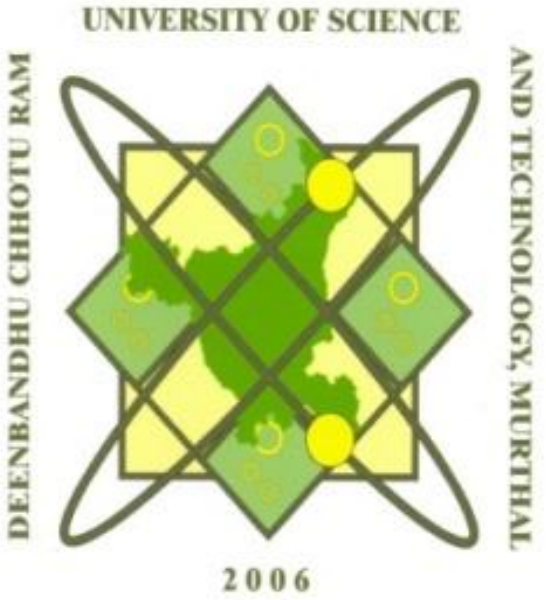
SCHEME OF STUDIES & EXAMINATION
SYLLABUS ('B' Scheme)
MASTER OF TECHNOLOGY
(2 Year Degree Programme)
COMPUTER SCIENCE AND ENGINEERING
(w.e.f. Session 2013-14)



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

S. No.	Course No.	Course Title	Teaching Schedule		Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	P		Theory	Practical			
1	CSE501B	SOFTWARE VERIFICATION, VALIDATION & TESTING	4	-	25	75	-	100	4	3
2	CSE503B	ADVANCED ALGORITHMS	4	-	25	75	-	100	4	3
3	CSE505B	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	4	-	25	75	-	100	4	3
4	CSE507B	ADVANCED OPERATING SYSTEMS	4	-	25	75	-	100	4	3
5	CSE509B	ADVANCED COMPUTER NETWORKS	4	-	25	75	-	100	4	3
6	CSE521B	SOFTWARE VERIFICATION, VALIDATION & TESTING LAB	-	3	20	-	30	50	1.5	3
7	CSE523B	ADVANCED ALGORITHMS LAB	-	3	20	-	30	50	1.5	3
TOTAL			**20**	**06**	**165**	**375**	**60**	**600**	**23**	

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

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY,
MURTHAL (SONEPAT)
SCHEME OF STUDIES & EXAMINATIONS
M. Tech. 1ST YEAR (SEMESTER - II) COMPUTER SCIENCE & ENGINEERING
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule		Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	P		Theory	Practical			
1	CSE502B	ARCHITECTURE OF HIGH PERFORMANCE COMPUTER SYSTEMS	4	-	25	75	-	100	4	3
2	CSE504B	COMPUTATIONAL INTELLIGENCE	4	-	25	75	-	100	4	3
3	CSE506B	INFORMATION SECURITY AND DATA HIDING	4	-	25	75	-	100	4	3
4		ELECTIVE I	4	-	25	75	-	100	4	3
5		ELECTIVE II	4	-	25	75	-	100	4	3
6	CSE524B	COMPUTATIONAL INTELLIGENCE LAB	-	3	20	-	30	50	1.5	3
7		ELECTIVE I LAB	-	3	20	-	30	50	1.5	3
TOTAL			**20**	**06**	**165**	**375**	**60**	**600**	**23**	

ELECTIVE I		ELECTIVE II	
CSE552B	SOFTWARE DESIGN AND CONSTRUCTION	CSE560B	GREEN COMPUTING
CSE554B	MOBILE COMPUTING	CSE562B	WIRELESS NETWORKS
CSE556B	DIGITAL IMAGE ANALYSIS	CSE564B	SCALABLE COMPUTING
CSE558B	ADVANCED DBMS	CSE566B	DATA WAREHOUSING

ELECTIVE I LAB	
CSE572B	SOFTWARE DESIGN AND CONSTRUCTION LAB
CSE574B	MOBILE COMPUTING LAB
CSE576B	DIGITAL IMAGE ANALYSIS LAB
CSE578B	ADVANCED DBMS LAB

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2. The choice of students for any elective shall not be binding on the department

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY,
MURTHAL (SONEPAT)
SCHEME OF STUDIES & EXAMINATIONS
M. Tech. 2ND YEAR (SEMESTER - III) COMPUTER SCIENCE & ENGINEERING
Credit Based Scheme w.e.f. 2014-15

S. No.	Course No.	Course Title	Teaching Schedule		Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	P		Theory	Practical			
1	HUM602B	TECHNICAL COMMUNICATION FOR RESEARCH	4	-	25	75	-	100	4	3
2		ELECTIVE III	4	-	25	75	-	100	4	3
3		ELECTIVE IV	4	-	25	75	-	100	4	3
4		ELECTIVE III LAB	-	3	20	-	30	50	1.5	3
5	CSE633B	DISSERTATION (PHASE - I)	-	6	100	-	-	100	6	-
6	CSE635B	SEMINAR	-	2	50	-	-	50	2	-
TOTAL			**12**	**11**	**245**	**225**	**30**	**500**	**21.5**	

