

Lecture Plan for 5th sem B.Tech(IT)

Paper Code: BCS 301

Paper Title: Theory of Computation

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S.No	Topics to be covered 1 st Term	No. of Lectures
1.	Introduction: Alphabets, Strings and Languages, Automata and Grammars	2
2.	Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA,	1
3.	Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA	1
4.	Equivalence of NFA and DFA,	1
5.	Minimization of Finite Automata, Distinguishing one string from other,	1
6.	Myhill Nerode Theorem	1
7.	Regular expression (RE): Definition, Operators of regular expression and there precedence, Algebraic laws for Regular expressions, Kleen's Theorem,	2
8.	Regular expression to FA, DFA to Regular expression, Arden Theorem,	2
9.	Non Regular Languages, Pumping Lemma for regular Languages, Application of Pumping Lemma,	2
10.	Closure properties of Regular Languages, Decision properties of Regular Languages	2
	Total	15
	1st MID SEM EXAM	
11.	FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.	2
12.	Context free grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation , Derivation trees, Ambiguity in Grammer, Inherent ambiguity,	1
13.	Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs,	2
14.	Normal forms for CFGs: CNF and GNF	2
15.	Closure properties of CFLs, Decision Properties of CFL's: Emptiness, Finiteness and Membership,	2
16.	Pumping lemma for CFL.	2
17.	Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack,	2
18.	Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA.	2
	Total	15
	2nd MID SEM EXAM	
19.	Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM	2
20.	Variants of Turing Machine, TM as Computer of Integer functions, Universal TM,	2
21.	Church's Thesis, Recursive and recursively enumerable languages, Halting problem,	2
22.	Introduction to Undecidability, Undecidable problems about	2
23.	TMs, Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory.	2
	Total	10
	Grand Total	40
	END TERM EXAM	

S. No	Topics to be covered 1 st Term	No. of Lectures
1.	Introduction and Overview of Graphics Systems: Use of Computer graphics, Introduction to CRT and TFT Displays, Raster and Random Scan Displays, Flat Panel Displays, TFT Displays.	2
2.	Scan Conversion Algorithms: Scan Converting Lines (DDA, Bresenham)	2
3.	Scan Converting Circles (Mid-point, Bresenham)	2
4.	Scan Converting Ellipses (Midpoint)	1
5.	Clipping: TwoDimensional Clipping, Cohen-Sutherland Subdivision Line Clipping Algorithm.	1
6.	2D-Transformation: Representation of Points, Transformations and Matrix, Transformation of Straight Line, 2D Rotation, Reflection, Scaling, Combined Transformations, Translation and Homogeneous Coordinates, Translation, Rotation about an Arbitrary Point	2
7.	Reflection through an Arbitrary Line, window-to-viewport transformation.	1
8.	3D-Transformation: Representation of Points, 3D Scaling, 3D Shearing, 3D Rotation, Three Dimensional Translation, 3D Reflection, Multiple Transformations	2
9.	Rotation about an Axis Parallel to a Coordinate Axis, Rotation about an Arbitrary Axis in Space	2
	Total	15
	1st MID SEM EXAM	
10.	The Dimensional Perspective Geometry: Geometric Projection, Orthographic Projections, Oblique Projections	2
11.	Perspective Transformations, Single-Point Perspective Transformation, Two-Point Perspective Transformation, Three-Point Perspective Transformation	2
12.	Solid Modeling: Representing Solids, Regularized Boolean Set Operation primitive Instancing, Sweep Representations, Boundary Representations,	2
13.	Spatial Partitioning Representations, Constructive Solid Geometry, Comparison of Representations	1
14.	Representing Curves & Surfaces: Polygon meshes, parametric, Cubic Curves, geometric and parametric continuities, Hermite	2
15.	Bezier (4-point, 5-point, general), B-Spline, Quadric Surface.	1
16.	Illumination and Shading: Modeling light intensities, ambient light, diffused light, specular reflection, attenuation factor, Reflection vector. Shading Models: constant shading, flat shading, gouraud shading, phong shading.	2
17.	Color concepts: RGB color model, YIQ color model, CMY color model, HSV color model, HLS color model.	1
18.	Hidden-Surface Removal: Hidden Surfaces and Lines, Back-Face Detection, A-buffer, ZBuffers Algorithm, Scan-line Algorithm, The Painter's Algorithm, Area subdivision.	2
	Total	15
	2nd MID SEM EXAM	
19.	Introduction to Multimedia: Multimedia, Multimedia Terms, Introduction to making multimedia, The Stages of project, the requirements to make good multimedia, Multimedia Applications.	2
20.	Multimedia: Multimedia Hardware, Software and Authoring Tools	2
21.	Graphics File Formats: TIFF, MIDI, JPEG, MPEG, RTF.	2

