Indira Gandhi University Meerpur Rewari

(A State University established under Haryana Act No.29 of 2013)

Examination Scheme & Syllabus for Master of Technology (Semester-I to II)

OUTCOME BASED EDUCATION SYSTEM /

LEARNING OUTCOME CURRICULUM FRAMEWORK

OBES / LOCF, CBCS CURRICULUM (w.e.f. 2019-20)

VISION AND MISSION OF THE DEPARTMENT

VISION

To train students to be highly effective instructors, researchers, developers and contributors to IT companies globally. Be regarded as a prestigious centre of scholarly achievement worldwide.

MISSION

1. To foster advance research and best education in IT domain.
2. To create skilled employees for businesses and industries based on latest IT technologies like artificial intelligence, data science and IoT etc.
3. To offer learning environment that is centered on the needs of the students in order to help in their overall development.

Programme Outcomes (PO), M.Tech, Department of CSE, Indira Gandhi University, Meerpur, Rewari

PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Research Aptitude	Capability to ask relevant/ appropriate questions for identifying, formulating and analyzing the research problems and to draw conclusion from the analysis.
PO3	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO4	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO5	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, multidisciplinary settings.
PO6	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO7	Modern Tool usage	Ability to use and learn techniques, skills and modern tools for scientific practices.
PO8	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO9	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout life.
PO10	Ethics	Capability to identify and apply ethical issues related to one’s work; avoid unethical behaviour such as fabrication of data, committing plagiarism and unbiased truthful actions in all aspects of work.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the latest IT technologies and apply these to manage projects.

Programme Educational Objectives (PEOs):

The Department of CSE has formulated the Programme Educational Objectives (PEO's) with those in fields. The Programme educational objectives (PEO) are the statement that describes the career and professional achievement after receiving the degree. The PEO's of the Master's degree in Computer Science & Engineering are as follows:

PEO1: To have fundamental as well as advanced knowledge of the Information Technologies.

PEO2: To provide the professional services to IT industries, Research organization, in the domain of super specialization.

PEO3: To opt for higher education, disciplinary & multi-disciplinary research and to be a life-long learner.

Programme Specific Outcomes (PSO's):

The Programme outcomes (PSO) are the statement of competencies/ abilities. PSOs are the statement that describes the knowledge and the abilities the post-graduate will have by the end of Programme studies.

PSO1: The detailed functional knowledge of theoretical concepts and experimental aspects of computer science.

PSO2: To integrate the gained knowledge with various contemporary and evolving areas in computer sciences like Artificial Intelligence, Machine Learning, and Data Science etc.

PSO3: To understand, analyze, plan and implement qualitative as well as quantitative problems in computer science.

PSO4: Provide opportunities to excel in academics, research or Industry.

Mapping of PEO's with PO's and PSO's

S. No.	*Programme Educational Objectives*	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
1	To have fundamental as well as advanced knowledge of IT.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2	To provide the professional services to industries, Research organization, in the domain of super specialization.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3	To opt for higher education, disciplinary & multi-disciplinary research and to be a life-long learner.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

INDIRA GANDHI UNIVERSITY, MEERPUR, REWARI

SCHEME OF STUDIES AND EXAMINATION M. TECH1stYEAR(COMPUTERSCIENCE&ENGINEERING)

SEMESTER 1st

CBCS Scheme effective from 2019-20

Sr.No	Course No.	Subject	Teaching Schedule				Examination Schedule(Marks)				Duration of Exam (Hours)	No ofhours/ week
			L	T	P	Total Credits	Marks of Classworks	Theory	Practical	Total		
1	MCSE101	Data Communication and Computer Networks	4	0	-	4	50	100	-	150	3	4
2	MCSE102	Advanced Operating Systems	4	0	-	4	50	100	-	150	3	4
3	MCSE103	Advanced Database Management System	4	0	-	4	50	100	-	150	3	4
4	MCSE104	Data Warehouse and Mining	4	0	-	4	50	100	-	150	3	4
5	MCSE105	Mathematical Foundation of Computer Science	4	0	-	4	50	100	-	150	3	4
6	MCSE106	Seminar	-		-	1		-	-	25		-
7	MCSE107	Advanced OperatingSystems Lab	-	-	2	2	50	-	50	100	3	2
8	MCSE108	Advanced Database Management System Lab	-	-	2	2	50	-	50	100	3	2
9	MCSE109	Self-Study Paper				1				25		
		TOTAL	26									

NOTE:

Examiner will set nine questions in total. Question one will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, firstbeing compulsory and selecting one from each Unit.

INDIRA GANDHI UNIVERSITY, MEERPUR, REWARI

SCHEME OF STUDIES AND EXAMINATION M. TECH1stYEAR(COMPUTERSCIENCE&ENGINEERING)

SEMESTER 2nd

CBCS Scheme effective from 2019-20

Sr.No	Course No.	Subject	Teaching Schedule				Examination Schedule(Marks)				Duration of Exam (Hours)	No of hours/ week
			L	T	P	Total Credits	Marks of Class works	Theory	Practical	Total		
1	MCSE201	Soft Computing	4	0	-	4	50	100	-	150	3	4
2	MCSE202	Algorithm Design	4	0	-	4	50	100	-	150	3	4
3	MCSE203	Seminar	-		-	1	25	-	-	25	-	-
4	MCSE204	Soft Computing Lab	-	-	2	2	50	-	50	100	3	2
5	MCSE205	Algorithm Design Lab	-	-	2	2	50	-	50	100	3	2
6	MCSE206A MCSE206B MCSE206C MCSE206D	Elective-1 (DCEC)	4	0	-	4	50	100	-	150	3	4
7	MCSE207	Foundation Elective				2						2
8	MCSE208	Self-Study Paper				1				25		
		TOTAL	**20**									

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remainingeight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

Elective 1: Choose any one from the following papers

MCSE206A Mobile and Wireless Communication
MCSE206B Optimization Techniques
MCSE206C Discrete Mathematics
MCSE206D Internet and Web Development

A candidate has to select this paper from the pool of Foundation Electives provided by the University.