ELECTIVE III			ELECTIVE IV	
CSE651B	SOFTWARE PROJECT MANAGEMENT		CSE661B	SOFTWARE MEASUREMENT & METRICS
CSE653B	AD HOC AND SENSOR NETWORKS		CSE663B	DISTRIBUTED DATA ARCHITECTURE AND MANAGEMENT
CSE655B	DATA MINING		CSE665B	INFORMATION SECURITY RISK ANALYSIS
CSE657B	CRYPTOGRAPHY AND NETWORK SECURITY		CSE667B	CYBER SECURITY AND FORENSICS
CSE659B	DATA ANALYTICS AND APPLICATIONS			

ELECTIVE III LAB	
CSE671B	SOFTWARE PROJECT MANAGEMENT LAB
CSE673B	AD HOC AND SENSOR NETWORKS LAB
CSE675B	DATA MINING LAB
CSE677B	CRYPTOGRAPHY AND NETWORK SECURITY LAB
CSE679B	DATA ANALYTICS AND APPLICATIONS LAB

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DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY,
MURTHAL (SONEPAT)
SCHEME OF STUDIES & EXAMINATIONS
M. Tech. 2ND YEAR (SEMESTER - IV) COMPUTER SCIENCE & ENGINEERING
Credit Based Scheme w.e.f. 2014-15

S. No.	Course No.	Course Title	Teaching Schedule		Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	P		Theory	Practical			
1	CSE602B	DISSERTATION	-	20	50	-	100	150	20	3
TOTAL			-	20	50	-	100	150	20	

CSE501B: SOFTWARE VERIFICATION, VALIDATION & TESTING

M.Tech. Semester –I (Computer Science & Engg.)

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

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

1. William Perry, Effective Methods for Software Testing , John Wiley & Sons, New York, 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoc, Testing Computer Software , Second Edition, Van Nostrand Reinhold, New York, 1993.
3. Boris Beizer, Software Testing Techniques , Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4. Louise Tamres, Software Testing , Pearson Education Asia, 2002
5. Roger S. Pressman, Software Engineering – A Practitioner's Approach , Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
6. Boris Beizer, Black-Box Testing – Techniques for Functional Testing of Software and Systems , John Wiley & Sons Inc., New York, 1995.
7. K.K. Aggarwal & Yogesh Singh, Software Engineering , New Age International Publishers, New Delhi, 2003.
8. Marc Roper, Software Testing , McGraw-Hill Book Co., London, 1994.
9. Gordon Schulmeyer, Zero Defect Software , McGraw-Hill, New York, 1990.
10. Watts Humphrey, Managing the Software Process , Addison Wesley Pub. Co. Inc., Massachusetts, 1989.

Note:

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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.)

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

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

Advanced Search Structures for Dictionary ADT: Splay trees, Amortized analysis, 2-3 trees, 2-3-4 trees, Red-black trees, Skip lists, Universal hash functions.

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

1. Mark Allen Weiss, Data Structures and Algorithms in C++, Addison Wesley, 2003.
2. Adam Drozdek, Data Structures and Algorithms in C++, Brooks and Cole, 2001.
3. Aho, Hopcroft and Ullmann, Data structures and Algorithm, Addison Welsey, 1984.
4. A. M. Tenenbaum, Langsam, Moshe J. Augentem, Data Structures using C, PHI Pub.
5. R. B. Patel, Expert Data Structure with C, , 3rd Pub, Khanna Pub. Pvt Ltd.
6. A. V. Aho, J. E. Hopcroft and T. D. Ullman, Data Structures and Algorithms, Original edition, Addison-Wesley, 1999, Low Price Edition.
7. Ellis Horowitz & Sartaj Sahni, Fundamentals of Data Structure , Pub, 1983. AW
8. Horowitz Sahni and Rajasekaran Sanguthevar,Fundamentals of computer algorithms , University press (India) Limited.
9. Robert Kruse, Data Structure and Program design in C , PHI
10. Jean Paul Tremblay, Richard B. Bunt, Introduction to Computer Science- An algorithms approach, 2002, T.M.H.
11. Willam J. Collins, Data Structure and Standard Template Library, 2003, T.M.H

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.)

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

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

Graphs & planar Graphs, Shortest path, Trees & Cut sets, Rooted Trees, Minimum Spanning Trees, and Transport Networks.

Unit 4

Random Variables, Stochastic Processes, Discrete parameter Markov Chains, Limiting state probabilities, State classification, Irreducible Markov Chains, Birth-Death processes.

Text/Reference Books

1. C. L. Liu, Elements of Discrete Mathematics, 1985, McGraw-Hill.
2. Kishore.S.Trivedi, Statistical Models for Computer Science Applications, PHI.
3. Ronald Graham, Donald Knuth and Oren Patashik, Concrete Mathematics: A foundation for Computer Science, 1989, Addison-Wesley.
4. Judith L. Gersting, Mathematical structures for Computer Science, 1993, Computer Science Press.
5. Doerr and Levasseur, Applied discrete structures for Computer Science, (Chicago: 1985, SRA)
6. A. Chetwynd and P. Diggle, Discrete Mathematics, (Modular Mathematics series), 1995, Edward Arnold, London.
7. S. Lipshutz, Schaums Outline series: Theory and Problems of Probability 1982, McGraw-Hill Singapore.
8. B. Kolman and R. c. Busby, Discrete Mathematical Structures, 1996, PHI.
9. Tembley & Manohar, Discrete Mathematical Structures with Applications to Computers, 1995, McGraw-Hill.

