

SCHEME OF EXAMINATION FOR M.TECH. (COMPUTER SCIENCE & ENGINEERING) w.e.f. Academic Session 2014-15

Paper Code	Nomenclature of Paper	Exam Time (hrs.)	External Marks		Internal Marks		Total Marks	
			Max	Pass	Max	Pass		
FIRST SEMESTER								
MT-CSE-14-11	ADVANCES IN ALGORITHMS	3	100	40	50	20	150	
MT-CSE-14-12	ADVANCED WEB TECHNOLOGIES	3	100	40	50	20	150	
MT-CSE-14-13	DATA WAREHOUSING & DATA MINING	3	100	40	50	20	150	
MT-CSE-14-14	ADVANCED COMPUTER ARCHITECTURE	3	100	40	50	20	150	
MT-CSE-14-15	S/W LAB – I BASED ON MT-CSE-14-11	3	100	40			100	
MT-CSE-14-16	S/W LAB – II BASED ON MT-CSE-14-12	3	100	40			100	
MT-CSE-14-17	SEMINAR				50	20	50	
	TOTAL		600		250		850	
SECOND SEMESTER								
MT-CSE-14-21	OBJECT ORIENTED ANALYSIS & DESIGN USING UML	3	100	40	50	20	150	
MT-CSE-14-22	DIGITAL IMAGE PROCESSING	3	100	40	50	20	150	
MT-CSE-14-23	ELECTIVE - I	3	100	40	50	20	150	
MT-CSE-14-24	ELECTIVE - II	3	100	40	50	20	150	
MT-CSE-14-25	S/W LAB – III BASED ON MT-CSE-14-21	3	100	40			100	
MT-CSE-14-26	S/W LAB – IV BASED ON MT-CSE-14-22	3	100	40			100	
MT-CSE-14-27	SEMINAR				50	20	50	
	TOTAL		600		250		850	
ELECTIVE PAPERS								
MT-CSE-14- 23(i) SOFTWARE QUALITY MODELS & TESTING		MT-CSE-14-24(i) DISTRIBUTED SYSTEMS						
MT-CSE-14-23(ii) HIGH PERFORMANCE NETWORKS		MT-CSE-14-24(ii) BIOMETRICS SYSTEM SECURITY						
MT-CSE-14-23(iii) ADVANCES IN DATABASES		MT-CSE-14-24(iii) SECURITY IN COMPUTING						
THIRD SEMESTER								
MT-CSE-14-31	RESEARCH METHODOLOGY & TOOLS	3	100	40	50	20	150	
MT-CSE-14-32	ADVANCED OPERATING SYSTEMS	3	100	40	50	20	150	
MT-CSE-14-33	ELECTIVE – I	3	100	40	50	20	150	
MT-CSE-14-34	ELECTIVE - II	3	100	40	50	20	150	
MT-CSE-14-35	S/W LAB – V BASED ON MT-CSE-14-31	3	100	40			100	
MT-CSE-14-36	S/W LAB – VI BASED ON MT-CSE-14-32	3	100	40			100	
MT-CSE-14-37	SEMINAR				50	20	50	
	TOTAL		600		250		850	
ELECTIVE PAPERS								
MT-CSE-14-33(i) DATA ANALYTICS		MT-CSE-14-34(i) CLOUD COMPUTING						
MT-CSE-14-33(ii) SOFT COMPUTING		MT-CSE-14-34(ii) WIRELESS NETWORKS AND MOBILE COMPUTING						
MT-CSE-14-33(iii) GENETIC ALGORITHMS		MT-CSE-14-34(iii) SEMANTIC WEB AND SOCIAL NETWORKING						
FOURTH SEMESTER								
MT-CSE-14-41	DISSERTATION	EVALUATION		200	80	100	40	300
		VIVA-VOCE		150	60			150
TOTAL			350		100		450	
GRAND TOTAL			2150		850		3000	

Maximum marks: 150 (**External:** 100, **Internal:** 50)**Time:** 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process.

Problem Identification & Formulation: Research Question, Investigation Question, Measurement Issues, Hypothesis, Qualities of a good Hypothesis, Null Hypothesis & Alternative, Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design: Concept, types and uses, Descriptive Research Designs: concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Qualitative and Quantitative Research: Qualitative research, Quantitative research, Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT – II

Measurement: Concept of measurement, Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio.

Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Thesis Writing: Writing - introduction, review of literature, results, abstract, summary, synopsis, Reference citing and listing.

UNIT – III

Introduction to R: Functions and packages in R; working with dataset in R; use of R for doing statistical analysis and graphics; R commands, Working with objects.

Packages in R – “caronline” for getting familiar with Database, Data Structures and visualization in R, “CORElearn” for introduction to correlation, regression and feature evaluation. BOOTS: feature selection for classification, CARET – classification and regression training, “klaR” for classification and visualization, Plot diagrams and charts using R packages, Mining algorithms: “rminer”, Text mining: “tm”.

UNIT – IV

Introduction to MATLAB/SCILAB/OCTAVE: Environment, Variables, Classes of variables, Statements, Operators, Expressions, Vectors and Matrices, Control and Loop constructs, Scripts and Functions, Input and Output statements, Using File Input and File output, User defined Functions, Program organization, String variable, Cell array and structures array, MAT-files and Input/Output, Function handles, Plot function, Animation, 2-D and 3-D plotting (line, pie, bar, Histogram, Polar, Contour, volumes, polygons), Customizing plots, Customizing plots, Creating applications with Graphical User Interface (GUI), Initialize and Designing GUI interfaces, Code and FIG files, Callback functions: Push buttons, toggle buttons, radio button, Check box, Slider, Pop-up menu, Adding components to GUIDE layout area, panels and Button groups, Axes, tables, ActiveX Component, Menus for GUI.

