SCHEME OF STUDIES & EXAMINATION
SYLLABUS (‘B’ Scheme)
MASTER OF TECHNOLOGY
(2 Year Degree Programme)
COMPUTER SCIENCE AND ENGINEERING
(w.e.f. Session 2013-14)

FACULTY OF INFORMATION TECHNOLOGY AND
COMPUTER SCIENCE
DEENBANDHU CHHOTU RAM UNIVERSITY
OF SCIENCE AND TECHNOLOGY
MURTHAL -131039 (SONIPAT) HARYANA
### DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY,
MURTHAL (SONEPAT)

SCHEME OF STUDIES & EXAMINATIONS

M. Tech. 1ST YEAR (SEMESTER - I) COMPUTER SCIENCE & ENGINEERING

Credit Based Scheme w.e.f. 2013-14

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Note: Students will be allowed to use Non-Programmable Scientific Calculator. However, sharing of calculator will not be permitted in the examination.
### Scheme of Studies & Examinations

**M. Tech. 1st Year (Semester - II) Computer Science & Engineering**

Credit Based Scheme w.e.f. 2013-14

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2. The choice of students for any elective shall not be binding on the department.
### Scheme of Studies & Examinations

**M. Tech. 2\textsuperscript{nd} Year (Semester - III) Computer Science & Engineering**

**Credit Based Scheme w.e.f. 2014-15**

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CSE501B: SOFTWARE VERIFICATION, VALIDATION & TESTING
M.Tech. Semester - I (Computer Science & Engg.)

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Unit 1

**Introduction:** What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory. **Functional Testing:** Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Unit 2

**Structural Testing:** Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing. **Testing Activities:** Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

Unit 3

**Reducing the number of test cases:** Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing. **Object Oriented Testing:** Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Unit 4

**Testing Tools:** Static Testing Tools, Dynamic Testing Tools, and Characteristics of Modern Tools and Implementation with example. Advanced topics in software testing: web based testing, Client server testing, Automated test cases generation, Regular expression and FSM based testing.

**Text/Reference Books**
4. Louise Tamres, Software Testing , Pearson Education Asia, 2002

**Note:**
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE503B: ADVANCED ALGORITHMS
M.Tech. Semester - I (Computer Science & Engg.)

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<td>Duration of Examination</td>
<td>3 Hrs.</td>
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Unit 1
Review of Basic Concepts: Abstract data types, Data structures, Algorithms, Big Oh, Small Oh, Omega and Theta notations, Solving recurrence equations, Master theorems, Generating function techniques.

Unit 2

Unit 3
Advanced Structures for Priority Queues and Their Extensions: Binomial heaps, Leftist heaps, Skewed heaps, Fibonacci heaps and its amortized analysis, Applications to minimum spanning tree algorithms

Unit 4
Graph Algorithms: DFS, BFS, Bi-connected components, Cut vertices, Matching, Network flow. Lower Bound Theory: Adversary arguments, information theory bounds

Text/Reference Books
9. Robert Kruse, Data Structure and Program design in C, PHI

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
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CSE505B: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
M.Tech. Semester -I (Computer Science & Engg.)

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Unit 1
Sets, Relations, Functions, Logic: Propositional logic. Truth tables, Tautologies, Resolution proof system, Predicate logic.
Finite state machines (FSM), FSM as models of physical systems, equivalent machines, FSM as language recognizers, finite state languages & type-3 languages.

Unit 2
Recurrence relations, derivation of recurrence relations from the general behavior of Systems. Solutions of Recurrence relations. Groups, Subgroups, Cyclic Group, Rings, Integral domains, Isomorphism & Homeomorphisms.

Unit 3

Unit 4

Text/Reference Books
2. Kishore S. Trivedi, Statistical Models for Computer Science Applications, PHI.

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE507B: ADVANCED OPERATING SYSTEMS
M.Tech. Semester - I (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

Unit 1

Unit 2

Unit 3
Distributed deadlock detection: Deadlock handling strategies, issues in deadlock detection & reevaluation, Control Organization: Centralized distributed & Hierarchical detection algorithms.