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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CSE507B: ADVANCED OPERATING SYSTEMS
M.Tech. Semester –I (Computer Science & Engg.)

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

Unit 1

Review of Operating Systems principles, Synchronization mechanisms, Process deadlocks, Architecture of Distributed Operating system: Motivation, System Architecture types, issues in distributed operating system, Communication primitives.

Unit 2

Inherent limitations of distributed operating systems. Event ordering. Timestamps. Distributed mutual exclusion. Token and non-token based algorithms. Comparative performance analysis.

Unit 3

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

Unit 4

Concurrency control. Shared Memory. File Systems. Agreement protocols for handling processor failures. Coordination of processes and related algorithms, Interprocess Communications, Failure handling and recovery mechanisms.

Text/Reference Books

1. Peterson, J.L. & Silbersehatz, A: Operating System Concepts, Addison, Wesley-Reading. . .
2. Brineh, Hansen: Operating System Principles, Prentice Hall of India.
3. Haberman, A.N: Introduction to Operating System Design Galgotia Publication, New Delhi.
4. Hansen, P.B: Architecture of Concurrent Programs, PHI.
5. Shaw, A.C: Logic Design of Operating Systems, PHI.
6. Mukesh Singhal & N.G. Shivaratri: Advanced concepts in operating systems, TMH 2001.
7. A S Tanenbaum : Modern Operating Systems, PHI.
8. A. Silberschatz, P. Galving, G. Gahne : Applied operating system concepts, 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.

CSE509B: ADVANCED COMPUTER NETWORKS
M.Tech. Semester –I (Computer Science & Engg.)

L	P	Credits			
4	-	4	Class Work	:	25 Marks
			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

Logical Addressing: IPv4 Addresses, IPv6 Addresses – Internet Protocol: Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – Multicasting Techniques and Protocols: Basic Definitions and Techniques, Intradomain Multicast Protocols, Interdomain Multicast Protocols, Node-Level Multicast algorithms – Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transprotocols, TCP Congestion Control – Application Layer: Principles of Network Applications, The web and HTTP, file Transfer: FTP, Electronic Mail in the internet, Domain Name system (DNS), PP File sharing, socket Programming with TCP and UDP Building a Simple Web Server.

UNIT IV

Advanced Routing : Routing architecture , Routing between peers (BGP) , IP switching and Multi-Protocol Label Switching (MPLS), MPLS Architecture and related protocols, Traffic Engineering (TE) and TE with MPLS , NAT and Virtual Private Networks (L2, L3, and Hybrid), CIDR –Introduction , CIDR addressing, CIDR address blocks and Bit masks 8, Mobile IP- characteristics, Mobile IP operation, Security related issues. Mobility in networks. Voice and Video over IP (RTP, RSVP, QoS) IPv6: Why IPv6, basic protocol, extensions and options, support for QoS, security, etc., neighbor discovery, auto-configuration, routing.

Text/Reference Books

1. Behrouz A. Forouzan, "TCP/IP Protocol Suit", TMH, 2000.
2. Tananbaum A. S., "Computer Networks", 3rd Ed., PHI, 1999
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F, Keith W.Ross, Third Edition, Pearson Education, 2007.
4. Computer and Communication Networks, NaderF, Mir, Pearson Education, 2007.
5. Larry L. Peterson, Bruce S ,"Computer Networks: A Systems Approach", 4th edition,Davie Publisher: Elsevier/Morgan Kaufmann, ISBN: 13:978-0-12-370548-8; 10:0-12-370548-7
6. Douglas E. Comer,"Internetworking with TCP/IP Vol –I",5th Edition Publisher:Prentice Hall, 5th edition.

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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CSE521B: SOFTWARE VERIFICATION , VALIDATION & TESTING LAB
M.Tech. Semester –I (Computer Science & Engg.)

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

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.)

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

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			
4	-	4	Class Work	:	25 Marks
			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

Multiprocessor architecture: taxonomy of parallel architectures. Centralized shared-memory architecture: synchronization, memory consistency, interconnection networks. Distributed shared-memory architecture. Cluster computers. Non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures.

Text/Reference Books

1. John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann.
2. John Paul Shen and Mikko H. Lipasti, Modern Processor Design: Fundamentals of Superscalar Processors, Tata McGraw-Hill.
3. M. J. Flynn, Computer Architecture: Pipelined and Parallel Processor Design, Narosa Publishing House.
4. Kai Hwang, Advanced Computer Architecture: Parallelism, Scalability, Programmability, McGraw-Hill.

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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CSE504B: COMPUTATIONAL INTELLIGENCE
M.Tech. Semester –II (Computer Science & Engg.)