Reference Books:

1. Donald Cooper & Pamela Schindler, Business Research Methods, McGraw Hill.
2. Alan Bryman & Emma Bell, Business Research Methods, Oxford University Press.
3. Kothari C.K. (2004), Research Methodology- Methods and Techniques (New Age International, New Delhi) 2nd Ed.
4. N. Gurumani, Scientific Thesis Writing and Paper Presentation, MJP Publishers.
5. Montgomery, Douglas C., Design and Analysis of Experiments, Wiley India Pvt. Ltd.
6. Gardener M., “BEGINNING R: THE STATISTICAL PROGRAMMING LANGUAGE”, Wiley India Pvt. Ltd.
7. Bansal R.K., Goel A., Sharma M.K., “MATLAB and its Applications in Engineering”, Pearson Education.
8. Gilat A., “MATLAB: An Introduction with applications”, Wiley India Pvt. Ltd.

Maximum marks: 150 (External: 100, Internal: 50)**Time:** 3 hours

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UNIT – I

DISTRIBUTED OPERATING SYSTEMS: Introduction, Issues, Communication Primitives, Inherent Limitations, **Lamport's Logical Clock**; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion, Non Token Based Algorithms, Lamport's Algorithm, Token Based Algorithms.

Suzuki Kasami's Broadcast Algorithm, Distributed Deadlock Detection Issues, Centralized Deadlock Detection Algorithms, Distributed Deadlock Detection Algorithms, Agreement Protocols Classification, Solutions, Applications.

UNIT – II

DISTRIBUTED RESOURCE MANAGEMENT : Distributed File Systems, Design Issues, Distributed Shared Memory, Algorithms for Implementing Distributed Shared memory, Issues in Load Distributing, Scheduling Algorithms, Synchronous and Asynchronous Check Pointing and Recovery.

UNIT – III

REAL TIME AND MOBILE OPERATING SYSTEMS : Basic Model of Real Time Systems, Characteristics, Applications of Real Time Systems, Real Time Task Scheduling, Handling Resource Sharing, Mobile Operating Systems, Micro Kernel Design, Client Server Resource Access, Processes and Threads, Memory Management.

UNIT – IV

INTRODUCTION TO ANDROID: Android Application package (APK), Working with Eclipse and Android, Application Design, Controls and User Interface, Basic Graphics and View class, Using Google Maps in applications, Applications with multiple screens, Adding Menus and popup menus in applications, Working with images, working with text files, tables and XML, Building client server applications, Publishing your application.

Reference Books:

1. Mukesh Singhal and Niranjana G. Shivaratri, "Advanced Concepts in Operating Systems - Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw Hill.
2. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Wiley India Pvt. Ltd.
3. Rajib Mall, "Real Time Systems: Theory and Practice", Pearson Education India.
4. James C.S. "Android Application development", CENGAGE Learning.
5. Gargenta M., Nakamura M., "Learning Android", OREILLY Publishers.

MT-CSE-14-33(ii) SOFT COMPUTING

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

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UNIT – I

Basic concepts of neuro-computing: Artificial Neural Network (ANN) and their biological roots and motivations, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms- Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Applications of Artificial Neural Networks, Competitive learning networks, Kohonen self organizing networks, Hebbian learning; Hopfield Networks, **Associative Memories**, The boltzman machine; Applications.

UNIT – II

Introduction to Fuzzy Logic: Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations. Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic.

UNIT – III

Genetic Algorithm (GA): Evolutionary computing, conditions for evolution, Simple Genetic Algorithm (SGA), different types of operators: Selection, Crossover, mutation and replacement, optimization problems and traditional optimization methods, differences between GA & traditional methods, Holland's schemata theorem, encoding schemes.

UNIT – IV

Random Optimization, Simulated Annealing, Tabu Search, Ant Colony Optimization, Particle Swarm Optimization, Memetic Algorithms.

Text Books:

1. S. N. Sivanandam & S. N. Deepa, Principles of Soft Computing, Wiley India Pvt. Ltd..
2. Goldberg D. E., Genetic Algorithms in Search, Optimization, and Machine Learning, Pearson Education.

Reference Books:

1. Jang, Sun, Mizutani, Neuro-Fuzzy and Soft computing, Pearson Education.
2. Haykin, Neural networks: a comprehensive foundation, Pearson Education.
3. Mitchell M., An Introduction to Genetic Algorithms, Prentice-Hall.
4. Klir G.J. & Yuan B., Fuzzy Sets & Fuzzy Logic, PHI.

MT-CSE-14-34(iii) SEMANTIC WEB AND SOCIAL NETWORKING

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

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UNIT – I

Web Intelligence Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners Lee www, Semantic Road Map, Logic on the semantic Web.

Knowledge Representation for the Semantic Web Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web

UNIT – II

Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT – III

Semantic Web Applications, Services and Technology Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWLS Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

UNIT - IV

Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis
Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

Text Books:

1. Berners Lee, Godel and Turing, Thinking on the Web Wiley India Pvt. Ltd.
2. Peter Mika, Social Networks and the Semantic Web, Springer, 2007.

Reference Books:

1. J.Davies, R.Studer, P. Warren, Semantic Web Technologies, Trends and Research in Ontology Based Systems, Wiley India Pvt. Ltd.
2. Liyang Lu, Semantic Web and Semantic Web Services, Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
3. Frank Van Harmelen, Information Sharing on the semantic Web Heiner Stuckenschmidt; Springer Publications.
4. T.Segaran, C.Evans, J.Taylor, Programming the Semantic Web, O'Reilly, SPD.