Unit 4

Text/Reference Books
1. Peterson, J.L. & Silbersehatz, A: Operating System Concepts, Addison, Wesley-Reading...
4. Hansen, P.B: Architecture of Concurrent Programs, PHI.
5. Shaw, A.C: Logic Design of Operating Systems, PHI.
7. A S Tanenbaum : Modern Operating Systems, PHI.

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE509B: ADVANCED COMPUTER NETWORKS
M.Tech. Semester -I (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination: 3 Hrs.

UNIT I
Introduction: Introduction to Network models-ISO-Osi, SNA, Apple talk and TCP/IP models. Review of Physical layer and Data link layers, Review of LAN (IEEE 802.3, 802.5, 802.11b/ a/ g, FDDI) and WAN (Frame Relay, ATM, ISDN) standards.

UNIT II
Advanced Technologies: Virtual circuits, Fixed size packets, Small size packets, Integrated service, History, Challenges, ATM Network protocols, IP over ATM, Wireless networks: Wireless communication basics, architecture, mobility management, wireless network protocols. Ad-hoc networks Basic concepts, routing; Bluetooth (802.15.1), Wi-Fi (802.11), WiMAX (802.16), Optical Network : links, WDM system, Optical LANs, Optical paths and networks.

UNIT III

UNIT IV

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 &6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE521B: SOFTWARE VERIFICATION, VALIDATION & TESTING LAB  
M.Tech. Semester - I (Computer Science & Engg.)

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<td>20 Marks</td>
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Prerequisites: Knowledge of C/ C++ Programming is essential.  
The students will be required to carry out 8 to 10 experiments covering the theory course CSE501B Software Verification, Validation & Testing.

CSE523B: ADVANCED ALGORITHMS LAB  
M.Tech. Semester - I (Computer Science & Engg.)

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<td>30 Marks</td>
<td>50 Marks</td>
<td>3 Hrs.</td>
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Prerequisites: Knowledge of C/ C++ Programming is essential.  
The students will be required to carry out 8 to 10 experiments covering the theory course CSE503B Advanced Algorithms.
CSE502B: ARCHITECTURE OF HIGH PERFORMANCE COMPUTER SYSTEMS
M.Tech. Semester -II (Computer Science & Engg.)

L P Credits | Class Work : 25 Marks
-----+-----+-----+-----
4  -  4 | Examination : 75 Marks
         | Total : 100 Marks
         | Duration of Examination : 3 Hrs.

UNIT I
Introduction: review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance. CISC and RISC processors.

UNIT II
Pipelining: Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards, and structural hazards, techniques for handling hazards. Exception handling. Pipeline optimization techniques. Compiler techniques for improving performance.

UNIT III
Hierarchical memory technology: Inclusion, Coherence and locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, mapping and management techniques, memory replacement policies. Instruction-level parallelism: basic concepts, techniques for increasing ILP, superscalar, super-pipelined and VLIW processor architectures. Array and vector processors.

UNIT IV

Text/Reference Books


Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE504B: COMPUTATIONAL INTELLIGENCE
M.Tech. Semester -II (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT I
Fundamentals of evolutionary computation techniques: Evolutionary Computation, Design and Analysis of Genetic Algorithms, Evolutionary Strategies, Evolutionary Programming

UNIT II

UNIT III
Fuzzy Logic and Neural Networks: Fuzzy logic, fundamentals of neural networks, Advanced neural network architectures and Hybrid Techniques

UNIT IV
Applications of evolutionary techniques: Application of computational intelligence and machine learning techniques to classification, prediction, pattern recognition, and optimization problems.

Text/Reference Books
1. Computational Intelligence - Concepts to Implementations by Eberhart & Shi
3. Introduction to Genetic Algorithms by Melanie Mitchell
4. Handbook of Genetic Algorithms by Davis
5. Machine Learning by Tom Mitchell
6. Daniel Ashlock, Evolutionary Computation for Modeling and Optimization, 2005

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE5068: INFORMATION SECURITY AND DATA HIDING
M.Tech. Semester - II (Computer Science & Engg.)