L	P	Credits			
4	-	4	Class Work	:	25 Marks
			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

Optimization: Particle Swarm Optimization, Ant Colony Optimization, Artificial Immune Systems, Other Algorithms:Harmony Search, Honey-Bee Optimization, Memetic Algorithms, Co-Evolution, Multi-Objective Optimization, Artificial Life, Simulated Annealing and Tabu Search, Constraint Handling

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: Applcation 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
2. Stephen Marsland, Machine Learning: An Algorithmic Perspective, CRC Press, 2009
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
7. Thomas Weise, Global Optimization Algorithms: Theory and Application, 2009
8. Gusz Eiben and Jim Smith, Introduction to Evolutionary Computing, 2007
9. Andries Engelbrecht, Computational Intelligence: An Introduction, 2007
10. Kenneth DeJong, Evolutionary Computation A Unified Approach, 2006

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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CSE506B: INFORMATION SECURITY AND DATA HIDING
M.Tech. Semester –II (Computer Science & Engg.)

L	P	Credits			
4	-	4	Class Work	:	25 Marks
			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 : Copy right 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
2. Information Hiding: Steganography and Watermarking - Attacks and Countermeasures (Advances in Information Security, Volume 1) Johnson, Neil F. / Duric, Zoran / Jajodia, Sushil G. 2001.
3. Information Hiding: Techniques for Steganography and Digital Watermarking , Katzenbeisser, Stefan / Petitcolas, Fabien A. P. 2000

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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CSE552B: SOFTWARE DESIGN AND CONSTRUCTION
M.Tech. Semester –II (Computer Science & Engg.)

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

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

Software Construction: Basics of object-oriented approach, object-oriented programming and languages, Scope of class members-public, private, protected. Class constructor, destructor, copy constructor, virtual destructor. Derived classes, scope of derivation-public, private, protected. Virtual functions,

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

1. J. Rumbaugh, et.al., Object-Oriented Modeling and Design, Prentice Hall (2004) 2nded.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User, Addison Wesley Professional (2005)
3. James Rumbaugh, Ivar Jacobson, Grady Booch: The Unified Modeling Language Reference Manual, Addison-Wesley, New YorkGrady Booch, Object-Oriented Analysis and Design, Pearson Education (2004) 2nd ed.
4. Roger S. Pressman: Software Engineering, A Practitioner's Approach, McGrawHill International Edition (2009) 7th ed.
5. G. Schneider, Applying Use Cases: A Practical Guide: Addison-Wesley Object Technology Series, Addison-Wesley (2001).
6. Marget A.Eills and Bjame Stroustrup, The Annotated C++ Reference Manual, Addison Wesley (1990).

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.

CSE554B: MOBILE COMPUTING
M.Tech. Semester –II (Computer Science & Engg.)

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

Unit 1

Overview of Ad Hoc Networks: Why Ad Hoc Networks?, Challenges, and benefits of Mobile Computing, Breakthrough Technology, Wireless Computing, Nomadic Computing, Mobile Computing, Pervasive Computing, Invisible Computing, Wearable Computing, Applications of mobile computing, Wireless and Mobile Computing Models, LAN Protocols: IEEE 802.11/a/g/n & Bluetooth, Data Management Issues. Sensor Networks- Challenges, Architecture, and Applications.

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

Mobile Agents: Introduction to Mobile Agents, Mobile agents vs. Client server, Agent migration and design issues, Mobile agent communication, Mobile Agent Security - Security Requirements and Cryptographic Techniques, Taxonomy of Possible Attacks - Malicious Agents, Malicious Agencies, Protecting Mobile Agents - Preventing Attacks on Mobile Agents, Detecting Attacks on Mobile Agents, Protecting Agencies - Agent Authentication and Authorization.

Reference and Text Books

1. Charles E. Perkins, Ad hoc Networks, Addison Wesley, 2008.
2. Mazliza Othman, Principles of mobile computing and communications, Auerbach Publications, 2007.

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.)

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

UNIT I

Fundamentals Of Image Analysis: Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II

Image Enhancement: Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

UNIT III

Image Segmentation And Feature Analysis :Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection –Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction. Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms. Image Compression: Fundamentals – Models – Elements of Information Theory– Error Free Compression – Lossy Compression – Compression Standards.

UNIT IV

Applications of Image Processing :Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Composting – Mosaics – Colour Image Processing..

Text/Reference Books

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing" Second Edition, Pearson Education, 2003.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001
3. Anil K. Jain, "Fundamentals of Digital Image Processing", Person Education, 2003.

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.

CSE558B: ADVANCED DATABASE MANAGEMENT SYSTEM
M.Tech. Semester –II (Computer Science & Engg.)

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

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

1. Thomas Connolly, Carolyn Begg, Database Systems, Dorling Kingsley (2009) 4thed.
2. H. F. Korth and A. Silverschatz, "Database Concepts", Tata McGraw Hill (2003) 3rd ed.
3. Hoffer, Prescott, Mcfadden, Modern Database Management, Pearson education (2008) 3rd ed.
4. Elmasri, Navathe, Fundamentals of Database systems, Addison Wesley (2003) 4thed.
5. C. J. Date, An Introduction to Database Systems, Pearson education (2002) 7th ed.
6. C.S.R. Prabhu, Object-oriented Database Systems, Eastern Economy Edition (2005) 2nd ed.

