ANNA UNIVERSITY TIRUCHIRAPPALLI
Tiruchirappalli – 620 024
Regulations 2008
Curriculum

M.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTER I

S .No.	Subject code	Subject	L	T	P	C
		Theory				
1	**MA5133**	Mathematical Foundations of Computer Science	3	1	0	4
2	**CS5101**	Computer Architecture	3	1	0	4
3	**CS5102**	Data Structures and Algorithms	3	0	0	3
4	**CS5103**	Operating Systems	3	0	0	3
5	**CS5104**	Software Engineering Methodologies	3	1	0	4
		Practical				
6	**CS5105**	Data Structures Laboratory	0	0	3	2
7	**CS5106**	Operating System Laboratory	0	0	3	2
					Total	**22**

SEMESTER II

S .No.	Subject code	Subject	L	T	P	C
		Theory				
1	**CS 5151**	Data Base Technology	3	0	0	3
2	**CS5152**	Computer Networks	3	0	0	3
3	**CS5153**	Compiler Design	3	1	0	4
4	**CS5154**	Object Oriented System Design	3	0	0	3
5	**CS5155**	Web Technology	3	0	0	3
6	**E1******	Elective I	3	0	0	3
		Practical				
7	**CS5156**	Networking Laboratory	0	0	3	2
8	**CS5157**	Database & Web Technology Laboratory	0	0	3	2
					Total	**23**

SEMESTER III

S. No.	Subject code	Subject	L	T	P	C
		Theory				
1	**E2******	Elective II	3	0	0	3
2	**E3******	Elective III	3	0	0	3
3	**E4******	Elective IV	3	0	0	3
		Practical				
4	**CS5251**	Project Work Phase I	0	0	12	6
					Total	**15**

SEMESTER IV

S. No.	Subject code	Subject	L	T	P	C
		Practical				
1	**CS5251**	Project Work Phase II	0	0	24	12
					Total	**12**

Total Credits to be Earned for the Award of the Degree = 72

LIST OF ELECTIVES

S. No.	Subject code	Subject	L	T	P	C
		Theory				
1	**CS5001**	Theory of Computation	3	0	0	3
2	**CS5002**	Soft Computing	3	0	0	3
3	**CS5003**	Mobile Computing	3	0	0	3
4	**CS5004**	Distributed Computing	3	0	0	3
5	**CS5005**	Multimedia Systems	3	0	0	3
6	**CS5006**	XML and Web Services	3	0	0	3
7	**CS5007**	Bio Informatics	3	0	0	3
8	**CS5008**	Grid Computing	3	0	0	3
9	**CS5009**	Network Security	3	0	0	3
10	**CS5010**	Embedded Systems	3	0	0	3
11	**CS5011**	Digital Imaging	3	0	0	3
12	**CS5012**	Software Quality Assurance	3	0	0	3
13	**CS5013**	Ad hoc Networks	3	0	0	3
14	**CS5014**	Data Warehousing and Data Mining	3	0	0	3
15	**CS5015**	Performance Evaluation of Computer Systems and Networks	3	0	0	3
16	**CS5016**	Agent Based Intelligent Systems	3	0	0	3
17	**CS5017**	Visualization Techniques	3	0	0	3
18	**CS5018**	Advanced Databases	3	0	0	3
19	**CS5019**	Software Project Management	3	0	0	3
20	**CS5020**	Component Based Technology	3	0	0	3

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Sylllabus

M.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTER I

MA5133 – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

	L	T	P	C
	3	1	0	4

UNIT I   FUNDAMENTAL STRUCTURES   9

Set Theory – Relationships between Sets – Operations on Sets – Set Identities – Principle of Inclusion and Exclusion – Minsets – Relations – Binary Relations – Partial Orderings – Equivalence Relations – Functions – Properties of Functions – Composition of Functions – Inverse Functions – Permutation Functions.

UNIT II   LOGIC   9

Propositional Logic – Logical Connectives – Truth Tables – Normal Forms (conjunctive and disjunctive) – Predicate logic – Universal and Existential Quantifiers – Proof Techniques – Direct and Indirect – Proof by Contradiction – Mathematical Induction.