LP Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT I
Information Security: Cryptography, Key exchange methods such as public and private key, Digital Signatures

UNIT II
Format of Image, Video and Audio: Different formats of multimedia files such as images, videos and audios will be studied

UNIT III
Steganography: History of steganography, Hiding data in multimedia files, Least significant bit method, Latest algorithms for data hiding. Comparison of different steganographic techniques, Applications of steganography

UNIT IV
Watermarking: Copyright protection mechanisms, Latest Watermarking Algorithms, Comparison of watermarking techniques, Applications of Watermarking

Text/Reference Books
1. Disappearing Cryptography: Being and Nothingness on the Net Wayner, Peter. 1996

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 &6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT-I

Software Design: Design concepts, the design model, software architecture, architectural design, data design, component level design, and user interface design.

UNIT-II

Object Modeling and Design: OMT, visual modeling, UML, Rational Rose Tool, Classes, objects, relationships, key abstractions, common mechanisms, diagrams, class diagrams, advanced classes, advanced relationships, interfaces, types, roles, packages, instances, object diagrams, interactions, use cases, use case diagrams, interaction diagrams, activity diagrams, events and signals, state machines, processes, threads, state chart diagrams, components, deployment, collaborations, patterns and frameworks, component diagrams, systems and models, code generation and reverse engineering.

UNIT-III


UNIT-IV

Function overloading. Friend functions and friend classes, Operator overloading, Dynamic memory allocation to classes and class members, new and delete operators. Overloading new and delete operators. Explicit type conversion operators. Input output streams, Stream class hierarchies, standard I/O objects: cin, cout, cerr, overloading <<, >> operators, File Streams, opening, reading, writing to file. File pointers and their manipulators, Introduction to templates and container classes.

Text/Reference Books


Note:

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
Unit 1


Unit 2

Routing: Taxonomy, Applications, Challenges in Mobile Environments, Hidden and exposed terminal problems, Routing Protocols- Proactive, Reactive, and Hybrid protocols, Dynamic State Routing (DSR), Ad hoc On-Demand Distance Vector (AODV), Destination Sequenced Distance – Vector Routing (DSDV), and Cluster Based Routing Protocol (CBRP), and Temporally Ordered Routing algorithm (TORA), Directed-diffusion, Low Energy Adaptive Clustered Hierarchical (LEACH) routing protocol.

Unit 3

Distributed location and data management: Mobile IP- Problem with Mobility, Terminology, Operation, Tunneling, Data transfer to the mobile system, Transport Control Protocol (TCP) Over wireless- Indirect TCP (I-TCP), Snoop TCP, Mobile TCP (M-TCP), Data management issues, Data delivery models, Broadcast disks, data replication, Data caching and design issues, Air indexing, Transaction processing in mobile computing environment.

Unit 4


Reference and Text Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE556B: DIGITAL IMAGE ANALYSIS
M.Tech. Semester - II (Computer Science & Engg.)

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<td>3 Hrs.</td>
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UNIT I

UNIT II

UNIT III

UNIT IV

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE 5588: ADVANCED DATABASE MANAGEMENT SYSTEM  
M.Tech. Semester-II (Computer Science & Engg.)

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UNIT-I
Transaction Processing, Concurrency & Recovery Management in Centralized DBMS. Concept of Transaction and its properties, Scheduling of transactions, Conflict operations, Two Phase Locking protocol, Recovery management in Centralized DBMS.
Distributed DBMS: Concepts and design: Introduction, functions and architecture of a DDBMS, distributed relational database design, Transparencies in a DDBMS, Date’s twelve rules for a DDBMS.

UNIT-II
Advanced concepts: Distributed transaction management, distributed concurrency control, distributed deadlock management, distributed database recovery, Replication servers, and Distributed query optimization, Mobile databases.

UNIT-III
Object-Oriented DBMS: Introduction: advanced database applications, weakness of RDBMS, storing objects in a relational database, next-generation database systems. Concepts and design: OODBMS perspectives, persistence, issues in OODBMS, advantages and disadvantages of OODBMS, Object-oriented database design.
Object relational DBMS: Introduction, third generation database manifestos, SQL8, Object oriented extensions in Oracle, Comparison of ORDBMS and OODBMS.