22.	Multimedia building blocks: Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects.	1
23.	Data Compression: Different Compression algorithms for text,	2
24.	Data Compression audio, video and images etc.	1
	Total	10
	Grand Total	40
	END TERM EXAM	

S. No	Topics to be covered 1 st Term	No. of Lectures
1.	Why has Requirement Engineering Become so important? Software Complexity – Why it is difficult to make, Industrial Challenges in RE, Domain Analysis	2
2.	Estimation- Overview: Why Estimation, Estimates, Targets, and Commitments, Ingredients of Good Estimation, Software Project Estimation	2
3.	Requirements engineering, Purpose of requirement engineering artifact modeling, Functional Requirements, Types of Non-Functional Requirements, RE Taxonomy	2
4.	RE Artifact (REAM) Model, Creation of REAM, RE Activity for Process Creation,	2
5.	Requirement Elicitation, General Elicitation Procedure, Methods of Requirement Elicitation - Interviewing Customers and Domain Expert, Questionnaires, Prototypes	2
6.	Brainstorming, QFD, RAD, CORE, IBIS, FODA, SSM	2
7.	MDRE, MDRE Processes, Elicitation and Analysis Model Heuristics, Determining Model Completeness, Quality Attribute Requirements.	2
8.	Software Estimation techniques and Estimate Planning, Executing the estimate: Software sizing, System Breakup Structure, Wideband Delphi Estimation Technique, Planning and controlling the project via the Estimate	2
	Total	16
	1st MID SEM EXAM	
9.	SLOC: Logical SLOC counting Details, Function Point Sizing, What is a Function Point, Uses and Benefits of Function Points, FPA Objectives	2
10.	FPA Model Attributes, FPA Process, Step-by-Step FP Contribution Calculation Process, International Function Point User Group Counting Standards Basic Process, Data Function	2
11.	Transactional Function, Complexity and FP Count Contributions,	2
12.	Estimation Case Study	2
13.	SEER-Function Based Sizing, COSMIC Full Function Point Approach	2
14.	Review	2
15.	Planning the Measurement Process, Change Management, Requirements Management Activities, Traceability, Creation of Requirements Management, Requirement-Driven System Testing, Process	2
16.	Planning with Measurement Frameworks: ISO 15939, CMMI, GQM Approach, CAME Approach.	2
	Total	16
	2nd MID SEM EXAM	
17.	Software Cost Estimation Methods: heuristic approach, parametric approach COCOMO	2
18.	COCOMO II: Strategy and rationale, Development Effort Estimates	2
19.	Software Economies and Diseconomies of Scale, Cost Factors	2
20.	The Application Composition Model	2
21.	The Early Design Model, The Post-Architecture Model	2
22.	Case study,	2
23.	Software Cost-Estimating Research Issues	2
	Total	14
	Grand Total	46
	END TERM EXAM	

S. No	Topics to be covered 1 st Term	No. of Lectures
1.	Introduction, goals & application of network.	2
2.	Layering concepts, OSI Reference model vs TCP/IP Protocol suite.	2
3.	Networks Topology.	1
4.	Signals, Digital Transmission, Analog to Digital & Digital to Digital conversion & Sampling theorem (Nyquist-Shannon)	2
5.	Analog Transmission, Digital to Analog & Analog to Analog conversion Multiplexing (FDM,WDM TDM).	2
6.	Transmission Media	1
7.	Switching (Packet Based, Circuit Based, Datagram Approach & Virtual Circuit).	2
8.	Hub, Repeater, Router, Gateway & Bridge.	1
9.	Network Traffic Capturing(TCP dump & Wireshark).	2
	Total	15
	1st MID SEM EXAM	
10.	Data Link Layer. Addressing, Error Detection & Correction Algorithms are Parity Bit, Checksum, CRC and Hamming codes.	2
11.	Error control & flow control Algorithms (Stop & Wait, Sliding window protocols (GO BACK-N & SELECTIVE REPEAT ARQ), Ethernet Switch (learning & filtering)	2
12.	Medium Access protocols (CSMA,CSMA/CD&CA,MACA)	2
13.	Wireless Access (Bluetooth,WiFi)	2
14.	Network Layer IP addressing & Subnet, basic Routing (or forwarding) mechanism. ARP,RARP,ICMP & IGMP.	2
15.	IPV4 frame format & function, Linux Network commands.	2
16.	Routing protocols (RIP,OSPF & BGP, Distance Vector & Link State).	3
	Total	15
	2nd MID SEM EXAM	
17.	Transport Layer:Port Addresses, UDP service & Application.	2
18.	TCP service & Application, TCP header format, connection setup & termination, flow control, error control & Congestion control & timer, State transition diagram.	2
19.	Application Layer: Web & HTTP,FTP, Email, Telnet, SSH, DNS	3
20.	SNMP, RTP, SIP, Bit Torrent.	2
21.	Linux Network commands: arp, route, ifconfig,netstat, traceroute, ping	1
	Total	10
	Grand Total	40
	END TERM EXAM	