UNIT III   COMBINATORICS   9

Basics of Counting – Counting Arguments – Pigeonhole Principle – Permutations and Combinations – Recursion and Recurrence Relations – Generating Functions.

UNIT IV   MODELING COMPUTATION AND LANGUAGES   9

Finite State Machines – Deterministic and Non– Deterministic Finite State Machines – Turing Machines – Formal Languages – Classes of Grammars – Type 0 – Context Sensitive – Context – Free – Regular Grammars – Ambiguity

UNIT.V   DISCRETE   9

Finite Probability – Probability Distributions – Conditional Probability – Independence – Bayes' Theorem – Mathematical Expectation.

L: 45 T: 15 Total: 60

TEXTBOOK

1. Judith L. Gersting, "Mathematical Structures for Computer Science", 5thEdition, W.H. Freeman and Company, 2003.

REFERENCES

1. J. P. Tremblay and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH, 1997.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 5th Edition, TMH, 2003.
3. R.P. Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Edition, 2002.
4. M.K. Venkataraman, N. Sridharan and N. Chandrasekaran, "Discrete Mathematics", The National Publishing Company, 2003.

CS5101 – COMPUTER ARCHITECTURE

	L	T	P	C
	3	1	0	4

UNIT I   FUNDAMENTALS OF COMPUTER DESIGN   9

Measuring and Reporting Performance – Quantitative Principles of Computer Design – Classifying Instruction set Architecture – Memory Addressing – Addressing Modes – Type and Size of Operands – Operations in the Instruction Set – Operands and Operations for Media and Signal Processing – Instructions for Control Flow – Encoding an Instruction Set – Example Architecture – MIPS and TM32.

UNIT II   INSTRUCTION LEVEL PARALLELISM   9

Pipelining and Hazards – Concepts of ILP – Dynamic Scheduling – Dynamic Hardware Prediction – Multiple Issues – Hardware based Speculation – Limitations of ILP – Case Studies – lP6 Micro Architecture

UNIT III   INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROAC   9

Compiler Techniques for Exposing ILP – Static Branch Prediction – Static Multiple Issue.   VLIW – Advanced Compiler Support – Hardware Support for Exposing Parallelism – Hardware Vs Software Speculation. Mechanism – IA 64 and Itanium Processor.

UNIT IV   MEMORY AND I/O   9

Cache Performance – Reducing Cache Miss Penalty and Miss Rate – Reducing Hit Time – Main Memory and Performance – Memory Technology – Types of Storage Devices – Buses – RAID – Reliability– Availability and Dependability – I/O Performance Measures – Designing I/O System.

UNIT V   MULTIPROCESSORS AND THREAD LEVEL PARALLELISM   9

Symmetric and Distributed Shared Memory Architectures – Performance Issues – Synchronization – Models of Memory Consistency – Multithreading.

L: 45 T: 15 Total: 60

TEXTBOOK

1.   John L. Hennessey and David A. Patterson, "Computer Architecture A Quantitative Approach", 3rd Edition, Morgan Kaufmann, 2003.

REFERENCES

1.   D. Sima- T. Fountain and P. Kacsuk, "Advanced Computer Architectures A Design Space Approach", Addison Wesley, 2000.
2.   Kai Hwang, "Advanced Computer Architecture Parallelism Scalability Programmability", Tata Mcgraw Hill, 2001.
3.   Vincent P. Heuring, Harry F. Jordan, "Computer System Design and Architecture", 2nd Edition, Addison Wesley, 2004.

CS5102 – DATA STRUCTURES AND ALGORITHMS

	L	T	P	C
	3	0	0	3

UNIT I   FUNDAMENTALS   8

Basic Concepts of OOPs – Templates – Algorithm Analysis – ADT – List (Singly– Doubly and Circular) Implementation – Array – Pointer – Cursor Implementation

UNIT II   BASIC DATA STRUCTURES   11

Stacks and Queues – ADT– Implementation and Applications – Trees – General– Binary – Binary Search – Expression Search – AVL – Splay – B Trees – Implementations – Tree Traversals.