UNIT-IV
Web technology and DBMS: Web as a database Application Platform: Requirements for web-DBMS integration, web-DBMS architecture, advantages and disadvantages of web-DBMS approach, approaches to integrating the web and DBMS, Oracle Internet Application Server (IAS).
Data Warehousing Concepts, OLAP and Data mining: Evolution of data warehousing, data warehousing concepts, benefits and problems of data warehousing, comparison of OLTP systems and data warehousing, On-Line Analytical Processing, Introduction to data mining.

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT-I

UNIT-II

UNIT-III
Terminal servers, Power management, Operating system support, Power supply, Storage, Video card, Display, Tools for monitoring. A model for sustainable software engineering, Role of generic knowledge base in enhancing sustainability, sustainability relevant criteria, sustainable development.

UNIT-IV
Green mobile, optimizing for minimizing battery consumption, Web, Temporal and Spatial Data Mining Materials recycling, Telecommuting, metrics for green computing. Techniques to measure energy consumption of software components, requirements and usage scenarios in reducing energy consumption, modeling energy consumption.

Text/Reference Books
2. Green Data Center: The steps for the journey by A. Galea, M. Schafer, M. Ebbes, IBM Press
3. The Greening of IT: How companies can make a difference for the environment by John Lamb, IBM Press
4. Green Computing: Large-Scale Energy Efficiency by Wu-chun Feng, Virginia Polytechnic Institute and State University, Blacksburg, USA (Eds.), CRC Press
5. Green Computing with Emerging Memory: Low-Power Computation for Social Innovation by Kawahara, Takayuki; Mizuno, Hiroyuki (Eds.), Springer Press
6. Sustainable ICTs and Management Systems for Green Computing by Wen-Chen Hu (University of North Dakota, USA) and Naima Kaabouch (University of North Dakota, USA), IGI Global Press

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE562B: WIRELESS NETWORKS
M.Tech. Semester -II (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT I

UNIT II
Routing in wireless Networks, IEEE 802.11 Wireless Standards, wireless ATM, wireless TCP/IP, WIRELESS WAN
Mechanism to support a mobile environment, communication in the infrastructure, IS-95 CDMA forward channel, IS - 95 CDMA reverse channel, forward channel in W-CDMA and CDMA 2000, reverse channels in W-CDMA and CDMA-2000, GPRS and higher data rates, short messaging service in GPRS mobile application protocols.

UNIT III
Security challenges in wireless networks, design of secure protocols: key distribution for access control, source authentication of transmissions, and non-repudiation; attacks in wireless networks; DOS and DDOS attacks, Authentication protocols: EAP-TLS, EAP-TTLS, EAP-PEAP,EAP-SIM

UNIT IV
IEEE 802.15 WPAN, Home RF, Bluetooth, interface between Bluetooth and 802.11, wireless geolocation technologies for wireless geolocation, geolocation standards for E.911 service. Wireless protocols for real time interactive applications, QoS Guarantees Heterogeneous wireless networks: characteristics, challenges, applications

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 &6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT I

UNIT II

UNIT III

UNIT IV

Text/Reference Books
3. Handbook of Research on Scalable Computing Technologies Kuan-Ching Li (Providence University, Taiwan), Ching-Hsien Hsu (Chung Hua University, Taiwan), Laurence Tianrueo Yang (St. Francis Xavier University, Canada), Jack Dongarra (University of Tennessee, USA) and Hans Zima (Jet Propulsion Laboratory, California Institute of Technology, USA and University of Vienna, Austria)

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE566B: DATA WAREHOUSING
M.Tech. Semester -II (Computer Science & Engg.)

L    P    Credits                  Class Work : 25 Marks
4    -    4                        Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT-I
Introduction to data ware house, Data ware House Building Blocks: subject oriented data, integrated data, Time-variant Data, Non volatile Data, data granularity, Data ware House and Data marts, top down and bottom up approaches, components of Dataware house. Meta data in data warehouse, data quality, role of catalog, data transformation

UNIT-II
Trends in data warehousing, data ware house expansion, multiple data types, data visualization, parallel processing, Dataware housing in Oracle, Demand for Online Analytical Processing, Major Features and Functions, OLAP Models, OLAP Implementation Considerations, Dataware housing and web, Web-Enabled Data Warehouse, Web-Based Information Delivery, OLAP and the Web, Building a Web-Enabled Data Warehouse.