General Instructions

1. Seminar

Max.Marks-25

Every candidate will have to deliver a seminar of 30 minutes duration on a topic (not from the syllabus) which will be chosen by him / her in consultation with the teacher of the department. The seminar will be delivered before the students and teachers of the department. A three-member committee (one coordinator and two teachers of the department of different branches) duly approved by the departmental council will be constituted to evaluate the seminar. The following factors will be taken into consideration while evaluating the candidate.
Distribution of marks will be as follows:

1. Presentation 10 marks
2. Depth of the subject matter 10 marks
3. Answers to the questions 05 marks

2. Self-Study Paper

Max.Marks-25

Objective: This course intends to create habits of reading books and to develop writing skills ina manner of creativity and originality. The students are to emphasis his/her own ideas/words which he/she has learnt from different books, journals and newspapers and deliberate the sameby adopting different ways of communication techniques and adopting time scheduling techniques in their respective fields. This course aims: - To motivate the students for innovative, research and analytical work - To inculcate the habit of self-study and comprehension - To infusethe sense of historical back ground of the problems - To assess intensity of originality and creativity of the students. Students are guided to select topic of their own interest in the given area in consultation with their teachers/Incharge/Resource Person.

Instructions for Students

1. Choose the topic of your interest in the given areas and if necessary, seek the help ofyour teacher.
2. Select a suitable title for your paper.
3. You are expected to be creative and original in your approach.
4. Submit your paper in two typed copies of A4 size 5-6 pages (both sides in 1.5 linespaces in Times New Roman Font size 12).
5. Organize your paper in three broad steps: (a) Introductions (b) Main Body (c)Conclusion
6. Use headings and sub-headings
7. Use graphics wherever necessary
8. Give a list of books/references cited/used
9. The external examiner will evaluate the self-study paper in two ways i.e. Evaluation15 Marks and Viva-Voce 10 marks.

Distribution of Marks

1. The evaluation is divided into different segment as under: 15 Marks
    i. Selection of Topic - 3 Marks
    ii. Logical Organization of subject matter - 5 Marks
    iii. Conclusions - 5 Marks
    iv. References - 2 Marks
2. Viva-Voce: - 10 Marks

    The external examiner will hold Viva-Voce based on contents of the student's Self StudyPaper focusing upon the description by the Candidate.

MCSE101 DATA COMMUNICATION AND COMPUTER NETWORKS

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3hrs.

Course Objective:

- Learn how computer network hardware and software operate
- Investigate the fundamental issues driving network design
- Learn about dominant network technologies

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Data communication: Digital and analog communication, Transmission modes, serial and parallelcommunication, packet switching, circuit switching and message switching

Network models: OSI and TCP/IP model, OSI vs TCP/IP

MAC: ALOHA, CSMA, CSMA/CD

UNIT 2

Network Layer: - ARP, RARP, ICMP, IGMP, IPv4, IPv6, IPv4 addressing, classful addressing, CIDR – Introduction ,CIDR addressing, CIDR address blocks and Bit masks, subnets and super netting,IPv6addressing, address space allocation ,global uncast addresses.

Routing Algorithms: - Distance vector Routing, Link State Routing, Path Vector Routing, Hierarchal Routing, RIP, OSPF, BGP.

UNIT 3

Transport Layer: -Transport Layer Services, UDP, TCP Protocol, TCP services, TCP features, connection management, congestion control SCTP Protocol, SCTP services, SCTP features, an SCTP association.

Application layer: - SMTP, POP, IMAP, and MIME, DHCP, DHCP operation, Configuration FTP, SSH.

UNIT 4

Network Management and Security: - Congestion control, Quality of services, SNMP, Ciphers- traditional, modern, asymmetric, public and private key, key management, digital signature, Network Layer Security, Transport Layer Security, Application Layer security, Firewall, VPN

Course Outcomes:

By the end of the course the students will be able to:

CO1. Independently understand basic computer network technology.
CO2. Understand and explain Data Communications System and its components.
CO3. Identify the different types of network topologies and protocols.
CO4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
CO5. Identify the different types of network devices and their functions within a network
CO6: Identify the basic security threats of a network.

Mapping of Paper No. MCSE101

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	M	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	M	S	S	M	S	S	S
CO4	S	S	M	M	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S
CO6	S	S	S	S	M	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. Computer Networks, Tanenbaum Andrew S, International edition.
2. TCP/IPprotocolsuite, Behrouz A. Forouzan, TMHpublication.
3. Data Communications and Networking, Behrouz A. Forouzan, TMH.
4. Computer Networking: A Top-Down Approach, Kurose and Ross.
5. Computer Networks – A System Approach, Larry L. Peterson & Bruce S.Davie.

MCSE102 ADVANCED OPERATING SYSTEMS

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Objectives:

- The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems);
- Hardware and software features that support these systems.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Operating System Concept, Functions of an Operating System, Design Approaches ,Types of Advanced Operating System –Synchronization Mechanisms ,Concept of a Process, Concurrent Processes, The Critical Section Problem, Other Synchronization Problems, Language Mechanisms for Synchronization, Axiomatic Verification of Parallel Programs - Process Deadlocks - Preliminaries, Models of Deadlocks, Resources, System State, Necessary and Sufficient conditions for a Deadlock, Systems with Single-Unit Requests, Consumable Resources, Re-usable Resources.

