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<td>Communications Skills Lab</td>
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**Elective – I & II**
- Mobile Computing
- Business Intelligence
- Distributed Computing
- Real Time Systems
- Artificial Intelligence
- Pattern recognition & Image Processing
- Embedded Systems
- Internetworking Technologies

**Elective – III & IV**
- Soft Computing
- Machine Learning
- Software Quality Assurance & Testing
- Cloud Computing
- Wireless and Mobile Networks
- Distributed Algorithms
- Pattern Recognition & Computer Vision
- Adhoc Sensor Networks
- Intelligent Agents
- Information Retrieval

**Elective – V & VI**
- Neural Networks
- Software Architecture & Design Patterns
- Middleware Systems
- Parallel Algorithms
- Reliability & Fault Tolerance
- Human computer Interaction
- Pervasive Computing
- Semantic Web
- Information Security Audit & Assurance
- Research Methodologies in Computer Science

III Semester and IV Semester: Project Work
SCHEME OF INSTRUCTION AND EXAMINATION
M.Tech-I YEAR (REGULAR)COMPUTER SCIENCE & ENGINEERING

SEMESTER –I

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**THEORY**

1. Advanced Algorithms
2. Advanced Operating Systems
3. Advanced Database Systems
4. OOSE
5. Mobile Computing (ELECTIVE-I)
6. Distributed Computing (ELECTIVE-II)

**PRACTICALS**

1. ADB + OOSE Lab
2. Communications Skills Lab

Total

Elective – I,II,III,IV,V,VI

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<tr>
<th>Mobile Computing</th>
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### SCHEME OF INSTRUCTION AND EXAMINATION

**M.Tech - I YEAR (REGULAR) COMPUTER SCIENCE & ENGINEERING**

#### SEMESTER – II

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### Elective – I, II, III, IV, V, VI

- Mobile Computing
- Business Intelligence
- Distributed Computing
- Real Time Systems
- Artificial Intelligence
- Pattern recognition & Image Processing
- Embedded Systems
- Internetworking Technologies
- Soft Computing
- Machine Learning
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- Information Security Audit & Assurance
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### III Semester and IV Semester: Project Work

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Sd/-

HEAD, DEPT. OF CSE
ADVANCED ALGORITHMS

Instruction 3 periods per week
Duration of University Examination 3 Hours
University Examination 80 Marks
Sessional 20 Marks

UNIT-I
Algorithm Analysis: Asymptotic Notation, Amortization
Basic Data Structure: Stacks and Queues, Vectors, Lists and Sequences, Trees, Priority Queues, Heaps, Dictionaries and Hash Tables

UNIT-II
Fundamental Techniques: The Greedy Method, Divide and Conquer, Dynamic Programming
Graphs: The Graph abstract data Type, Data Structures for Graphs, Graph Traversal, Directed Graphs.

UNIT-III
Weighted Graphs: Single Source Shortest Paths, All pairs Shortest Paths, Minimum Spanning Trees

UNIT-IV
Text processing: Strings and Pattern Matching algorithms, Tries, Text Compression, Text Similarity testing.

UNIT-V
Computational Geometry: Range Trees, Priority Search Trees, Quadtrees and k-d Trees, Convex Hulls, N-P Complete.

Suggested Reading
ADVANCED OPERATING SYSTEMS

Instruction 3 periods per week
Duration of University Examination 3 Hours
University Examination 80 Marks
Sessional 20 Marks

UNIT- I

UNIT-II
Distributed Mutual Exclusion: classification, requirement, performance, non-token based algorithms, Lamport’s algorithms, the RichartAgarwala algorithm, token based algorithm-Suzukukasamil’s broadcast algorithm, Singhal’s heuristic algorithms
Deadlock Detection: Resource Vs communication deadlock, A graph – theoretic model, prevention, avoidance, detection, control organization, centralized deadlock-detection algorithm, the completely centralized algorithm, the HO- Ramamoorthy algorithms. Distributed deadlock detection algorithm- path-pushing algorithms, the edge chasing, hierarchical deadlock algorithm, menace-muntz and Horamamoorthy algorithm. Agreement protocols: The system model, the Bizantine agreement, the consensus problem.