S. No	Topics to be covered 1 st Term	No. of Lectures
1.	The Compelling need for Data Warehousing, Data Warehouse: the building blocks	1
2.	Defining the business requirements: Dimensional analysis, Information packages, Requirements gathering methods. Requirements definition: scope and content.	2
3.	Principles of dimensional modeling, From requirements to data design, The star schema, Star schema keys, Advantages	2
4.	Dimensional modeling: Updates to dimensional tables, Miscellaneous dimensions. The snowflake schema, Aggregate fact tables, Families of STARS.	2
5.	OLAP in Data Warehouse, Demand for OLAP, Need for multidimensional analysis, OLAP characteristics, Major features and functions, Dimensional analysis, Hyper cubes, Drill down and roll up, Slice and dice, Rotation	2
6.	OLAP Models MOLAP Model, ROLAP Model, HOLAP Model, ROLAP vs. MOLAP, OLAP implementation considerations.	1
7.	Data Mining basics Data mining definition, The knowledge discovery process	1
8.	OLAP vs. Data Mining, Data Mining & Data warehouse	2
9.	Process of data mining, Data mining applications, Benefits of DM	2
	Total	15
	1st MID SEM EXAM	
10.	Associations and correlations Association rule mining, Apriori algorithm	2
11.	Improving efficiency	1
12.	Kinds of association rules, Multilevel, Multi- dimensional	2
13.	Classification and regression, Types of classification algorithm	2
14.	Bayesian	1
15.	Rule based decision tree, KNN	2
16.	Cluster Analysis., Grid based Clustering methods, Model based Clustering methods	2
17.	Density based Clustering methods	1
18.	Portioning based Clustering methods, Hierarchical based Clustering methods	2
	Total	15
	2nd MID SEM EXAM	
19.	Major data Mining techniques, Cluster detection, K means algorithm	2
20.	Link analysis	2
21.	Neural networks, Genetic algorithms	2
22.	Fuzzy logic, Web mining	2
23.	Sentiment analysis, Opinion mining	2
	Total	10
	Grand Total	40
	END TERM EXAM	

S. No.	Topics to be covered 1 st Term	No. of Lectures
1.	Definition of Morals, Values and Ethics, Discussion on values: Integrity, Work Ethic, Respect for Others	2
2.	Discussion on values: Living Peacefully, Caring, Sharing, Honesty, Valuing Time, Co-operation, Commitment, Empathy, Self-Confidence, Character, Spirituality	2
3.	Indian values: Learning from Vedas, Geeta and other Scriptures	2
4.	Ethical Living and Harmony in Life	2
5.	Profession and Professionalism	1
6.	Ethical Theories: Kohlberg's Theory, Piaget's Theory	2
7.	Gilligan's Theory	1
	Total	12
	1st MID SEM EXAM	
8.	Engineering Profession, Engineering Professionals- Training, Skill Set, Life Skills	2
9.	Engineering Ethics: Making Senses and Issues, Ethical Obligations of Engineers	2
10.	Ethical Codes for Engineers.	1
11.	Moral Dilemmas, Types of Enquiry	1
12.	Engineering as experimentation, Engineers as responsible Experimenters	2
13.	Safety and Risk, Engineer's Responsibility for Safety, Risk – Benefit Analysis	2
14.	Case Studies	2
	Total	12
	2nd MID SEM EXAM	
15.	Disaster Management, Professional Rights, Employee Rights, Intellectual Property Rights	2
16.	Multinational corporations, Environmental ethics, computer ethics, Research Ethics.	2
17.	Weapons Development, Corporate Social responsibility, Business Ethics	2
	Total	06
	Grand Total	30
	END TERM EXAM	