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.

CSE560B: GREEN COMPUTING
M.Tech. Semester –II (Computer Science & Engg.)

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

UNIT-I

Definition of the term, Origins, Fundamentals, Regulations and industry initiatives-Government, Industry. Approaches to green computing- Middleware Support, Compiler Optimization, Product longevity. Software induced energy consumption, its measurement and rating

UNIT-II

Algorithmic efficiency, High performance computing, Sustainable computing, Resource allocation, Virtualization, Server Consolidation, Technical aspects of software regarding environment awareness like Green Power Indicator.

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

1. Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting by Jason Harris, Emereo Publishing
2.Green Data Center: The steps for the journey by A. Galea, M. Schafer, M. Ebbers, 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
7.Green IT for Sustainable Business Practice: A Foundation Guide by Mark O'Neill, British Informatics Society Limited

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

UNIT I

Wired and wireless networks , Infrastructure of Wireless Networks, Challenges. Overview of wireless networks, categories of wireless networks. Wireless LAN: Infra red Vs radio transmission, Infrastructure and Ad hoc Network, IEEE 802.11, Wi Fi, WiMax, HIPERLAN, Bluetooth,Wireless MAN, Wireless WAN, Wireless PAN , Wireless Mesh Networks (WMNs) , wireless sensor networks Cellular Networks ,Cellular Internet Access, Mobility management in cellular networks

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: characterstics , challenges, applications

Text/Reference Books

1. William Stallings, "Wireless Communications & Networks", Pearson, Second Edition, 2007.
2. Matthew S. Gast, "802.11 Wireless Networks", O'Reilly, Second Edition, 2006.
3. Kaveh Pahlavan, Prashant Krishnamoorthy, Principles of Wireless Networks, - A united approach-Pearson Education, 2002.
   Larry L. Peterson, Bruce Davie ,"Computer Networks: A Systems Approach", 4th edition,Davie Publisher: Elsevier / Morgan Kaufmann, ISBN: 13:978-0 -12-370548-8; 10:0-12-370548-7
4. X.Wang and H.V.Poor, Wireless Communication Systems, Pearson education, 2004.
5. P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis, Wireless Networks, John Wiley & Sons, 2003.
6. Wireless and Mobile Network Architecture by Yi-Bing Lin and Imrich Chlamtac, John Wiley & Sons, 2000.
7. Perrig, Adrian; Tygar J. D., Secure Broadcast Communication in Wired and Wireless Networks, Allied Publishers, 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.

CSE564B: SCALABLE COMPUTING
M.Tech. Semester –II (Computer Science & Engg.)

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

UNIT I

Scalable Computing and Communications: Past, Present, and Future , Reliable Minimum Connected Dominating Sets for Topology Control in Probabilistic Wireless Sensor Networks: Topology Control in Wireless Sensor Networks (WSNs), DS-Based Topology Control, Deterministic WSNs and Probabilistic WSNs, Reliable MCDS Problem, A GA to Construct RMCDS-GA

UNIT II

Peer Selection Schemes in Scalable P2P Video Streaming Systems: Overlay Structures, Peer Selection for Overlay Construction,. Multicore and Many-Core Computing : Architectural Options for Multicore Systems, Multicore Architecture Examples , Programming Multicore Architectures, Many-Core Architectures.

UNIT III

Scalable Computing on Large Heterogeneous CPU/GPU Supercomputers: Heterogeneous Computing Environments , Scalable Programming Patterns for Large GPU Clusters , Hybrid Implementations A Performance Analysis Methodology for MultiCore,Multithreaded Processors: Methodology, Simulation Tool (ST), Analytic Modeling Technique, Testing. The Future in Mobile Multicore Computing : Hardware Initiatives, Software Initiatives

UNIT IV

Modeling and Algorithms for Scalable and Energy-Effi cient Execution on Multicore Systems : Model-Based Hybrid Message-Passing Interface (MPI)/OpenMP Power-Aware Computing , Power-Aware MPI Task Aggregation Prediction Cost Optimization for Scalable Communication in Wireless Networks with Movement-Based Location Management: Cost Measure and Optimization for a Single User, Cost Optimization with Location Update Constraint, Cost Optimization with Terminal Paging Constraint Fault Tolerance and Transmission Reliability in Wireless Networks: Reliability Issues in Wireless and Sensor Networks, Reliability and Fault Tolerance of Coverage Models for Sensor Networks, Fault-Tolerant k-Fold Pivot Routing in Wireless Sensor Networks, Impact of Variable Transmission Range in All-Wireless Networks

Text/Reference Books

1.Samee U. Khan, Albert Y. Zomaya, Lizhe Wang, " Scalable Computing and Communications: Theory and Practice", January 2013, Wiley-IEEE Computer Society Press, ISBN: 978-1-1181-6265-1, US $144.95

2. S. Mendelson and A. J. Smola, editors. Machine Learning, Proceedings of the Summer School 2002, Australian National University, volume 2600 of Lecture Notes in Computer Science. Springer, 2003.

