer : network layer design issue, purpose of network layer, Functions of the Network Layer. **Lecture : 5**
8. Introduction to Internet Protocol : IPv4 Format, ICMP. **Lecture : 2**
9. Routing Algorithms : Static Routing, Dynamic Routing, Distance Vector Routing Algorithm, Routing Information Protocol, Link State Routing, OSPF Routing Protocol. Interior and Exterior Protocol, and Border Gateway Protocol. **Lecture : 10**
10. Introduction to Transport Layer: TCP & UDP. **Lecture : 1**
11. Introduction to Application Layer: TCP/IP Application Protocol. **Lecture : 1**

Text Book:
1. Data Communication & Networking by Forouzan, Tata McGraw Hill.
2. Computer Network, 4e, by Andrew S. Tenenbaum, Pearson Education/ PHI.
3. Data Communication and Computer Networks, by Prakash C.Gupta, PHI.
4. Networking Ali-in-one Desk Reference by Doug Lowe, Wiley Dreamtech
Reference Books:
1. Computer Networking: A Top-Down Approach featuring the Internet, 3e by James F.Kurose.
2. Computer Network by Godbole, Tata McGraw Hill.
3. Computer Networking, by Stanford H. Rowe, Marsha L. Schuh

IT 1x03 OPERATING SYSTEM
L-T-P : 3-0-3 Credit : 5
1. Introduction : Introduction to OS, Operating system functions, evaluation of O.S., Different types of O.S., Batch multi programmed, Time-sharing, Real-time, Distributed, Parallel.
2. Process : Concept of processes, process scheduling, operations on processes, inter-process communication, communication in Client-Server-Systems, overview & benefits of threads.
3. Process Scheduling : Scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms.
4. Process Synchronization : Background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores.

5. Deadlocks : System model deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

6. Memory Management : Background, logical vs. physical address space, swapping contiguous memory allocation paging segmentation.

7. Virtual Memory : Background, demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.

8. File Systems : File concept, access methods, directory structure.

9. Disk Management : Disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN)

EE 1x11 MICRO PROCESSOR AND ITS APPLICATION
L-T-P : 3-0-3 Credit : 5
Intel 8085
1. Introduction : CPU, Register, memory, Buses, Memory addressing capacity of a CPU. **Lecture : 3**
2. CPU Architecture, Pin configuration, Instructions, Addressing modes, Instruction word size, Languages. **Lecture : 4**
3. Timing Diagram : Read cycle, write cycle, fetch cycle, Memory read, Memory write, I/O cycle. **Lecture : 3**
4. Programming : Simple programming : 8-bit addition &subtraction, 16-bit addition , Delay subroutine using register, finding lowest & highest no. in data array. **Lecture : 5**
5. Data transfer schemes, I/O port. **Lecture : 6**
6. 8255, 8251, 8253, 8257 chips, pin diagram, control word, operating modes. **Lecture : 6**
7. Interfacing to ADC, Analog multiplexer, simple & hold. **Lecture : 4**
Intel 8086
8. Architecture : BIU & Execution unit, pin diagram, function of different modes, Registers. **Lecture : 4**
9. Addressing Modes, Instruction **Lecture : 4**
10. Programming. Lecture : 3

Text Books :
1. Fundamental of Microprocessor & Microcomputer by B.Ram, Dhanpat Rai
2. Advance Microprocessor by B.Ram
Reference Books :
1. Microprocessor & Interfacing by D.V hall,TMH
2. Microprocessor Architecture by R.S Gaonkar
3. Microprocessor with Application in process control by S.I Ahson. TMH
4. Programming Microprocessor Interfaces by Michael Andrews, PHI
5. The Intel Microprocessor Architecture, Programming & Interfacing by B.Brey, PHI

CS 1x29 INTRODUCTION TO JAVA PROGRAMMING LANGUAGE
L–T–P : 3–0–3 Credit: 5
1. Introduction to Java : Feature to Java, Java Virtual Machine, Differences between C++ and Java, Part of Java, API Document, Starting a Java Program. Important Classes, Formatting the Output **Lecture : 2**
2. Naming Conventions and Data Types : Naming Conventions in Java. Data types in Java, Literals**. Lecture : 1**
3. Operators and Control Statements in Java : Arithmetic Operators, Unary Operators, Relational Operators, Logical Operators, Boolean Operators, Bitwise Operators, Ternary Operators, New Operator, Cast Operator, If .... else statement, Switch statement, Break statement, Continue statement, Return statement, do … while loop, while loop, for loop. **Lecture : 4**
4. Input and Output : Accepting Input from the keyboard, reading input in Java, Util, Scanner class, displaying output with System.out.print(), Displaying formatted output with string, Format. **Lecture : 2**
5. Arrays and Strings : Types of Arrays, Array name, Length, Command Line Arguments, Creating Strings, String Class Methods, String Comparison, Immutability of Strings, Creating String Buffer Objects, String Buffer Class Methods, String Builder Class, String Builder Class Methods. **Lecture : 3**
6. Wrapper Classes : Number class, Character class, Byte class, Short class, Integer class, Long class, Float class, Double class, Boolean class, Math class**. Lecture : 3**

7. Introduction to OOPS : Problems in procedure oriented approach, Features of Object Oriented Programming System, Object creation, Initializing the instance variable, Constructors. **Lecture : 2**

8. Methods of Java : Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods. **Lecture : 4**

9. Inheritance and Polymorphism : Inheritance, The Keyword **'super'**, The Protected Specified, Types of Inheritance, Polymorphism with variables, Polymorphism using methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Abstract Classes. **Lecture : 3**

10. Packages : Package, Different types of Packages, Interface in a Package, Access Specifies in Java. **Lecture : 3**

11. Exceptional handling : Errors in Java Program, Exceptions throws and throw clause, Types of exceptions, Rethrowing an exception. **Lecture : 2**

12. Threads : Single and Multitasking, Creating and terminating the thread, Single and Multi tasking using threads, Deadlock of threads, Thread communication. **Lecture : 3**

13. Introduction to AWT and Applets : AWT components, Creating and closing the frame, Drawing in the frame, Displaying dots and text in the frame, Event Handling, Listeners and Listener methods, Creating and uses of Applets, An applet with swing components, Applet parameters. **Lecture : 4**

14. Introduction on Java database connectivity : Database servers and clients, JDBC, Connecting to a Database, Stored Procedures and Callable Statement, Storing file and Image into database, retrieving a file and images from database, Types of JDBC drivers**. Lecture : 4**

Text Books :
1. Core Java by R Nageswara & Kogent Solution Inc, Dreamtech.
2. The Complete Reference Java Tata McGraw Hill.
3. Java 6 Programming Black Book, w/CD by Kogent Solutions Inc,, Dreamtech .

Reference Books:
1. Professional Java, JDK 6 Ed. by Richardson Avondolio Wrox.
2. Programming with Java by E Balagurusamy Tata McGraw Hill