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NOTE:
Examiner will set nine questions in total. Question one will be compulsory and will comprise of all sections 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.
### Sr. No | Course No. | Subject | Teaching Schedule | Examination Schedule (Marks) | Duration of Exam (Hour) | No. of hours/week |
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**Elective 1:** Choose anyone from the following papers:  
E206A Mobile and Wireless Communication  
E206B 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 a habit of reading books and to develop writing skills in a manner of creativity and originality. The students are to emphasise his/her own ideas/words which he/she has learnt from different books, journals, and newspapers and deliberate the same by 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 infuse the sense of historical background
- To assess intensity of originality and creativity of the students.

Students are to select a 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 area and if necessary, seek the help of your 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. Organise 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: (a) Evaluation 15 marks and (b) Viva-Voce 10 marks.
Distribution of Marks

1. The evaluation is divided into different segments 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 content of the student's Self Study Paper focusing upon the description by the Candidate.
MCSE101 DATA COMMUNICATION AND COMPUTER NETWORKS

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Duration of Exam: 3hrs.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections and remaining eight questions to be set by taking two questions from each unit. The student has 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 parallel communication, packet switching, circuit switching and messageswitching
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
Routing Algorithms: Introduction, CIDR addressing, CIDR address blocks and Bitmasks, subnets and supernetting, IPv6 addressing, address space allocation, global unicast addresses.

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

References:
1. Computer Networks, Tanenbaum Andrew S, International edition,
2. TCP/IP protocol suite, Behrouz A. Forouzan, TMH publication
3. Data Communications and Networking, Behrouz A. Forouzan, TMH
5. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie,
MCSE102 ADVANCED OPERATING SYSTEMS

Marks Credits
LTP Exam: 100 4
4- - Sessional: 50
Total: 150 4

Duration of Exam: 3hrs.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections 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


UNIT 2


UNIT 3

UNIT4


Recommended Books:
MCSE103 AdvancedDatabaseManagementSystem

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Duration of Exam: 3hrs.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections 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


UNIT 2

Recovery: Reliability, Transactions, recovery in centralized DBMS, reflecting updates, Buffer management, loggings 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: Basic 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 relational approach.

References:

4. Databasesystem concepts by Korth.
MCSE104 DATAWAREHOUSE AND MINING

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NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections. Remaining eight questions to be set by taking two questions from each unit. The student has 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 data cube, Data cube operations,

UNIT 2

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

UNIT 3

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

UNIT 4

Cluster analysis: Introduction, partitional methods, hierarchical methods, and density based methods, dealing with large databases, clustering software.


References:
MCSE105  MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

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UNIT 1

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

UNIT 2

PushDown Automata: Basics of PDA, Acceptance by PDA, PDA and CFL, Parsing and PDA: TopDown Parsing and Bottomup Parsing

UNIT 3

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

UNIT 4


References:

1. Introduction to Theory of Computation – Michael Sipser (ThomsonNrools/Cole)
3. Theory of Computation by Peter Linz
4. Introduction to languages and theory of computation – John C. Martin (MGH)
MCSE106 Seminar

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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 the seminar report, content of the presentation, communication and presentation skills.

MCSE107 Advanced Operating System Lab

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

MCSE108 Advanced Database Management System Lab

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A student has to perform 10-12 practicals based on the theory paper.
MCSE201SOFTCOMPUTING

LTP

Exam : 100 4
Sessional: 50
Total : 150 4

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections 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


UNIT 2


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

UNIT 3


UNIT 4


References:
1. Neural Networks - Simon Haykin
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. Neural Networks - Satish Kumar
MCSE202 ALGORITHM DESIGN

Marks Credits
LTP Exam : 100 4
Sessional: 50  
Total : 150 4

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections 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:

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

UNIT 2

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

UNIT 3


UNIT 4

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

5. *Algorithms Design (PIE)* by Eva Tardos and Jon Klienberg, person.
### MCSE203  Seminar

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**Sessional:** 1

**Total:** 25

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, content of the presentation, communication, and presentation skills.

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### MCSE204  SOFTCOMPUTINGLAB

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**Sessional:** 50

**Total:** 100

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

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### MCSE205  ALGORITHMDESIGNLAB

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**Sessional:** 50

**Total:** 100

A student has to perform 10-12 practicals based on the theory paper.
MCSE206A MOBILEANDWIRELESSCOMMUNICATION

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DurationofExam: 3hrs.

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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 inhibits sense multiple access. CDMA, comparison, CSM-mobile services, architectureradio, interface, protocol, localization, calling handover, security, new data services, Introduction to W’LL.

UNIT 2


UNIT 3


UNIT 4

References:

3. Wireless Communications: Theodore S. Rappaport; Pearson
MCSE206B OPTIMIZATION TECHNOQUES

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UNIT 1


UNIT 2

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

UNIT 3


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 I: Single server Model (M/M/1/∞/∞/FCFS), Model II: Finite Capacity Queue System, Model III: Multi-server Model, Model IV: Machine Servicing Model.

References:

1. Optimization Techniques by C. Mohan and Kusum Deep, New Age International
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**UNIT 1**

Propositions, Logical Connectives, Conditionals and Biconditionals, 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 Algebra, 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, Coloring 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

**References:**

4. DiscreteMathematicalStructures, B. Kolman, R. C. Busby and S. Ross, PHI
5. DiscreteMathematics, BabuRam, VinayakPublishersandDistributors, Delhi
6. DiscreteMathematics, SemyourLipschutzandMarcLipson, Schaum'soutline
MCSE206D  INTERNETANDWEB DEVELOPMENT

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Duration of Exam: 3hrs.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all sections 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 next hop routing, other routing related protocols, Internet Access through PPP, SLIP, WWW

UNIT 2


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, Web Browser, 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 and schemas, XML variables, DOM methods, simple API for XML, web services, and application of XML.

Active Server Pages (ASP): How ASP works, ASP objects, filesystem, objects, ASP.NET

References:

2. Internet and World Wide Web Programming, Deitel, Deitel and Neito, 2000, Pearson Education.
5. Intranet and Internet Engg. By Minoli.