UNIT-III

UNIT-IV

Text/Reference Books
3. Data Warehouse: Practical Advice from the Experts By: Joyce Bischoff, Ted Alexander Publisher: Prentice Hall

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
The students will be required to carry out 8 to 10 experiments covering the theory course

CSE504B COMPUTATIONAL INTELLIGENCE

CSE524B: COMPUTATIONAL INTELLIGENCE LAB
M.Tech. Semester -II (Computer Science & Engg.)

L    P    Credits          Class Work  :  20 Marks
3     1.5
Examination :  30 Marks
Total :  50 Marks
Duration of Examination :  3 Hrs.

The students will be required to carry out 8 to 10 experiments covering the theory course
CSE524B COMPUTATIONAL INTELLIGENCE

CSE572B: SOFTWARE DESIGN AND CONSTRUCTION LAB
M.Tech. Semester -II (Computer Science & Engg.)

L    P    Credits          Class Work  :  20 Marks
3     1.5
Examination :  30 Marks
Total :  50 Marks
Duration of Examination :  3 Hrs.

The students will be required to carry out 8 to 10 experiments covering the theory course
CSE572B SOFTWARE DESIGN AND CONSTRUCTION

CSE574B: MOBILE COMPUTING LAB
M.Tech. Semester -II (Computer Science & Engg.)

L    P    Credits          Class Work  :  20 Marks
3     1.5
Examination :  30 Marks
Total :  50 Marks
Duration of Examination :  3 Hrs.

The students will be required to carry out 8 to 10 experiments covering the theory course
CSE574B MOBILE COMPUTING

CSE576B: DIGITAL IMAGE ANALYSIS LAB
M.Tech. Semester -II (Computer Science & Engg.)

L    P    Credits          Class Work  :  20 Marks
3     1.5
Examination :  30 Marks
Total :  50 Marks
Duration of Examination :  3 Hrs.

The students will be required to carry out 8 to 10 experiments covering the theory course
CSE576B DIGITAL IMAGE ANALYSIS
CSE578B: ADVANCED DATABASE MANAGEMENT SYSTEMS LAB
M.Tech. Semester -II (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course CSE558B ADVANCED DATABASE MANAGEMENT SYSTEMS
HUM602B: TECHNICAL COMMUNICATION FOR RESEARCH
M.Tech. Semester -III (Computer Science & Engg.)

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<td>3 Hrs.</td>
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UNIT I
Introduction to critical thinking, reasoning, arguments: deductive and inductive arguments, clarity, accuracy, precision and relevance in academic writing

UNIT II
Data collection: use of print, electronic sources and digital sources; Note making, paraphrasing, summary; Documentation avoiding plagiarism; Title, body, introduction and conclusion; Revising, proof-reading

UNIT III
Writing papers for Seminar/ Conference proceedings, Project / Research Proposals, Literature Review, Writing reports

UNIT IV
Oral presentations for academic purposes: seminar, conferences; Choosing appropriate medium; Interaction and persuasion; Interviews/ viva skills

Text/Reference Books


SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST) AND INSTRUCTIONS FOR THE EXAMINER

Theory
1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have four questions in all.
3. The student is required to attempt all the four questions.
4. Question no. 1 will be of 20 marks. The question will constitute various sub-parts with enough choice. It will be in the form of short answer/ brief note type questions covering the Unit I of the syllabus.
5. Question no 2 will be of 20 marks. The question may have two/ three parts with internal choice, covering various components of the Unit II.
6. Question no 3 will be of 25 marks. The question may have two/three parts with internal choice, covering various components of the Unit III. The student will be asked to write a paper/proposal/report covering contents of the unit. The emphasis would be on testing the actual research writing.