UNIT 2

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 , and Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms. Agreement Protocols, Classification – Solutions, Applications.

Distributed Resource Management: Distributed File systems, Architecture, Mechanisms, Design Issues, Distributed Shared Memory, Architecture, Algorithm, Protocols - Design Issues. Distributed Scheduling, Issues, Components, Algorithms.

UNIT 3

Failure Recovery and Fault Tolerance: Basic Concepts-Classification of Failures, Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Check-pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Non-blockingCommit Protocols; Voting Protocols; Dynamic Voting Protocols.

UNIT 4

Multiprocessor and Database Operating Systems: Structures, Design Issues, Threads, Process Synchronization, Processor Scheduling, Memory Management, Reliability / Fault Tolerance; Database Operating Systems, Introduction, Concurrency Control, Distributed Database Systems, Concurrency Control Algorithms.

Course Outcomes:

By the end of the course the students will be able to:

CO1: Demonstrate understanding of the concepts, structure and design of operating Systems.

CO2: Demonstrate understanding of operating system design and its impact on application Systemdesign and performance.

CO3: Understand Distributed Computing techniques, Synchronous and Processes.

CO4: Apply Shared Data access and Files concepts.

CO5: Design a distributed system that fulfills requirements with regards to key distributed systems properties.

CO6: Understand Distributed File Systems and Distributed Shared Memory.

Mapping of Paper No. MCSE102

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	S	M	S	S	S	S	S	M
CO5	M	S	S	S	S	S	S	M	S	S	M	S	M	S	S
CO6	S	S	S	S	S	S	S	S	S	M	S	S	S	S	S

S = Strong, M = Medium, W = Weak

Recommended Books:

1. MukeshSinghal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGrawHill,2000
2. Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Addison n Wesley Publishing Co., 2003.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.

MCSE103 ADVANCED DATA BASE MANAGEMENT SYSTEM

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Objectives:

- This module aims to give students in depth information about system implementation techniques, data storage, representing data elements, database system architecture, the system catalog, query processing and optimization
- Transaction processing concepts, concurrency control techniques, database recovery techniques, database security and authorization,
- Enhanced data models for advanced applications, temporal databases, deductive databases, database technology for decision support systems, distributed databases and client server architecture, advanced database concepts, and emerging technologies and applications.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Architecture, Advantages, Disadvantages, Data models, relational algebra, SQL, Normal forms. **Query Processing:** General strategies for query processing, transformations, expected size, statistics in estimation, query improvement. Query evaluation, view processing, query processor.

UNIT 2

Recovery: Reliability, Transactions, recovery in centralized DBMS, reflecting updates, Buffer management logging schemes, disaster recovery. **Concurrency:** Introduction, Serializability, Concurrency control, locking schemes, Timestamp based ordering, Optimistic, Scheduling, Multiversion techniques,Deadlocks.

UNIT 3

Object Oriented Database Development: Introduction, Object definition language, creating object instances, Object query language. **Distributed Database:** Basis concepts, options for distributing a database distributed DBMS.

UNIT 4

Data Warehousing: Introduction, basis concepts, data warehouse architecture, data characteristics, reconciled data layer, data transformation, derived data layer, user interface. **Object Relational Databases:** Basic Concepts, Enhanced SQL, Advantages of object relationalapproach.

Course outcomes: -

By the end of the course the students will be able to:

CO1: The students will be able to understand DBMS Components, Advantages and Disadvantages.

CO2: The students will be able to understand Data modeling: ER, EER, Network, Hierarchical andRelational data models.

CO3: The students will be able to understand normalization, general strategies for query processing,query processor, syntax analyzer, Query decomposition, Heuristic Query optimization.

CO4: The students will be able to understand transaction concept, schedules, serializability, locking andconcurrency control protocol.

CO5: Understand and analyze transaction processing and concurrency control.

CO6: Describe how XML query are being processed and executed.

Mapping of Paper No. MCSE103

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	S	S	M	S	S	S	S	M	S	S	S	S
CO4	S	S	M	M	S	M	S	S	M	S	S	S	S	S	S
CO5	M	S	S	S	S	S	M	M	S	S	S	M	S	S	S
CO6	S	S	S	S	S	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. An introduction todatabase systemsby Bipin C.Desai,Galgotia Publications.
2. Modern Database Management by Feffery A Liofer, Mary B. Prescotl, Fred R Mcfadden, 6th edition, Pearson Education.
3. Principlesof distributeddatabase systems, byM. Tamer & Valduriez, 2nd editon, LPE Pearson education.
4. Database system concepts by Korth.-

MCSE104 DATA WAREHOUSE AND MINING

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Objectives:

- To study the methodology of engineering legacy databases for data warehousing and data mining toderive business rules for decision support systems.
- To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Data warehousing: Introduction, Operational data stores, ETL, Data warehouses – design guidelines for data warehouse implementation, Data warehouse metadata; OLAP – introduction, Characteristics, Multidimensional view and datacube ,Datacube operations,

UNIT 2

Data mining: Introduction, association rules mining, Naive algorithm, Apriori algorithm, direct hashing and pruning (DHP), Dynamic Item set counting (DIC), Mining frequent pattern without candidate generation(FP, growth),performance evaluation of algorithms,

UNIT 3

Classification: Introduction, decision tree, tree induction algorithm – split algorithm based on information theory, split algorithm based on Gini index; naïve Bayes method; estimating predictive accuracy of classification method; classification software, software for association rule mining; case study; KDD Insurance Risk Assessment

UNIT 4

Cluster analysis: Introduction, partitional methods, hierarchical methods, and density based methods, dealingwith large databases, clustersoftware.
Web Data Mining: Web Terminology and Characteristics, Locality and Hierarchy in the web, Web Content Mining, Web Usage Mining, Web Structure Mining, Web mining Software.