3. Handbook of Research on Scalable Computing Technologies Kuan-Ching Li (Providence University, Taiwan), Ching-Hsien Hsu (Chung Hua University, Taiwan), Laurence Tianruo 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			
4	-	4	Class Work	:	25 Marks
			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

Defining the business requirements, Dimensional Analysis, Requirements gathering methods, Requirements Definition, Data Design, Architectural Plan, Data Storage Specifications, information delivery strategy, Infrastructure Supporting Architecture, Hardware and Operating Systems,Database Software, Collection Physical Design Steps.

UNIT-IV

Principles of Dimensional Modeling, From Requirements to Data Design,The STAR Schema,STAR Schema Keys, Advantages of the STAR Schema, STAR Schema: Examples, Updates to the Dimension Tables,Miscellaneous Dimensions,The Snowflake Schema,Aggregate Fact Tables,Families of STARS.Physical Design Considerations. Physical Storage. Indexing the Data Warehouse. Performance Enhancement Techniques of Tools, Data Warehouse Appliances.

Text/Reference Books

1. Data Warehousing Fundamentals for IT Professionals, 2nd Edition By:Paulraj Ponniah ISBN: 978-0-470-46207-2 Publisher :Wiley
2. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals By:Paulraj Ponniah ISBN: 978-0-471-46389-4 Publisher: Wiley
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.

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE504B **COMPUTATIONAL INTELLIGENCE**

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE552B SOFTWARE DESIGN AND CONSTRUCTION

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE554B MOBILE COMPUTING

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE556B DIGITAL IMAGE ANALYSIS

CSE578B: ADVANCED DATABASE MANAGEMENT SYSTEMS LAB
M.Tech. Semester –II (Computer Science & Engg.)

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE558B **ADVANCED DATABASE MANAGEMENT SYSTEMS**

HUM602B: TECHNICAL COMMUNICATION FOR RESEARCH
M.Tech. Semester –III (Computer Science & Engg.)

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

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

1. Anderson, Marilyn, Pramod K Nayar and Madhucchandra Sen. Critical Thinking, Academic Writing and Presentation Skills. Pearson Education and Mahatma Gandhi University, 2010
2. Mitra, Barun K. Effective Technical Communication: A Guide for Scientists and Engineers. Delhi: OUP, 2006
3. Wallwork, Adrian. English for Writing Research Papers. London: Springer, 2011
4. McMurrey, David A. And Joanne Buckley. Handbook for Technical Writing. New Delhi: Cengage Learning, 2008

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.

CSE651B: SOFTWARE PROJECT MANAGEMENT
M.Tech. Semester –III (Computer Science & Engg.)

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

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

Schedule estimation: GANTT Charts, Activity networks, PERT/CPM networks.Cost estimation: COCOMO I, COCOMO II models. Measurement and Tracking Planning: Earned Value Analysis.

UNIT-III

Quality Planning: Quality control, Quality assurance, Formal Technical Reviews, The SQA Plan, ISO and CMM standards. Project Monitoring and Control: Audits and Reviews.
Risk Management: Reactive vs. proactive Risk strategies, Risk projection, Risk Refinement, Risk Monitoring, Monitoring and management, RMMM plan.

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

1. Pankaj Jalote, Software Project Management in Practice, Pearson Education Asia (2002).
2. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw Hill Publishing Company Ltd., New Delhi (2006) 3rd ed.
3. Software Project Management By Walker Royce, Addison Wesley
4. Tom Demarco, Controlling Software Project Management, Measurement, Prentice Hall, New Jersey (1982).
5. Watts S. Humphrey, Winning with Software An Executive Strategy, Pearson Education Asia (1998).
6. Philip Metzger, Managing A Programming Project, Prentice Hall, New Jersey (1983).
7. Tom Glib, Finzi Susannah, Principles of Software Engineering Management, Addison Wesley, England (2000).

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.

CSE653B: AD-HOC AND SENSOR NETWORKS
M.Tech. Semester –III (Computer Science & Engg.)

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

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

Issues in designing MAC protocols for ad-hoc wireless networks, design goals, classification of MAC protocols, MAC protocolls for sensor network, location discovery, contention-based protocols, schedule-based protocols S-MAC, IEEE 802.15.4. Security in Mobile Ad-hoc Networks: Vulnerabilities of Mobile Ad-hoc Networks, Potential Attacks, Attack Prevention Techniques. Intrusion detection techniques.