UNIT-III
Distributed File System: Mechanisms, Design Issues
Case Studies: Sun NFS, Sprite File System, DOMAIN, Coda File system
Case Studies: IVY, Mirage, Clouds

UNIT-IV
Failure Recovery: Backward, Forward Error Recovery in Concurrent Systems, consistent Set of Check Points, Synchronous and Asynchronous check Pointing and Recovery.
Protection and Security: Access Matrix, Private Key, Public Key, Kerberos System.

UNIT-V
Database Operating System: Concurrency Control, Distributed databases, Concurrency control Algorithms.

Suggested Reading
ADVANCED DATABASES

Instruction: 3 periods per week
Duration of University Examination: 3 Hours
University Examination: 80 Marks
Sessional: 20 Marks

UNIT-I
Object Based Databases: Overview, complex Data Types, Structured Types and Inheritance in SL, table Inheritance, Array and Multiset Types in SQL, Object–Identity and Reference Types in SQL, Implementing O-R features, Persistent Programming Languages, Object-Relational Mapping, Object – Oriented versus Object- Relational.

UNIT-II

UNIT-III
Query processing: Overview, Measures of Query Cost, Selection operating, sorting, Join Operation, Other Operations, Evaluation of Expressions.

UNIT-IV
Distributed Databases: Homogenous and Heterogeneous Databases, distributed data storage, Distributed Transactions, Commit Protocols, concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, cloud Based Databases, Directory systems.

UNIT-V
Advanced Application development: Performance Tuning, Performance Benchmarks Other Issues in Application Development, Standardization
Spatial and Temporal Data and Mobility: Motivation, Time in Databases, spatial and Geographical Data, Multimedia Databases, Mobility and Personal databases

Suggested Reading
OBJECT ORIENTED SOFTWARE ENGINEERING

Instruction 3 periods per week
Duration of University Examination 3 Hours
University Examination 80 Marks
Sessional 20 Marks

UNIT- I

UNIT-II
Requirement Capture, Requirement Analysis, Refining the Requirement Models, Objects Interaction

UNIT-III
Operations, Control, Design, System Design.

UNIT-IV

UNIT-V

Suggested Reading
DISTRIBUTED COMPUTING

Instruction 3 Periods per Week
Duration of University Examination 3 Hours
University Examination 80 Marks
Sessional 20 Marks

UNIT I

UNIT II
Remote Object Invocation: Distributed Objects, Binding a Client to an Object, Static verses Dynamic Remote Method Invocations, Parameter Passing.

UNIT III
Process, Threads: Introduction to Threads, Threads in Distributed Systems.
Clients: user Interfaces, Client-Side Software for Distribution Transparency.
Servers: General Design Issues, Object Servers.
Software Agents: Software Agents in Distributed Systems, Agent Technology.
Naming: Naming, Entities: Names, Identifiers, and Address, Name Resolution, The Implementation of a Name System.
Locating Mobile Entities: Naming verses Locating Entities, Simple Solutions, Home-Based and Hierarchical Approaches.

UNIT IV
Distributed Object based Systems
GLOBE: Overview of GLOBE, Communication, Process, Naming, Synchronization, Caching Replication, Fault Tolerance, Security, Comparison of CORBA, DCOM, and COM.
UNIT-V

**Distributed Multimedia Systems:** Introduction, Characteristics of Multimedia Data.

**Quality of Service Management:** Quality of Service Negotiation, Admission Control.

**Resource Management:** Resource Scheduling.

*Suggested Reading:*


MOBILE COMPUTING

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 80 Marks
Sessional 20 Marks

UNIT-I

UNIT-II
Telecommunication Systems: GSM, GPRS, RA, Satellite Networks, Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB, DVB, CDMA and 3G.

UNIT-III
Wireless LAN: IEEE 802.11, Architecture, Services, MAC-Physical Layer, IEEE 802.11a-802.11b Standards, Bluetooth.

UNIT-IV

Mobile IP-Dynamic Host Configuration Protocol.

Traditional TCP-Classical TCP Improvements-WAP, WAP 2.0

UNIT-V
Publishing & Accessing Data in Air: Pull and Push Based Data Delivery models, Data Dissemination by Broadcast, Broadcast Disks, Directory Service in Air, Energy Efficient Indexing Scheme for Push Based Data Delivery.

File System Support for Mobility: Distributed File sharing for Mobility Support, Coda and other Storage Manager for Mobility Support.


Suggested Reading: