B.E. III YEAR COMPUTER ENGINEERING

CO 34002: THEORY OF COMPUTATION

Theory:

1. Introduction: L, G, & AT, Review of Sets, Graphs, Trees, Proof Techniques, Languages and Grammars – Fundamental Concepts Principal of Maths. Inche, proof by contradiction, etc.
2. Finite Automata- DFAs, NFAs, Regular Expressions, Regular Grammars and Languages, Properties of Regular Languages, Pumping Lemma for Regular Languages Applications of Regular Expressions .
3. Pushdown Automata- Context Free Grammar, Parsing, Ambiguity, Nondeterministic PDAs, Normal form of CFGs, CFG to NPDA, NPDA to CFGs. Deterministic PDA, Pumping Lemma for CFGs, Application of CFGs.
4. Turing Machines – Turing Machine as acceptor, Recognizing a Language, Universal TMs, Linear Bounded Automata, Context Sensitive Languages, Recursively Enumerable Languages, Unrestricted Grammars.
5. Chomsky Hierarchy, Concept of Solvability and Unsolvability, Church's Thesis, Complexity Theory – P and NP problems, Introduction to Petri Nets.

Text Books

1. Cohen John, "Introduction to Computer Theory", Second Edition, Wiley and Sons, 1996.
2. Hopcroft, Ullman, Motwani, "Introduction to Languages, Automata and Computation", 2nd Edition, Pearson Education, 2003.
3. Peter Linz, "An Introduction to Formal Languages and Automata", Jones and Bartlett, 2001.

Reference Books

1. Lewis and Papadimitiriou, "Elements of Theory of Computation", Pearson Education, 2002.
2. Mandrioli D. and Gezzi C., "Theoretical Foundations of Computer Science", Krieger Publishing Co., Inc., USA, 1993.
3. K.L.P. Mishra and N. Chandrasekaran, "Theory of Computation", Prentice Hall, 1998.
4. John C. Martin, "Introduction to Languages and the Theory of Computation", Mc Graw Hill, 2010.

CO 34005: DATA BASE MANAGEMENT SYSTEMS

Theory:

1. Basic Concepts of Data and Information, Overview of Information Systems, File organization and access methods; Introduction to DBMS, Difference between DBMS and traditional file storage system. Characteristics of DBMS. Data Models, Schemas and Instances, DBMS architecture, Components of DBMS. Data Independence. Study of Entity Relationship Model, Type of attributes, Entity types, Relationship and Cardinalities, Participation, Roles and constraints.
2. Relational Data Model: Domains, Tuples, Attributes, Relations, keys and types of keys, Integrity Constraints, Relational Algebra: Queries using Select operation, project operation, renaming, joins, union, intersection, difference, division, and product etc. Relational Calculus, Tuple calculus. Query Language: SQL –basic SQL queries, functions, constraints, joins and nested queries, QBE (Query By Example), Indexing, and PL/SQL.
3. Normalization Theory and Database methodologies: Relation Schemas, Functional Dependencies- Definition and rules of axioms, Normal forms- 1NF, 2NF, 3NF and BCNF, Dependency preservation, properties, loss less join decomposition. Query Processing and Optimization: Various algorithms to implement select, project & join operation of relational algebra, complexity measures.
4. Transaction Processing: Introduction to Concurrency and Recovery, Read and Write Operations, Transaction properties, Transaction states, Schedules, Serializability, types of serializability and test for serializability, Concurrency Control: Types of Locks, Timestamp Based, Validation Based etc. Multiversion schemes, Recovery: Basic concepts, techniques based on deferred update and immediate update, Shadow paging, check points.
5. Storage structure: Secondary Storage Devices, RAID, Heap Files and Sorted files, Hashing techniques, Indexing techniques: Bitmap Indices, Case Study of any contemporary DBMS.

Text Books

1. Korth H.F. & Silberschatz A., Sudarshan, "Database Systems", McGraw-Hill, Sixth edition, 2010.
2. Elmasri R., Navathe S.B., "Fundamentals of Database Systems", The Benjamin/ Cummings Publishing Company. Inc., 2004.
3. Date C.J., "An Introduction to Database Systems", Addision Wesley, 8th edition, 2003

Reference Books

1. Oracle 9i, The Complete Reference, Oracle Press.
2. Alexis Leon, Mathews Leon, "Database Management Systems", Leon Press Chennai and Vikas Publishing House Private Limited, New Delhi, 2002.

CO 34007: COMPUTER NETWORKS

Theory:

1. Introduction to computer networks & their uses, Different topologies. ISO-OSI model: Layered Architecture, Peer-to-Peer processes and encapsulation, Function and Services of OSI layers; The Physical layer: Digital Signals, Transmission Impairments and Maximum data rate of a channel, Shennons theorem, Nyquist theorem. Transmission media: Guided and Unguided medias. Circuit, Packet and Message switching, virtual Circuit. Introduction to ISDN & its components.
2. The data link layer: Design issues & function, Error detection & correction, Forward error correction Versus Retransmission, Hamming code & CRC codes, Framing: Fixed size and Variable size Frame, Bit stuffing and Byte stuffing. Data link layer protocols: Simplest, Stop and Wait, Sliding window protocols, PPP, SLIP, HDLC. The medium access sublayer: Static and Dynamic Channel Allocation, Protocols: ALOHA Protocol, CSMA (CSMA/CD, CSMA/CA), Collision Free Protocol- Bit Map.
3. IEEE 802 standards for LANs (IEEE 802.3, IEEE 802.4, IEEE 802.5), LAN Devices: HUB, Switches- Learning, Cut-Through and store and forward switches, Bridges: IEEE 802.x to IEEE 802.y, Spanning Tree, Remote Bridge. Internetworking Devices: Routers & gateways. The network layer: Design issues and functions, Internal organization (Virtual Circuit & Datagrams).
4. Routing algorithms: Shortest path routing, Flooding, LSR, Distance Vector Routing, Hierarchical Routing. Introduction to TCP/IP Protocol stack: Protocol Architecture, Classful IP addressing, ARP, RARP, IP Datagrams with options and its delivery, ICMP.
5. Subnet, Supernet, CIDR. Transport Layer: Congestion control, Load Shedding, Jitter control, addressing and multiplexing, Connection establishment and connection release, flow control. Application layer: Introduction to DNS and Email.

Text Books

1. Tanenbaum A. S., "Computer Networks", Pearson Education, 4th edition, 2003.
2. Behrouz A Forouzan, "Data communication and networking", TMH publication, 4th edition, 2006.
3. Comer, "Internetworking with TCP/ IP Vol-1", Pearson education, 4th Edition, 2002.

Reference Books

1. Peterson & Davie, "Computer Networks", Thomson Learning.
2. W. Richard Stevens, "TCP/IP Illustrated Vol-1 " Addison-Wesley.
3. Craig Zacker, "Networking The Complete Reference", TMH, 2001.

CO 34008: OBJECT ORIENTED SOFTWARE ENGINEERING

Theory:

1. Review of Object Oriented Concepts and Principles: The Object Oriented Paradigm, Basic Concepts, Software Development Life Cycle and Model Architectures.
2. Introduction to RUP: Basic Concepts, Symptoms in Software Development and their Root Causes, Best Practices of RUP, RUP software life cycle, 4+1 view model, Various Workflows.
3. Introduction to UML, Notations, Relationships, Stereotypes, Study of UML based tools Like Rational Rose, Poseidon, etc. Object Oriented Analysis: Conventional v/s OO analysis approach, Requirement analysis, Use case diagram,, Activity diagram, Analysis class Model.
4. Object Oriented Design: Conventional v/s OO design approach, Design of CRC cards, Class diagram Behavioral Modeling: Interaction Diagram, State chart Diagram, Implementation Diagram: Component and deployment Diagram. Illustrative Case Studies like ATM, Payroll, Course and Registration System.
5. Object Oriented Testing: Correctness and consistency of OOA & OOD models, Testing Strategies and test cases for OO software process, Project Management, Rational Tool Mentors. Introduction to Design Patterns.

Text Books

1. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modelling Language User Guide", Pearson Education
2. Stephen R. Schach, "Object Oriented Classical Software Engg." Tata McGraw Hill, 2007.
3. Gamma G.Helm, Johnson, "Design Patterns, Elements of Reusable Object Oriented Software", Addison Wesley.

Reference Books

1. Ivon Jacobson, "Object Oriented Software Engineering", Addison Wesley. Booch G., "The Unfied Modelling User Guide"
2. Phillipe Kruchten, "The Rational Unified Process - An Introduction", Pearson Ed. 2000.
3. Ivar J, Grady B, James R., "The Unified Software Development Process", Pearson Ed. 2003.
4. Timothy C. Lethbridge, Robert Laganiere, "Object Oriented Software Engg." , Tata McGraw Hill, 2004.
5. IBM Rational Modules