7. Question no 4 will be of 10 marks. The question may be on theoretical aspects of various components of the Unit IV.

**NOTE:** Oral presentation part of the syllabus (Unit IV) must be evaluated orally and regularly as a part of internal assessment. But also an examiner appointed by the Chairperson, Department of Humanities, along with the course teacher will conduct a small oral exam of 10 marks on the last teaching day of the semester for objective assessment of student’s oral learning.
UNIT-I
Project Planning: Characteristics of a software project,Software scope and feasibility, resources, the SPM plan. Software Project Estimation: Size/ scope estimation, Decomposition techniques, WBS. Effort estimation: Sizing, Function point, LOC, FP vs LOC.

UNIT-II

UNIT-III

UNIT-IV
Team Management: Team structures: hierarchical, Egoless, chief programmer, mixed; Team software Process; Resource leveling, Building a team: Skill sets. Configuration Management: Baselines, Configurable items, SCM repository, SCM process, version control change control, configuration audit.

Text/Reference Books
3. Software Project Management By Walker Royce, Addison Wesley

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT I
Introduction to ad-hoc/sensor networks: Key definitions of ad-hoc/ sensor networks, unique constraints and challenges, applications of ad-hoc networks, applications of sensor network, issues in ad-hoc wireless networks, issues in design of sensor network. Sensor network architecture, Sensor deployment, Scheduling and coverage issues, self configuration and topology control, querying, data collection and processing, data dissemination, collaborative information processing and group connectivity. Target tracking, localization and identity management.

UNIT II

UNIT III
Issues in designing a routing protocol, classification of routing protocols, proactive and reactive protocols, AODV, DSDV, DSR, TORA hybrid routing, zone routing protocols (ZRP), Power aware routing (PAR) protocol, Location Based routing, Multicasting protocols. Routing protocols for sensor networks: data centric, hierarchical, location based, energy efficient routing, agent-based routing, random walk, trace routing.

UNIT IV
QoS and Energy Management: Issues and Challenges in providing QoS, classifications, MAC, network layer solutions, QoS frameworks, need for energy management, battery management schemes, transmission power management schemes, and system power management schemes, Congestion control in ad hoc networks

Text/Reference Books
2. Feng Zhao and Leonides Guibas, Wireless sensor networks, Elsevier publication - 2004

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE655B: DATA MINING
M.Tech. Semester -III (Computer Science & Engg.)

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<td>4</td>
<td>25 Marks</td>
<td>75 Marks</td>
<td>100</td>
<td>3 Hrs.</td>
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UNIT-I

UNIT-II

UNIT-III

UNIT-IV
Discovering sequence, information from non-sequential data. Connections with HMMs. Putting it all together: Bi-clustering. Compositional data mining. Mining chains of relations. Integrated query/mining languages. Paradigms for interfacing with database systems. Applications: Data mining applications in bioinformatics, personalization, information retrieval, web modelling, filtering, and text processing.

Text/Reference Books
1. Data Mining: Practical Machine Learning Tools and Techniques by Mark Hall, Ian Witten, Eibe Frank, Publisher: Morgan Kaufmann
2. Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management by Michael J. A. Berry Publisher: Wiley
3. Handbook of Statistical Analysis and Data Mining Applications by Robert Nisbet Publisher: Academic Press, Elsevier
4. Data Mining: Concepts and Techniques, Third Edition (The Morgan Kaufmann Series in Data Management Systems) by Jiawei Han

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III, and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT - I

UNIT - II
PUBLIC KEY CRYPTOGRAPHY: Key Management - Diffie-Hellman key Exchange - Elliptic Curve Architecture and Cryptography - Introduction to Number Theory - Confidentiality using Symmetric Encryption - Public Key Cryptography and RSA.

UNIT - III

UNIT - IV
SYSTEM LEVEL SECURITY: Intrusion detection - password management - Viruses and related Threats - Virus Counter measures - Firewall Design Principles - Trusted Systems.

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE659B: DATA ANALYTICS AND APPLICATIONS  
M.Tech. Semester –III(Computer Science & Engg.)

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<td>25</td>
<td>25 Marks</td>
<td>75 Marks</td>
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<td>3 Hrs.</td>
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UNIT-I

UNIT-II

UNIT-III
Data Visualization: Meaning and significance, Traits of Meaning full Data, Brief History of Information Visualization, Power of visual perception, Making abstract data Visible, Building Blocks of information Visualization. Analytical Techniques.