UNIT III   ANVANCED DATA STRUCTURES   10

Set – Implementation – Basic Operations on Set – Priority Queue – Implementation – Graphs – Directed Graphs – Shortest Path Problem – Undirected Graph – Spanning Trees – Graph Traversals.

UNIT IV   MEMORY MANAGEMENT   7

Issues – Managing Equal Sized Blocks – Garbage Collection Algorithms for Equal Sized Blocks – Storage Allocation for Objects with Mixed Sizes – Buddy Systems – Storage Compaction.

UNIT V   SEARCHING - SORTING AND DESIGN TECHNIQUES   9

Searching Techniques – Sorting – Internal Sorting – Bubble Sort – Insertion Sort – Quick Sort – Heap Sort – Bin Sort – Radix Sort – External Sorting – Merge Sort – Multiway Merge Sort – Polyphase Sorting – Design Techniques – Divide and Conquer – Dynamic Programming – Greedy Algorithm – Backtracking – Local Search Algorithms.

Total: 45

TEXT BOOKS
1.   Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2002.
2.   Aho Hopcroft Ullman, "Data Structures and Algorithms", Pearson   Education, 2002.

REFERENCES
1.   Horowitz Sahni , Rajasekaran, "Computer Algorithms", Galgotia, 2000.
2.   Tanenbaum A.S, Langram Y, Augestien M.J., "Data Structures using C & C++", Prentice Hall of India, 2002.

CS5103 – OPERATING SYSTEMS

	L	T	P	C
	3	0	0	3

UNIT I   FUNDAMENTALS   7

Main frame Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Hand held Systems – Operating Systems Structures: System Components – Operating System Services – System Calls – System Programs – System Design and Implementation – CPU scheduling Basic Concepts – Scheduling Algorithms.

UNIT II   PROCESS MANAGEMENT   11

Process Concepts – Process Scheduling – Operation on Process – Co operating process – Inter Process Communication – Threads – Multithreading Models – Process Synchronization – The Critical Section Problem – Synchronization Hardware – Semaphores – Classical problem of Synchronization – Monitors – Deadlock – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

UNIT III   MEMORY MANAGEMENT   9

Background – Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory – Demand Paging – Page Replacement – Thrashing.

UNIT IV   FILE SYSTEMS   9

File Concepts – Access methods – Directory Structure – File Protection – File System Implementation – File System Structure and Implementation – Directory Implementation – Allocation methods Free Space Management – Recovery – Disk Structure – Disk Scheduling.

UNIT V   DISTRIBUTED OPERATING SYSTEM   9

Design Issues in Distributed Operating System – Distributed File Systems – Naming and Transparency – Remote File Access – Stateful versus Stateless service – Distributed Coordination – Event Ordering–Mutual Exclusion – Atomicity– Concurrency Control – Deadlock Handling – Election Algorithms – Case Study – Linux.

Total: 45

TEXT BOOKS

1.   Silberschatz Galvin Gagne, "Operating System Concepts", 6th Edition, TMH, 2003.
2.   Pradeep K. Sinha, "Distributed OS concepts and Design", IEEE computer Society Press, PHI,1998.

REFERENCES

1.   Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, PHI, 2001.
2.   Achut S. Godbole and Kahate Atul, "Operating Systems & Systems Programming", Tata Mcgraw Hill, 2003.
3.   Charles Crowley, "Operating Systems A Design Oriented Approach", Tata McGraw Hill, 1999.

CS5104 – SOFTWARE ENGINEERING METHODOLOGIES

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L  T  P  C
3  1  0  4
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UNIT I   FUNDAMENTALS   11
A Generic View of Processes – Process Maturity – Process Models – Agile Process and Models – Software Cost Estimation – Risk Analysis – Software Project Planning & Scheduling.

UNIT II   REQUIREMENT ANALYSIS   6
System Engineering Hierarchy – Requirement Engineering Tasks – Initiating the Process – Eliciting Requirements – Developing Use Cases – Negotiating Requirements – Validating Requirements – Building the Analysis Models Concepts – Object Oriented Analysis – Scenario Based Modeling – Data & Control Flow Oriented Model – Class Based Model – Behavioral Model.