COURSE OUTCOMES:

On successful completion of this course, the learner will be able to

CO1. Describe the fundamental concepts, benefits and problem areas associated with data ware housing

CO2. Describe the various architectures and main components of a data warehouse.

CO3. Design a data warehouse, and be able to address issues that arise when implementing a datawarehouse.

CO4. Compare and contrast OLAP and data mining as techniques for extracting knowledge from a datawarehouse.

CO5:Describe the use of Online Analytical Processing to analyze and interpret data.

CO6: Discuss various case studies to identify the needs and patterns for business domains.

Mapping of Paper No. MCSE104

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	S	M	S	S	S	M	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	M	M	S	S	S	S	M	S	S	S	M	S	S
CO5	M	S	S	S	S	S	M	S	S	S	S	M	S	S	M
CO6	S	S	M	S	S	M	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. Han J., Kamber M. and Pei J., Data mining concepts and techniques, Morgan KaufmannPublishers (2011) 3rd ed.
2. .Pudi V., Krishana P.R., Data Mining, Oxford Universitypress, (2009) 1st ed.
3. AdriaansP.,ZantingeD.,Datamining,Pearsoneducationpress(1996),1sted.
4. Pooniah P., Data Warehousing Fundamentals,Willeyinterscience Publication, (2001), 1st ed

MCSE105 MATHEMATICALFOUNDATIONOFCOMPUTERSCIENCE

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

C**ourse Objectives:**

- This **course** is to provide **mathematical** background and sufficient experience on various topics of discrete **mathematics** like matrix algebra, logic and proofs, combinatorics, graphs, algebraic structures, formal languages and finite state automata.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Regular Languages: Finite automata, DFA, NFA, Equivalence of DFA & NFA. An application, Mealy and Moore Models, Regular expressions and languages. Context free languages: CFGs, Applications, Ambiguity removal, CNF, GNF.

UNIT 2

Push Down Automata: Basics of PDA, Acceptance By PDA, PDA and CFL, Parsing and PDA: Top Down Parsing and Bottom up Parsing

UNIT 3

Turing Machine: Turing machines, variants of TMs, Restricted TMs, TMs and Computers. Decidability**:** Decidable languages, decidable problems concerning Context free languages, the halting problem, halting problem is undecidable.

UNIT4

Reducibility and Computability: Undecidable problems from language theory – Regular expressions, Turing machines, Reduction. A simple undecidable problem (PCP), Primitive recursive functions, tractable decision problems, theory of Optimization, Church- Turing Thesis.

Course Outcomes:

Upon completing the course, the student will:

CO1: Be familiar with the basic's concepts in theory of computation.
CO2: Be able to construct finite state machines and the equivalent regular expressions.
CO3: Be able to construct pushdown automata and their equivalent context free grammars.
CO4: Be exposed to the advanced concepts of theory of automata computation.

CO5: Develop mathematical thinking and problem solving skills associated with research and writing proofs.
CO6: Get exposure to a wide variety of mathematical concepts used in computer science discipline like probability.

Mapping of Paper No. MCSE105

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	M	S	M	M	S	S	S	S	M	S	S	S	S	M	S
CO5	M	S	S	S	S	S	M	S	S	S	M	S	S	S	S
CO6	S	S	S	S	M	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. IntroductiontoTheoryofComputation–MichaelSipser(ThomsonNrools/Cole)
2. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, RajeevMotwani& J.D.Ullman(PearsonEducationAsia),2ndEdition.
3. Theory of Computation by Peter Linz
4. Introduction to languages and theory of computation–JohnC.Martin(MGH)

MCSE106 Seminar

L T P		Marks	Credits
- - -	**Sessional:**	-	**1**
	Total :	25	

At the end of this course the student shall be able to

CO1 prepare the topic and contents on a technical topic
CO2 speak on a technical topic effectively
CO3 enhance communication skills

A candidate has to present a seminar on a recent topic/ technology/ research advancement and has to submit a seminar report. The marks will be given on the basis ofseminar report, contents of the presentation, communication and presentation skills.

MCSE107 ADVANCE OPERATING SYSTEM LAB

			Marks	Credits
L T P	**Exam**	**:**	50	2
- - 2	**Sessional**	**:**	50	
	Total	**:**	100	

Course outcomes:

CO1 To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.

CO2 To provide students' knowledge of memory management and deadlock handling algorithms.

CO3 At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system

A student has to perform 10-12 practicals based on theory paper.

Suggested list of experiments:

1. Execution of various file/directory handling commands.

2. To study the various commands operated in vi editor in LINUX.

3. To study the various File Acess Permission and different types users in LINUX.

4. Write programs in:

i. Write a shell script program to find the Maximum three numbers.
ii. Write a shell script program for comparison of strings
iii. Peform Arithmetic operation using CASE

5. Write programs in:

i. Calculate the factorial value of a number using shell script.
ii. To write a shell program to generate fibonacci series.
iii. Write a program to draw a Pascal's Triangle

6. Write programs in:

i. Write a program to demonstrates a one-way pipe between two Process.
ii. Write a program to illustrate IPC through pipe and fork system calls – Printing onlyodd numbers

7. Write programs in:

i. To write a program to create a process in LINUX.
ii. To study Dinning Philosophers Problem.