UNIT-IV
Big Data, In-Memory Processing, limitations of In Memory Processing. Big Data Privacy, Big data Visualization, Map Reduce algorithm, OLAP and its applications, Data Mining Process, Knowledge Discovery, Decision Support Systems

Text/Reference Books
1. "Now You See It: Simple Visualization Techniques for Quantitative Analysis" by Stephen Few Publisher: Jonathan G Koomey
2. Big Data Analytics: Turning Big Data into Big Money by Frank J. Ohlhorst Publisher: Wiley

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE661B: SOFTWARE MEASUREMENTS & METRICS
M.Tech. Semester -III (Computer Science & Engg.)

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<td>25 Marks</td>
<td>75 Marks</td>
<td>100 Marks</td>
<td>3 Hrs.</td>
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UNIT-I

**Basics of measurement:** Measurement in everyday life, measurement in software engineering, scope of software metrics, representational theory of measurement, measurement and models, measurement scales, meaningfulness in measurement, goal-based framework for software measurement, classifying software measures, determining what to measure, software measurement validation, empirical investigation, types of investigation, planning and conducting investigations.

UNIT-II

**Software:** Metrics data collection and analysis: What is good data, how to define the data, how to collect the data, how to store and extract data, analyzing software-measurement data, frequency distributions, various statistical techniques.

**Measuring internal product attributes:** Measuring size, aspects of software size, length, functionality and complexity, measuring structure, types of structural measures, control-flow structure, modularity and information flow attributes, data structures.

UNIT-III

**Measuring external product attributes:** Modeling software quality, measuring aspects of software quality, software reliability, basics of software reliability, software reliability problem, parametric reliability growth models, predictive accuracy, recalibration of software-reliability growth predictions, importance of operational environment, wider aspects of software reliability.

**Resource measurement:** Measuring productivity, teams, tools, and methods.

UNIT-IV

**Metrics for object-oriented systems:** The intent of object-oriented metrics, distinguishing characteristics of object-oriented metrics, various object-oriented metric suites LK suite, CK suite and MOOD metrics.

**Dynamic Metrics:** Runtime Software Metrics, Extent of Class Usage, Dynamic Coupling, Dynamic Cohesion, and Data Structure Metrics.

**Metrics for component-based systems:** The intent of component-based metrics, distinguishing characteristics of component-based metrics, various component-based metrics.

Text/Reference Books

5. Note: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.

Note:

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
UNIT-I

Introduction Features of Distributed databases, Features of Centralized databases, Level of Distributed Transparency, Reference Architecture, Types of Data Fragmentation, Distribution Transparency, access primitives, integrity constraints

UNIT-II

Global And Fragment Queries Global Queries, fragment Queries, Equivalence Transformations for Queries, transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parameter Queries Optimization Of Access Strategies, Frame Work for Query Optimization, Join Queries, General Queries

UNIT-III


UNIT-IV

Reliability Basic concepts, Commitment Protocols, reliability and Concurrency Control, Consistent View of Network, detection and Resolution of Inconsistency, Check points and cold restart Distributed Database Systems Commercial Systems Commercial Systems, Tanden’s ENCOMPASS Distributed Database systems, IBM’s inter system Communication, features of Distributed, INGRESS HETEREGENEOUSDATABASE : General problems, brief study of MULTIBASE.

Text/Reference Books


Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE665B: INFORMATION SECURITY RISK ANALYSIS
M.Tech. Semester -III (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT I

UNIT II
Cryptography - Public Key Cryptography - Principles of Public Key Cryptosystems - The RSA Algorithm - Key Management - Authentication - Elements, types and methods - Digital Signature - Intrusion Detection System (IDS) - Types and challenges - Intrusion prevention system (IPS) - Firewalls - Design Principles, Scanning, filtering and blocking.

UNIT III

UNIT IV
Risk management and security planning - Risk management Process Overview - Cost-Benefit Analysis, Risk Analysis, Laws and Customs, Human Issues, Organizational issues - Information system Risk analysis - System approach to risk management, Threat assessment, Assets and safeguards, modes of risk analysis - Effective risk analysis, Qualitative Risk analysis, Value analysis

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE667B: CYBER SECURITY AND FORENSICS
M.Tech. Semester -III (Computer Science & Engg.)