UNIT III   SOFTWARE DESIGN   8
Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Class Based and Conventional Components Design – Real time System Design – User Interface Analysis and Design.

UNIT IV   SOFTWARE TESTING   7
Software Testing – Strategies – Issues – Test Strategies for Conventional and Object Oriented Software – Validation and System Testing – Testing Tactics – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing – Object Oriented Testing – Testing GUI – Testing Client/Server – Test Documentation.

UNIT V   SOFTWARE QUALITY ASSURANCE   13
Software Quality Concepts – Quality Assurance – Software Technical Reviews – Formal Approach to Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan – Software Maintenance – Software Configuration Management –Reverse Engineering & Reengineering – Use of CASE Tools

L: 45: T: 15: Total: 60

TEXT BOOKS
1.   Roger S. Pressman,"Software Engineering a Practitioner's Approach", 6th Edition, McGraw Hill, 2005.
2.   I. Sommerville, "Software Engineering", 5th Edition, Addison Wesley, 1996.

REFERENCES
1.   Pankaj Jalote, "An Integrated Approach to Software Engineering", Springer Verlag, 1997.
2.   James F Peters and Witold Pedryez, "Software Engineering an Engineering Approach", John Wiley and Sons, 2000.
3.   Fairely, "Software Engineering Concepts", McGraw Hill, 1995.

CS5105 – DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	2

1. Implementation of Singly – Doubly and Circular linked list.
2. Implementation of Multistack in a Single Array.
3. Implementation of Circular Queue.
4. Implementation of Binary Search trees.
5. Implementation of Hash table.
6. Implementation of Heaps.
7. Implementation of AVL Rotations.
8. Implementation of Breadth First Search Techniques.
9. Implementation of Depth First Search Techniques.
10. Implementation of Prim's Algorithm.
11. Implementation of Dijkstra's Algorithm.
12. Implementation of Kruskal's Algorithm.
13. Implementation of Searching Techniques.
14. Implementation of Sorting Techniques.

CS5106 – OPERATING SYSTEM LABORATORY

L	T	P	C
0	0	3	2

1. Implement the following CPU Scheduling Algorithms.
   - i) FCFS
   - ii) Round Robin
   - iii) Shortest Job First.

2. Implement the Mutual Exclusion Problem Using Dekker's Algorithm.
3. Implement Inter Process Communication Problem (Producer–Consumer / Reader– Writer Problem) Using Semaphores.
4. Implement Best fit– First Fit Algorithm for Memory Management.
5. Implement Memory Allocation with Pages.
6. Implement FIFO page Replacement Algorithm.
7. Implement LRU page Replacement Algorithm.
8. Implement the creation of Shared memory Segment.
9. Implement File Locking.
10. Implement Banker's algorithm.

SEMESTER II

CS5151 – DATA BASE TECHNOLOGY

L T P C
3 0 0 3

UNIT I DATA BASE SYSTEM CONCEPT 10
File Systems – Database Systems – Database Systems Architecture – Data Models – Relational Model – Hierarchical Model – Network Model – Entity–Relationship Model – Data Dictionary – Database Administration and Control.

UNIT II RELATIONAL DATABASES 9
Codd's Rules – Base tables – Views – Domains and Key Concept – Integrity Rules – Relational Algebra – Relational Calculus – Commercial Query Languages – Embedded SQL – Normalization and Database Design.

UNIT III DATABASE SYSTEM DESIGN 8
File and Storage Structures – Indexing and Hashing – Query processing – Database Recovery – Concurrency Control – Transaction Processing – Security and Integrity – Triggers.

UNIT IV DISTRIBUTED DATABASES 9
Centralized versus Distributed databases – Fragmentation – Distributed database architecture – Client / Server databases – Distributed transactions – Locking and Commit protocols – Distributed concurrency Control – Security and reliability – Parallel databases.

UNIT V ADVANCED DATABASES 9
The World Wide Web – Object Oriented Database – Object Relational Database – XML – XML/QL – Data Analysis and OLAP – Data mining – Data warehousing.