8. Simulation of scheduling algorithms: Write a program to implement the following processscheduling algorithms

i. First Come First Serve
ii. Shortest Remaining Job First
iii. Round Robin

9. Write a program to simulate banker's algorithm for deadlock avoidance.

10. Write programs in:

i. Page replacement algorithm for FIFO.
ii. Page replacement algorithm for LFU.
iii. Page replacement algorithm for LRU.

MCSE108 ADVANCE DATABASE MANAGEMENT SYSTEM LAB

		Marks	Credits
L T P	**Exam :**	50	2
- - 2	**Sessional :**	50	
	Total :	100	

Course outcomes:

CO1. Students will get the practical concepts of DBMS, Data Models (like Entity-Relationship Model,relational Databases), and Database.
CO2. Students will get the practical implementation of Relational Algebra &l Calculus
CO3.Students will get the concepts of SQL and Integrity Constraints
CO4. Students will get the concepts Normalization using functional dependencies

A student has to perform 10-12 practical's based on theory paper.Suggested list of experiments:

1. Create a student table and to manipulate with the DDL commands such as create, Alter, View,Truncate,Drop.
2. Create a student table and to manipulate with DML commands such as insert, update, select, Delete.
3. Create a student table and to manipulate with TCL commands such as Commit, Rollback, Save point
4. Create a student table and to manipulate with DCL commands such as Grant, Revoke.
5. Create a database and perform Join queries such as Simple join, Self-Join, Outer Join.
6. Create a database view and Drop a view.
7. Create a student table and Insert, Delete, Alter, View using Nested Queries
8. Create a PL/SQL Program for addition, finding the maximum number, Sum of Numbers usingProcedures.
9. Create a function to calculate the factorial, calculate the greatest among three numbers of a givennumber using PL/SQL.
10. Create a PL/SQL Program and perform Control Structure functions such as Loop, While, If, Else.
11. Create a Cursor procedure to calculate payroll process of an Employee.

12.Create a simple Trigger that does not allow INSERT, UPDATE and DELETE operations on the table

13. 13.Create a trigger that raises an user defined error message and does not allow UPDATION andINSERTION

14. Create a form in VB for Simple calculator and also create menu-based calculator.

MCSE201 SOFTCOMPUTING

			Marks	Credits
L T P	**Exam**	**:**	100	4
4 - -	**Sessional**	**:**	50	
	Total	**:**	150	4

Course Objectives:

- To Conceptualize the working of human brain using ANN.
- To become familiar with neural networks that can learn from available examples andgeneralize to form appropriate rules for inference systems.
- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on humanexperience.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Neural Networks: History, Overview of Biological Neuro-System, Mathematical Models of Neurons, ANN architecture, Learning rules, Gradient Descent Algorithm, Learning Paradigms-Supervised, Unsupervised and Reinforcement Learning, ANN Training Algorithms-Perceptrons, Training Rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT 2

Fuzzy Logic: IntroductiontofuzzyLogic,ClassicalandFuzzySets,OverviewofClassicalSets, Membership Function, Fuzzy Rulegeneration.

Operations on Fuzzy Sets: Compliment, Intersection,Union,Combination of Operations, AggregationOperation.

UNIT 3

FuzzyArithmetic: FuzzyNumbers,LinguisticVariables,ArithmeticOperationsonIntervals& Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Classical Logic, Multi-Valued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

UNIT 4

Uncertainty Based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

Course Outcomes:

After the completion of the course the student will be able to:

CO1: Know and understand various fields of Soft computing:
CO2: Understanding principles of neural networks and fuzzy logic fundamentals.
CO3:Design the required and related systems.
CO4: achieve an understanding of the technical potential and the advantages and limitations ofthe learning and self organizing systems of today.
CO5: Develop intelligent systems leveraging the paradigm of soft computing techniques.

CO6: Implement, evaluate and compare solutions by various soft computing approaches for finding the optimal solutions.

Mapping of Paper No. MCSE201

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	M	S	S	M	S	S	M	S
CO4	S	S	M	S	M	S	S	S	M	S	S	S	S	S	S
CO5	M	S	S	S	S	S	M	S	S	S	S	M	S	S	M
CO6	S	M	S	S	S	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. Neural Networks SimonHaykin
2. Neural Networks-Kosko.
3. Principles of Soft Computing -Dr. S. N. Sivanandam and Dr. S. N. Deepa,
4. Fuzzy Logic & Fuzzy Sets Klir& Yuan
5. Neutral Networks-SatishKumar

MCSE202 ALGORITHM DESIGN

			Marks	Credits
L T P	**Exam**	**:**	100	4
4 - -	**Sessional**	**:**	50	
	Total	**:**	150	4

Course Objectives:

- Analyze the asymptotic performance of **algorithms**.
- Write rigorous correctness proofs for **algorithms**.
- Demonstrate a familiarity with major **algorithms** and data structures.
- Apply important **algorithmic design** paradigms and methods of analysis.
- Synthesize efficient **algorithms** in common engineering **design** situations.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Foundation & Data Structure:

Foundation & Elementary Data Structure: Algorithms, Performance analysis: Space & time complexity, Growth of functions, Divide & Conquer, Recurrence Equations, Basic elements of data structure like Stacks & Queues, Trees ,Graphs ,Linked List ,Sorting & Order statistics. Data Structure: Dynamic sets & searching: Introduction, Array doubling, Amortized time analysis, R-B trees ,Hashing ,Dynamic equivalence relations &Union-Find programs ,Priority queues with a decrease key operation.

Graph & graph traversals: DFS, strongly connected components, Bi-connected components.

UNIT 2

Advanced Design & Analysis Techniques:

Greedy & Dynamic Method: General methods, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal merge patters, Single-source shortest path, 0/1 Knapsack, Multistage graphs, All-pair shortest path, Optimal binary search trees, Travelling salesperson problem, Flow shop scheduling.

Backtracking & Branch and Bound: General methods, 8 Queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem, Travelling salesperson problem, Efficiency consideration.

UNIT 3

NP-Hard & NP-Complete Problems: Basic concepts, Cook's Theorem, NP-hard graph problem, NP-Hard scheduling problems. String Matching: Introduction, A straight forward solution, The Knuth-Morris-Pratt algorithm, The Boyer-Moore algorithm, approximate string matching.

UNIT 4

Parallel Algorithms: Introduction, Parallelism, The PRAM, and other models, some simple PRAMalgorithms, Handling write conflicts, Merge and Sorting, Finding connected components.

Approximation algorithms: Introduction, Absolute approximations, ϵ- approximations, Polynomial timeapproximation schemes ,Fully Polynomial time approximations schemes.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

CO1:Argue the correctness of algorithms using inductive proofs and invariants.

CO2:Analyze worst-case running times of algorithms using asymptotic analysis.

CO3:Describe the divide-and-conquer paradigm and explain when an algorithmic designsituation calls for it.

CO4:Describe the dynamic-programming paradigm and explain when an algorithmic designsituation calls for it.

CO5:Explain the major graph algorithms and their analyses. Employ graphs to modelengineering problems.

C06: Analyze randomized algorithms. Employ indicator random variables and inearity of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.

Mapping of Paper No. MCSE202

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	M	M	S	S	S	M	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	M	S	S	S	S	M	S	S	M
CO6	S	S	S	S	M	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. ComputerAlgorithms:Introductiontodesignandanalysis(3rdedition)bySaraBaase and Allen VanGelder , Pearson, 2000.
2. Fundamentals of Algorithms by Gilles Brassard and Paul Bratley
3. DesignandAnalysisofAlgorithms(ComputerscienceSeries)byJeffreyD.SmithPubl.
4. Fundamentals of Computer algorithms, Ellis Horowitz and SratajSahnim 1978, Galgotia publ.
5. Algorithms Design (PIE) by Eva Tardos and Jon Klienberg, person.
6. IntroductiontoAlgorithms,ThomashCormen,HarlesEleisersonandRonaldLrivest: 1990, TMH.

MCSE 203 Seminar

L T P		Marks	Credits
- - -	**Sessional:**		1
	Total :	25	

Course Outcomes:

At the end of this course the student shall be able to

CO1prepare the topic and contents on a technical topic

CO2 speak on a technical topic effectively

CO3 Enhance communication skills

A candidate has to present a seminar on a recent topic/ technology/ research advancement and has to submit a seminar report. The marks will be given on the basis of seminar report, contents of the presentation, communication and presentation skills.

MCSE204 SOFT COMPUTINGLAB

		Marks	Credits
L T P	**Exam :**	50	2
- - 2	**Sessional :**	50	
	Total :	100	

Course Outcomes:

After going through this course, a student shall be able

CO1 To know about the basics of soft computing techniques and also their use insome real-life situations.

CO2 To solve the problems using neural networks techniques.

CO3 To find the solution using different fuzzy logic techniques

CO4 To use the genetic algorithms for different modelling

A student has to perform 10-12 practical's based on theory paper.

Suggested list of experiments:

1. WAP to implement Artificial Neural Network
2. WAP to implement Activation Functions
3. WAP to implement Adaptive prediction in ADALINE NN
4. WAP to implement LMS and Perceptron Learning Rule
5. WAP to implement ART NN
6. WAP to implement BAM Network
7. WAP to implement Full CPN within put pair
8. WAP to implement discrete Hopfield Network
9. WAP to implement Hebb Network
10. WAPtoimplementHetroassociateneuralnetformappinginputvectorstooutputvectors
11. WAP to implement Delta Learning Rule
12. WAP to implement XOR function in MADALINE NN
13. WAP to implement AND function in Perceptron NN
14. 14.WAP to implement Perceptron Network
15. WAP to implement Feed Forward Network
16. WAP to implement Instar learning Rule
17. WAP to implement Weight vector Matrix

MCSE205 **ALGORITHM DESIGN LAB**

			Marks	Credits
L T P	**Exam**	**:**	50	2
- - 2	**Sessional**	**:**	50	
	Total	**:**	100	

Course Outcomes:

Upon completion of this course, students will be able to do the following:

1. Analyze the asymptotic performance of algorithms.

2. 2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations

A student has to perform 10-12 practical's based on theory paper.

Suggested list of experiments:

1. Write a program to search an element in a two -dimensional array usinglinear search.
2. Using iteration & recursion concepts write programs for finding theelement in the array using Binary Search Method
3. Write a program to perform following operations on tables using functionsonly
a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick SortTechnique
5. Write a program to implement the various operations on string such aslength of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using call byvalue and call by reference strategies.
7. Write a program to implement binary search tree. (Insertion and Deletionin Binary search Tree)
8. Write a program to create a linked list & perform operation such as insert,delete, update, reverse in the link list
9 . Write the program for implementation of a file and performingoperations such as insert, delete, update a record in the file.

10. Create a linked list and perform the followingoperations on it.
a) add anode
b) Delete a node
11. Write a program to simulate the various searching & sorting algorithmsand compare their timings for a list of 1000 elements.
12. Write a program to simulate the various graph traversing algorithms.
13. Write a program which simulates the various tree traversal algorithms.

MCSE206A MOBILE AND WIRELESS COMMUNICATION

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3hrs.