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

1. C. Siva Ram Murthy, and B. S. Manoj, Ad-hoc Wireless networks , Pearson Education - 2008.
2. Feng Zhao and Leonides Guibas, Wireless sensor networks , Elsevier publication - 2004
3.Ad Hoc & Sensor Networks: Theory and Applications, World Scientific Publishing Company, 2006.
4. Protocols & Architectures for Wireless Sensor Networks, Wiley, 2005
5. William Stallings, Wireless Communications and Networks , Pearson Education – 2004
6. Charles E. Perkins, Ad Hoc Networking, Pearson, ISBN:9788131720967
7. Azzedine Boukerche, Handbook of Algorithms for Wireless Networking and Mobile Computing, Chap-man & Hall/CRC, 2006
8. Mohammad Ilyas and Imad Mahgoub, Handbook of Sensor Networks: Compact Wireless and Wired sensing systems, CRC Press, 2005.
9. Anna Hac, Wireless Sensor Network Designs, John Wiley & Sons Ltd., 2003.
Nirupama Bulusu and Sanjay Jha, Wireless Sensor Networks : A systems perspective, Artech House, August 2005.
10. Jr., Edgar H. Callaway, Wireless Sensor Networks : Architecture and Protocols, Auerbach, 2003.

11.C.S. Raghavendra, Krishna M. Sivalingam and Taieb Znati, Wireless Sensor Networks, Springer, 2005
12. Jagannathan Sarangapani, Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control, CRC Press, 2007.

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.)

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

UNIT-I

Introduction: Models, methodologies, and processes. The KDD process. Generic tasks . Broad themes (search, induction, querying, approximation, and compression). Application areas. The good, bad, and ugly of data mining practice: data dredging, data fishing, and data scrubbing. Discrete Structures: Itemset mining. Concept lattices. Borders and levelwise theories.Condensed representations. Frequent pattern mining. Redescription mining. Graphs and other structures. Combinatorial tiles. Customized data structures for speeding up data mining algorithms.

UNIT-II

Attribute-Value Learning Techniques: Decision trees. Decision lists. Classification and regression trees. Association rules. Correlations. Rule-based mining. Sequential versus simultaneous paradigms. Relational Mining Techniques: Inductive logic programming. Main approaches to ILP,Rule induction, beam search, logical decision trees, clausal discovery. Inverse resolution, relative least general generalization. Propositionalization techniques. Operators for efficient search of relational spaces. Learning from interpretations. Comparative merits of attributevalue and relational mining techniques. Domain theories and incorporating prior background knowledge.

UNIT-III

Probabilistic Techniques: Conditional independence and its modelling. Inference and representational complexity. Bayesian networks. Connections between probabilistic (generative) and enumerative data mining paradigms. Probabilistic models for query approximation. Sequences and order: Total and partial orders. Episodes and event streams. Frequent episode mining. Order-theoretic methods. Modelling sequential data.

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.

CSE657B: CRYPTOGRAPHY AND NETWORK SECURITY
M.Tech. Semester –III (Computer Science & Engg.)

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

UNIT - I

INTRODUCTION:OSI Security Architecture - Classical Encryption techniques - Cipher Principles - Data Encryption Standard - Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES - AES Cipher - Triple DES - Placement of Encryption Function - Traffic Confidentiality

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

AUTHENTICATION AND HASH FUNCTION: Authentication requirements - Authentication functions - Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs - MD5 message Digest algorithm - Secure Hash Algorithm - RIPEMD - HMAC Digital Signatures - Authentication Protocols - Digital Signature Standard

UNIT - IV

NETWORK SECURITY: Authentication Applications: Kerberos - X.509 Authentication Service - Electronic Mail Security - PGP - S/ MIME - IP Security - Web Security.
SYSTEM LEVEL SECURITY: Intrusion detection - password management - Viruses and related Threats - Virus Counter measures - Firewall Design Principles - Trusted Systems.

Text/Reference Books

1. William Stallings, "Cryptography And Network Security - Principles and Practices", Prentice Hall of India, Third Edition, 2003.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
4. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.

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.)

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

UNIT-I

Statistical Analysis of Data, Individual Differences, Descriptive Statistics, Frequency Distributions, Histograms, Histograms, Shapes of Distributions, Measures of Central Tendency Computing the Mean, Measuring Variability, Measures of Relationship, Regression, Reliability Indices, Standard Scores (Z-scores),Inferential Statistics, Populations and Samples

UNIT-II

The Null Hypothesis, Chi-Square and T-Test, Statistical Decisions, Statistical Decision Process, Testing for Mean Differences, Power of a Statistical Test, Statistical versus Practical Significance, Effect Size, Meta-Analysis.

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

3.Gelman, Andrew, and Jennifer Hill. *Data Analysis Using Regression and Multilevel/Hierarchical Models.* 1st ed. Cambridge, UK: Cambridge University Press, 2006. ISBN: 9780521867061.

4.Gelman, Andrew, John B. Carlin, Hal S. Stern, and Donald B. Rubin. *Bayesian Data Analysis.* 2nd ed. New York, NY: Chapman & Hall, 2003. ISBN: 9781584883883

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.)

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

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

1. Software Metrics: A rigorous and Practical Approach by Norman E. Fenton and Shari Lawrence Pfleeger, International Thomson Computer Press (1997) 2nd ed.
2. Applied Software Measurement by Capers Jones, McGraw Hill (2008).
3. Object-Oriented Software Metrics by Mark Lorenz, Jeff Kidd, Prentice Hall (1994).
4. Practical Software Metrics For Project Management And Process Improvement by Robert B Grady, Hewlett Packard Professional Books (2004) 1st ed.
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.