Total: 45

TEXT BOOKS
1. Abraham Silberschatz, Henry F. Korth, S. Sudharsan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 3rd Edition, Addison Wesley, 2004.

REFERENCES
1. Jim Buyens, "Step by Step Web Database Development", PHI, 2001.
2. Stefano Ceri & Giuesppe Pelagatti, "Distributed Databases Principles and Systems", McGraw Hill Book Company– 1987.
3. C.J. Date- "An Introduction to Database system"- Pearson Education- 7th Edition- 2003.

CS5152 – COMPUTER NETWORKS

	L	T	P	C
	3	1	0	4

UNIT I   NETWORK ARCHITECTURE   9

Layering and Protocols – OSI Architecture – Internet Architecture – Link and Medium Access Protocols – Framing – Error Detection – Reliable Transmission – IEEE 802 Standards – Ethernet – Token Rings – Wireless – Network Adapters.

UNIT II   NETWORK LAYER   9

Circuit Switching – Packet Switching – Switching and Forwarding – Bridges and LAN Switches – Cell Switching – Inter networking – Routing – Global Internet – Multicast.

UNIT III   TRANSPORT LAYER   9

UDP – TCP – Remote Procedure Call – Performance – Congestion Control and Resource Allocation – TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service   Bandwidth – Delay – Jitter.

UNIT IV   NETWORK SECURITY AND APPLICATION   9

Cryptographic Algorithms – DES – RSA – MD5 – Security Mechanisms – Fire Walls – Name Service – Traditional Applications – SMTP – HTTP – Multimedia Application – RTP – RTCP – SCTP .

UNIT V   NETWORK MANAGEMENT   9

Introduction – Network Monitoring – Network Control – SNMPV1 – Network Management Concepts – Information – Standard MIBS.

L: 45 T: 15 Total: 60

TEXTBOOKS

1.   Larry L. Peterson and Brule S. Davie, "Computer Networks A System Approach" ,2nd Edition, MarGankangmann, Harcourt Asia, 2002 (Unit I, II, III & IV)
2.   William Stallings, "SNMP, SNMP V2, SNMP V3, RMON 1 and 2", 3rd Edition. Addison Wesley, 6th Indian reprint 2002. (Unit V)

REFERENCES

1.   J.F Kurose and K.W. Ross, "Computer Networking A top down approach featuring the internet", Addison Wesley, 2001.
2.   William Stallings,   "Data & Computer Communication", 6th Edition, Pearson Education, 2002.
3.   Mani Subramanian, "Network Management Principles and Practice", Addison Wesley, 2000.

	L	T	P	C
	3	0	0	3

UNIT I   FUNDAMENTALS   9
Basic Concepts – Grammar – Language – Parts of a Compiler – Grouping of Phases – Compiler Construction Tools.

UNIT II   LEXICAL ANALYZER   9
Role of a Lexical Analyzer – Input Buffering – Specification and Recognition of Tokens – Finite Automata – Regular Expression to Finite Automation – Optimization of DFA based Pattern Matchers –Use of a Tool for Generating Lexical Analyzer.

UNIT III   SYNTAX ANALYZER   9
Role of a Parser – Context Free Grammars – Top Down Parsing – Bottom Up Parsing – Use of a Tool to Generate Parsers.

UNIT IV   INTERMEDIATE CODE GENERATION   9
Intermediate Languages – Declaration – Assignment Statements – Boolean Expressions – Flow Control Statements – Back Patching.

UNIT V   CODE GENERATION   9
Introduction to Optimization Techniques – Issues in the Design of a Code Generator – Run Time Storage Management – Design of a Simple Code Generator.

Total: 45

TEXT BOOK
1.   A.V. Aho, Ravi Sethi, J.D. Ullman, "Compilers, Principles, Techniques and Tools", Addison Wesley, 1988.

REFERENCES
1.   Fischer Leblanc, Benjamin Cummings, "Crafting Compiler ", Menlo Park, 1988.
2.   Kennath C.Louden, "Compiler Construction Principles and Practice", Vikas publishing House, 2003.
3.   Allen I. Holub, "Compiler Design in C", Prentice Hall of India, 2001.