L P Credits Class Work : 25 Marks
4 - 4 Examination : 75 Marks
Total : 100 Marks
Duration of Examination : 3 Hrs.

UNIT-I

UNIT-II
Role of Computers and Internet in Cyber crime penetration and prevention : Computer as witness, evidence, act, defining evidence, computer forensics, computer storage, media of electric record for use of course of law

UNIT-III

UNIT-IV

Text/Reference Books

Note:
1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit (1 & 2 from unit I, 3 & 4 from unit II, 5 & 6 from unit III and 7 & 8 from unit IV). The students will be required to attempt only 5 questions selecting at least one question from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
CSE671B: SOFTWARE PROJECT MANAGEMENT LAB  
M.Tech. Semester -III (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course  
CSE651B SOFTWARE PROJECT MANAGEMENT

CSE673B AD HOC AND SENSOR NETWORKS LAB  
M.Tech. Semester -III (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course  
CSE653B AD HOC AND SENSOR NETWORKS

CSE675B DATA MINING LAB  
M.Tech. Semester -III (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course  
CSE555B DATA MINING

CSE677B CRYPTOGRAPHY AND NETWORK SECURITY LAB  
M.Tech. Semester -III (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course  
CSE657B CRYPTOGRAPHY AND NETWORK SECURITY
CSE679B DATA ANALYTICS AND APPLICATIONS LAB
M.Tech. Semester -III (Computer Science & Engg.)

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The students will be required to carry out 8 to 10 experiments covering the theory course
CSE659B DATA ANALYTICS AND APPLICATIONS.

CSE633B DISSERTATION PHASE - I
M.Tech. Semester -III (Computer Science & Engineering)

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<td>100 Marks</td>
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The primary objective of this course is to develop in student the capacity for analysis &
judgment and the ability to carry out independent investigation in design / development
through a dissertation work involving creativity, innovation and ingenuity. The work must
start with comprehensive literature search and critical appreciation thereof so as to select
research problem the student wishes to work on.

Each student will carry out independent dissertation under the supervision of some
teacher(s) who will be called Supervisor(s). In no case more than two supervisors can be
associated with one dissertation work.

The dissertation involving design / testing/ computer simulation/ case studies etc. which
commences in the III Semester will be completed in IV Semester. The evaluation of the
dissertation phase -I besides approval of the dissertation topic of the students will be done by
a committee constituted as under:
Chairperson of Department : Chairperson
M Tech Coordinator / Sr Faculty : Member Secretary
Respective dissertation supervisor : Member

The student will be required to submit two copies of his/ her report to the department for
record (one copy each for the department and participating teacher).
The objectives of the course remain:
- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the supervision of a teacher assigned by the department. He/She will give a seminar talk on the same before a committee constituted by the chairperson of the department. The committee should comprise of 2 or 3 faculty members from different specializations. The teacher(s) associated in the committee will each be assigned 2 hours teaching load per week.

However, supervision of seminar topic will be in addition to the regular teaching load.
The dissertation started in III Semester will be completed in IV Semester and will be evaluated in the following manner.

**Internal Assessment**

Internal Assessment (class work evaluation) will be effected as per ordinance through interim report, presentation and discussion thereon by the following committee of three persons:
- Chairperson of Department: Chairperson
- M Tech Coordinator/ Sr Faculty: Member
- Secretary: Member
- Respective dissertation supervisor: Member

**External Assessment**

Final dissertation will be assessed by a panel of examiners consisting of the following:
- Chairperson of Department: Chairperson
- Respective Supervisor(s): Member(s)
- External expert: To be appointed by the University

Note: The External Expert must be from the respective area of specialization. The chairperson & M Tech Coordinator with mutual consultation will divide the submitted dissertations into groups depending upon the area of specialization and will recommend the list of experts for each group separately to the V C for selecting the examiners with the note that an external expert should be assigned a maximum of FIVE dissertations for evaluation.

The student will be required to submit THREE copies of his/her report to the M Tech Coordinator for record and processing.