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

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<tr>
<th>S. No.</th>
<th>Programme Educational Objectives</th>
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<th>PO10</th>
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<th>PSO2</th>
<th>PSO3</th>
<th>PSO4</th>
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INDIRA GANDHI UNIVERSITY, MEERPUR, REWARI  
SCHEME OF STUDIES AND EXAMINATION M. TECH 1st YEAR (COMPUTER SCIENCE & ENGINEERING)  
SEMESTER 1st  
CBCS Scheme effective from 2019-20

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<th>Duration of Exam (Hours)</th>
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**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, first being compulsory and selecting one from each Unit.
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**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.

**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 in a 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 infuse the 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 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. 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 segments 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 Study Paper focusing upon the description by the Candidate.
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 parallel communication, 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, IPv6 addressing, 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
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

<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>PO1</th>
<th>PO2</th>
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<th>PO4</th>
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<th>PO6</th>
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</table>

S = Strong, M = Medium, W = Weak

References:
2. TCP/IP protocol suite, Behrouz A. Forouzan, TMH publication.
3. Data Communications and Networking, Behrouz A. Forouzan, TMH.
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 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


UNIT 2


UNIT 3

UNIT 4


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 System design 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

<table>
<thead>
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S = Strong, M = Medium, W = Weak

Recommended Books:
Marks | Credits
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100 | 4
50 | 4
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


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 relational approach.
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 and Relational 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 and concurrency control protocol.
CO5: Understand and analyze transaction processing and concurrency control.
CO6: Describe how XML query are being processed and executed.

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S = Strong, M = Medium, W = Weak

References:
4. Database system concepts by Korth.-
MCSE104 DATA WAREHOUSE AND MINING

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Duration of Exam: 3 hrs.

Course Objectives:
- To study the methodology of engineering legacy databases for data warehousing and data mining to derive 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, dealing with large databases, cluster 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

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References:
MCSE105 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

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Duration of Exam: 3 hrs.

Course 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.

UNIT 4

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.

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S = Strong, M = Medium, W = Weak

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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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 of seminar report, contents of the presentation, communication and presentation skills.
MCSE107 ADVANCE OPERATING SYSTEM LAB

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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 Access 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. Perform 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 only odd 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 process scheduling 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.
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 & Calculus
CO3. Students will get the concepts of SQL and Integrity Constraints
CO4. Students will get the concepts of 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 using Procedures.
9. Create a function to calculate the factorial, calculate the greatest among three numbers of a given number 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. Create a trigger that raises an user defined error message and does not allow UPDATION and INSERTION

14. Create a form in VB for Simple calculator and also create menu-based calculator.
MCSE201 SOFTCOMPUTING

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

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

UNIT 2
Operations on Fuzzy Sets: Compliment, Intersection, Union, Combination of Operations, Aggregation Operation.

UNIT 3

UNIT 4

Course Outcomes:
After the completion of the course the student will be able to:
- CO1: Know and understand various fields of Soft computing:
- CO3: Design the required and related systems.
- CO4: Achieve an understanding of the technical potential and the advantages and limitations of the 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.

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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-SatishKumar
MCSE202 ALGORITHM DESIGN

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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:**
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, $\epsilon$-approximations, Polynomial time approximation 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 design situation calls for it.

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

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

CO6: Analyze randomized algorithms. Employ indicator random variables and invariance of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.

Mapping of Paper No. MCSE202

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S = Strong, M = Medium, W = Weak
References:

2. Fundamentals of Algorithms by Gilles Brassard and Paul Bratley
5. Algorithms Design (PIE) by Eva Tardos and Jon Klienberg, person.
### MCSE 203 Seminar

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**Course Outcomes:**

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

### MCSE204 SOFT COMPUTING LAB

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**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 in some 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. WAP to implement Hetroassociateneuralnetformappinginputvectorstooutputvectors
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. 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

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

1. Analyze the asymptotic performance of algorithms.
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 using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using function only
   a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using call by value and call by reference strategies.
7. Write a program to implement binary search tree. (Insertion and Deletion in 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 performing operations such as insert, delete, update a record in the file.
10. Create a linked list and perform the following operations on it.
   a) add a node
   b) Delete a node
11. Write a program to simulate the various searching & sorting algorithms and 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

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

Duration of Exam: 3hrs.

Course Objectives:
- To introduce the concepts and techniques associated with Wireless Cellular Communication systems.
- 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


UNIT 3


UNIT 4

Course Outcomes

CO1: Understand the cellular radio concepts such as frequency reuse, handoff and interference between mobiles and base stations.
CO2: Identify the techno-political aspects of wireless and mobile communications such as the allocation of the limited wireless spectrum by regulatory agencies.
CO3: Understand propagation effects such as fading, time delay spread, and Doppler spread, how to measure and model the impact that signal bandwidth and motion.
CO4: Understand the information theoretical aspects (such as the capacity) of wireless channels and basic 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

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S = Strong, M = Medium, W = Weak

References:
3. Wireless Communications : Theodore S Rappaport; Pearson
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 the framework 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


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-Hungarian Method

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’s Method

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

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S = Strong, M = Medium, W = Weak

**References:**

1. Optimization Techniques by C. Mohan and Kusum Deep, New Age International
MCSE206C  DISCRETE MATHEMATICS

L T P  Exam:  Marks  Credits
4 - -  Sessional:  100  4
   Total:  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 problems using the principle of inclusion-exclusion.
- Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-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,
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

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S = Strong, M = Medium, W = Weak

References:

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, Seymour Lipschutz and Marc Lipson, Schaum's outline
Duration of Exam: 3hrs.

Course Objective:

- This course is intended to teach the basics involved in publishing content on the World Wide Web. 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 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

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, WebCrawlers

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, 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.

S = Strong, M = Medium, W = Weak

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References:

2. Internet and World Wide Web Programming, Deitel, Deitel and Neito, 2000, Pearson Education.
3. Beginning XHTML by Frank Boumpery, Cassandra Greer, Dave Ragett, Jenny Ragett, Subastia Schintenbaumer and Ted Wugofski 2000,WROX
   Press(Indian Shroff Publication SPD)1st Edison.
5. Intranet and Internet Engg. By Minoli.