Course Objectives:

- To introduce the concepts and techniques associated with Wireless Cellular Communicationsystems.
- To familiarize with state of art standards used in wireless cellular systems.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Application, history, market, reference model and overview. Wireless Transmission- Frequencies, signals, antennae, signal propagation, multiplexing, modulation, spread spectrum, cellular system.

MAC and Telecommunication System: Specialized MAC, SDMA, FDMA, TDMA – Fixed TDM, classical ALOHA, Slotted, ALOHA, CSMA ,DAMA, PKMA, reservation TDMA. Collision avoidance,polling inhibit sense multiple access. CDMA, comparison, CSM-mobile services, architecture radio, interface, protocol, localization, calling handover, security, new data services, Introduction to W'LL.

UNIT 2

Satellite and Broadcast Systems: History, Applications, GEO, LEO, MEO, routing, localization, handover in satellite system. Digital audio and video broadcasting. **WIRELESS LAN:** IEEE 802 11- System and protocol architecture, physical layer. MAC layered management. Bluetooth- User scenarios, physical layer, MAC Layer, networking, security and link management.

UNIT 3

Mobile Network Layer: Mobile IP-goals, assumptions, requirement, entities, terminology, IP packet delivery. Agent advertisement and discovery, registration ,tunneling, encapsulation, optimization, reserve tunneling, IPv6.DHCP.Adhoc Networks, Routing, destination sequence distance vector, dynamic source routing, hierarchical algorithm, algorithm, algorithm metric.

UNIT 4

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping; TCP, Mobile TCP fast retransmission, Transaction oriented TCP. **Support for Mobility:** File, system, WWW-HIT, HTML, system architecture. WAP-architecture, Wireless datagram, protocol, wireless transport layer security, wireless transaction protocol ,application environment,telephony application.

Course Outcomes

CO1: Understand the cellular radio concepts such as frequency reuse, handoff and interferencebetween mobiles and base stations.
CO2: Identify the techno-political aspects of wireless and mobile communications such as theallocation of the limited wireless spectrum by regulatory agencies.
CO3: Understand propagation effects such as fading, time delay spread, and Doppler spread, how tomeasure and model the impact that signal bandwidth and motion.
CO4: Understand the information theoretical aspects (such as the capacity) of wireless channels andbasic spread spectrum techniques in mobile wireless systems.
CO5: Describe current and future cellular mobile communication systems (GSM, IS95, WCDMA,etc), wireless LANs, adhoc and sensor networks.
CO6: Ability to analyze improved data services in cellular communication.

Mapping of Paper No. MCSE206A

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	S	S	M	S	S	S	S	S	S
CO5	M	S	S	M	S	S	M	S	S	M	S	M	S	S	M
CO6	S	S	S	S	S	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. JochenSchiller,"MobileCommunication",Pearson Education,2002
2. LEE,"Mobile Cellular Telecommunications "McGRAW-Hill,2nd Edition.
3. Wireless Communications : Theodore S Rappaport; Pearsons

MCSE206B OPTIMIZATION TECHNIQUES

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3hrs.

Course Objectives:

- Introduction to optimization techniques using both linear and non-linear programming. The focus of the course is on convex optimization though some techniques will be covered for non-convex function optimization too. After an adequate introduction to linear algebra and probability theory, students will learn to frame engineering minima maxima problems in theframework of optimization problems.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Linear Programming: Simplex Method, Big M-Method, Duality in Linear Programming, Sensitivity Analysis, Revised Simplex Method, Two-Phase Simplex Method, Dual Simplex Method. Integer Linear Programming: Branch and Bound Algorithms, Gomory Cutting Plane Method.

UNIT 2

Transportation Problems: Types of Transportation Problems, Mathematical Models, Transportation Algorithms. **Assignments:** Definition, Differences between Transportation and Assignment Models, Representation Assignment Problem as Transportation Problem and as Linear Programming, Assignment Algorithm-HungarianMethod

UNIT 3

Non-Linear Programming: Classical optimization Techniques, NLP with constraints: Graphical Solution, Multivariable Optimization with Equality constraints (Lagrange Multipliers Method), with inequality constraints-Kuhn-Tucker conditions, Quadratic Programming and Separable Programming: Standardform, Wolf's Method, Beale'sMethod
.Search Method for Unconstrained Non-Linear Programming Problems.

UNIT 4

Reliability: Basic concepts, conditional failure rate function, Failure time distributions, certain life Models, Reliability of a system in terms of the reliability of its

components, series system, parallel system. Queuing Theory: Introduction ,elements or Parameters of Queuing system, Steady state Balance Equation, Kendall's Notation for Representing Queuing Models, Model!:Single server Model(M/M/1/∞ / ∞ /FCFS), Model Finite Capacity Queue System,Model3:Multi-server Model, Model4: Machine Servicing
Model.

Course Outcomes:

CO1: Formulate optimization problems.

CO2: Understand and apply the concept of optimality criteria for various type of optimization problems.

CO3: Solve various constrained and unconstrained problems in single variable as well as multivariable.

CO4: Apply the methods of optimization in real life situation.

CO5: Apply the knowledge of game theory concepts to articulate real-world competitive situations to identify strategic decisions to counter the consequences.

CO6: Demonstrate the various selective inventory control models to analyse and optimize inventory systems.

Mapping of Paper No. MCSE206B

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	S	S	S	S	S	M
CO5	M	S	S	S	S	S	M	S	S	S	S	S	S	S	M
CO6	S	S	S	S	S	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. Optimization Techniques by C.Mohan and Kusum Deep, New Age International
2. Operations Research by K.Rajagopal, PHI, Inida.
3. Reliability Engineering by K K Aggarwal, Springer.