CSE663B: DISTRIBUTED DATA ARCHITECTURE AND MANAGEMENT
M.Tech. Semester –III (Computer Science & Engg.)

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

UNIT-I

Introduction Features of Distributed databases, Features of Centralizeddatabases, Level of Distributed Transparency, Reference Architecture, Types of Data Fragmentation, Distribution Transparency, access primitives, integrity constraints Distributed Database Design A framework for Distributed Database Design, Design of Database Fragmentation, Allocation of fragments

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

Management Of Distributed Transactions Framework for Transaction Management, Atomicity of Distributed Transactions, Concurrence Control for Centralized Database. Concurrency Concurrency Control for Distributed databases, Foundations, Locking Protocols, Deadlocks,Timestamps.

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

1.Ceri. S. Pelagatti G, "Distributed Databases : Principles and Systems", 1985, MCG
2. Ozsu, " Principles of Distributed Database Systems" , 1e, 2002, PEA.

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

UNIT I

Essentials of computer security - Sources of security threats – Intruders, Viruses, Worms and related threats - Threat identification - Threat analysis - Vulnerability identification and Assessment - Components of Computer Security - Physical security – System access control - Goals of Security - Efforts to secure computer networks – Ethical issues in Computer Security- Operational issues, Human issues.

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

Vulnerabilities – Sources of vulnerabilities, Vulnerability identification and Assessment, Cyber crime and Hackers, Viruses and content filtering - Security Assessment, Analysis and Assurance – Computer network security protocol and standards - Security Policies – Integrity policies – confidentiality policies - Security models - Access Control Matrix Model, Take-Grant Protection Model.

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

1. Matt Bishop, “Computer Security: Art and Science”, Addison-Wesley Professional, 2003.
2. Joseph M.Kizza, “Computer Network security”, Springer, 2005
3. Matt Bishop, “Introduction to Computer Security”, Addison-Wesley Professional, 2005.
4. Thomas R.Peltier, “Information Security Risk Analysis”, CRC Press, 2001.
5. C.A.Roper, “Risk management for Security professional”, Elsevier, 1999.

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

UNIT-I

Introduction to Forensics and Cyber Crime: Fundamentals of computer, Internet Technology, E-Governance & E - Business ,Crime - Introduction, crime, criminology, origin, source, recent trends. Emergence of information based society, economic, administration, social, dependence of use of information, accession, threats, civil society and global society
Fundamentals: Overview of computer forensics and Investigative Techniques, Computer forensic tools, activities of forensic investigations and testing methodology,

UNIT-II

Types and Categories of Cyber Crime Categories of cyber crime: Personal, Business, Financial, Office Security, Cyber Crime – Complete transparency, hacking/cracking, denial of service, IP piracy, phrasing, hetaerism etc. Cyber attack – cyber attackers
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

Cyber Security: The concept of cyber security – meaning – scope and the frame work – basic structure – development – and – management, Rules, Regulations, Act, Legislation - Meaning, Scope, Difference between Rules

UNIT-IV

Need for a Cyber Act: The Indian Context – Need for a Cyber Act - Information Technology Act – Scope and further Development – Information Technology Act (Amendment) - coverage of Cyber Security and Cyber Crime Indian cyber Laws vs. cyber laws of U.S.A – similarities – scope and coverage – Effectiveness

Text/Reference Books

1. Cyber crime: Bernadette H. Schell and Clemens Martin - ABC-CLIO, Inc.
2. Scene of the Cybercrime: Computer Forensics Handbook by Debra Littlejohn Shinder. – Syngress Shinder Books
3. Understanding Cryptography: A Textbook for Students and Practitioners :Christof paar, Jan Pelzl.
4. Computer Forensics: Investigating Network Intrusions and Cyber Crime (Ec Council Press Series: Computer Forensics)
5. Cyber Forensics: Understanding Information Security Investigations (Springer's Forensic Laboratory Science Series) by Jennifer Bayuk

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.)

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE651B **SOFTWARE PROJECT MANAGEMENT**

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE653B **AD HOC AND SENSOR NETWORKS**

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE655B DATA MINING

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

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE657B **CRYPTOGRAPHY AND NETWORK SECURITY**

CSE679B DATA ANALYTICS AND APPLICATIONS LAB
M.Tech. Semester –III (Computer Science & Engg.)

L	P	Credits			
	3	1.5	Class Work	:	20 Marks
			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 CSE659B **DATA ANALYTICS AND APPLICATIONS.**

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

L	P	Credits	
-	6	6	Class Work : 100 Marks

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).

CSE635B SEMINAR

M.Tech. Semester –III (Computer Science & Engineering)

L	P	Credits	Class Work : 50 Marks
-	2	2	

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 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.

CSE602B DISSERTATION

M.Tech. Semester –IV (Computer Science & Engineering)

L	P	Credits		
-	20	20	**Class Work**	**: 50 Marks**
			Examination	**: 100 Marks**
			Total	**: 150 Marks**
			Duration of Examination	**: 3 Hours**

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
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.