MCSE206C DISCRETE MATHEMATICS

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3hrs.

Course Objectives:

- Simplify and evaluate basic logic statements including compound statements, implications,inverses, converses, and contrapositives using truth tables and the properties of logic.
- Express a logic sentence in terms of predicates, quantifiers, and logical connectives
- Apply the operations of sets and use Venn diagrams to solve applied problems; solve problemsusing the principle of inclusion-exclusion.
- Determine the domain and range of a discrete or non-discrete function, graph functions, identifyone-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Propositions, Logical Connectives, Conditionals and Bi-conditionals, Tautologies, Logical Equivalences, Predicates, Quantifiers, Inference theory, Validity Probability, Information and Mutual Information

UNIT 2

Poset, Lattices, Principle of Duality, Basic Properties of Lattices, Some Special Lattices, Boolean Algebras, Identities of Boolean Algebra, Uniqueness of Finite Boolean Algebras, Boolean Functions and Boolean Expressions, Normal Forms, The Karnaugh Map method, Application of Boolean Algebra to Switching Circuits

UNIT 3

Introduction to Graphs, Types of Graphs, Representation of graphs, Paths and Circuits, Graph Traversals, Shortest Path in Weighted Graphs, Dijkstra Algorithm, Euler Graphs, Fleury's Algorithm, Hamiltonian Graphs, Travelling Salesman Problem, Planar Graphs, Kuratowski's Two Graph, Euler's Theorem, Colouring of Graphs, Transport Networks Trees, Rooted Trees, Representation of Algebraic Expressions by Binary Trees, Binary Search Trees, Spanning Trees and Cut-Sets,

Minimum Spanning Tree, Kruskal's Algorithm, Prim's Algorithm

UNIT 4

Languages, Phrase Structure Grammars, Types of Grammars and Languages, Finite State Machines, Equivalent Machines, Finite State Machines as Language Recognizers, Finite State Languages and Type-3 Languages, Turing Machine

Course Outcomes:

CO1: Students completing this course will be able to express a logic sentence in terms of predicates, quantifiers, and logical connectives.
CO2: Students completing this course will be able to apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
CO3: Students completing this course will be able to use tree and graph algorithms to solve problems.
CO4: Students completing this course will be able to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
CO5: Demonstrate different traversal methods for trees and graphs.
CO6: Model problems in Computer Science using graphs and trees.

Mapping of Paper No. MCSE206C

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	S	S	S	M	S	S	M	S	S	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	M	S	M	S	S	M	S	M	S
CO6	S	S	S	S	M	S	S	S	S	M	S	S	M	S	S

S = Strong, M = Medium, W = Weak

References:

1. Elements of Discrete Mathematics: A Computer Oriented Approach,C. L. Liu and D. P.Mohapatra,McGraw Hill Education
2. Discrete Mathematical Structures with Applications to Computer Science, J. P Tremblay andR.Manohar, Tata McGraw Hill Edition
3. Mathematical Structures for Computer Science, J. L. Gersting, Computer Science Press, New York
4. Discrete Mathematical Structures, B. Kolman, R.C. Busby and S Ross, PHI
5. Discrete Mathematics, Babu Ram, Vinayak Publishers and Distributors, Delhi
6. Discrete Mathematics, SemyourLipschutz and Marc Lipson, Schaum's outline
7. Discrete Mathematics, R.K. Bisht and H. S.Dhami, Oxford University Press

MCSE206D **INTERNETANDWEBDEVELOPMENT**

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3hrs.

Course Objective:

- This course is intended to teach the basics involved in publishing content on the World WideWeb. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Internet protocol model, Internet addresses, IP Routing concepts, Table Driven and next hop routing, other routing related protocols, Internet Access through PPP, SLIP, WWW

UNIT 2

Router technology: Hubs, Bridges, Routers, Routing Protocols, Routing security, Switch based routing, Routing in unicast environment, multi casting, and mobile routing.

UNIT 3

Web server and Browser: Web Servers (IIS/PWS & Apache),HTTP request types, system architecture,client-side scripting, accessing web servers, HTTP, secure HTTP, Secure Sockets Layer, WWW Proxies, WebBrowser, Bookmarks, Cookies, Progress Indicators, Customization of Browsers, Browsing Tricks, Next Generation Web Browsing, Search Engines ,Architecture of Search Engines, Search Tools, Web Crawlers

UNIT 4

Website Development: DHTML, XHTML, AJAX, XML: Structuring data, XML namespaces, DTD andschemas, XML variables, DOM methods, simple API for XML, web services, and application ofXML. Active Server Pages (ASP): How ASP works, ASP objects, file system, objects, ASP.NET

Course outcomes:

At the end of the course the students will be able to: -

CO1: Employ fundamental computer theory to basic programming techniques.

CO2: Use fundamental skills to maintain web server services required to host a website.

CO3: Select and apply markup languages for processing, identifying, and presenting of information in webpages.

CO4: Use scripting languages and web services to transfer data and add interactive components to webpages.

CO5: Create and manipulate web media objects using editing software.

CO6: Build interactive web applications using AJAX.

Mapping of Paper No. MCSE206D

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	M	S	S	M	S	S	S	S	S
CO2	S	M	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	M	M	S	S	S	S	S	M	S	S	S	S	S	S	M
CO4	S	S	M	S	M	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	S	S	M	S	S	M
CO6	S	S	S	M	S	S	S	S	S	M	S	S	S	S	S

S = Strong, M = Medium, W = Weak

References:

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4. Complete Reference Guide to Java Script, Aron Weiss, QUIE, 1977.
5. Intranet and Internet Engg. By Minoli.