CS5154 – OBJECT ORIENTED SYSTEM DESIGN

L	**T**	**P**	**C**
3	**0**	**0**	**3**

UNIT I   OBJECT ORIENTED DESIGN FUNDAMENTALS   9

The Object Model – Classes and Objects – Complexity of Software – Classification – Notation – Process – Pragmatics – Binary and Entity Relationship – Object Types – Object State – OOSD Life Cycle.

UNIT II   OBJECT ORIENTED METHODOLOGIES AND UML   9

Object Oriented Methodology Rumbaugh – Booch – Jacobson – Shaler/Mellor – Coad/Yardon – Patterns – Frame Works – The Unified Approach – UML.

UNIT III   OBJECT ORIENTED ANALYSIS   9

Identify Use Cases – Use Case Model – Documentation – Classification – Identifying Classes – Noun Phrases Approach – Common Class Pattern Approach – Use Case Driven Approach – Identifying Object Relationship– Attributes and Models.

UNIT IV   OBJECT ORIENTED DESIGN   9

Design Process – Design Axioms – Designing Classes – Access Layer Design – View Layer Design.

UNIT V   MANAGING OBJECT ORIENTED DEVELOPMENT   9

Managing Analysis And Design – Evaluation Testing – Coding – Maintenance – Metrics – Case Study Foundation Class Library – Client/Server Computing.

Total: 45

TEXTBOOK

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.

REFERENCES

1. Larman, "Applying UML & Patterns, An Introduction to Object Oriented Analysis and Design", Pearson Education, 2nd Edition, 2003.
2. Bernd Bruegge, Allen H. Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson Education, 2nd Edition, 2004.

CS5155 – WEB TECHNOLOGY

	L	T	P	C
	3	0	0	3

UNIT I   FUNDAMENTALS   9

Introduction – Network Concepts – Web Concepts – Internet Addresses – Retrieving Data with URL – HTML – DHTML Cascading Style Sheets – Scripting Languages Javascript – VBscript.

UNIT II   COMMON GATEWAY INTERFACE   9

Common Gateway Interface Programming CGI Scripts – HTML Forms – Custom Database Query Scripts – Server Side Includes – Server Security Issues – XML.

UNIT III   JAVA PROGRAMMING   9

Java Fundamentals Classes – Inheritance – Packages – Interfaces – Exceptions Handling – Multi threading – Applets.

UNIT IV   SERVER SIDE PROGRAMMING   9

Server Side Programming – Active Server Pages – Java Server Pages – Java Servlets. Servlet Container – Exceptions – Sessions and Session Tracking – Using Servlet Context – Dynamic Content Generation – Servlet Chaining and Communications.

UNIT V   APPLICATIONS   9

Simple applications – Internet Commerce – Database connectivity – Online databases – EDI Applications in Business – Plug–ins – Firewalls.

Total: 45

REFERENCES
1.   Deitel, Deitel and Neito, "Internet and World Wide Web, How to program", Pearson education Asia, 2001.
2.   D.Norton and H. Schildt, "Java 2 the complete Reference", TMH, 2000.
3.   Elliotte Rusty Herold, "Java Network Programming", O'Reilly Publications, 3rd Edition, 2004.
4.   Eric Ladd and Jim O'Donnell, et al, "Using HTML 4, XML, and JAVA1.2", PHI publications, 2003.
5.   Jeffy Dwight, Michael Erwin and Robert Nikes "Using CGI", PHI Publications, 1997.

CS5156 – NETWORKING LABORATORY

L	**T**	**P**	**C**
0	**0**	**3**	**2**

1. Retrieving data with URLs.
2. Implementation of Socket Programming.
3. Using TCP/IP.
4. Using UDP.
5. Implementation of FTP.
6. Implementation of ECHO/PING/TALK.
7. Implementation of Remote command Execution.
8. Implementation of ARP.
9. Implementation of RARP.
10. Implementation of RMI / RPC.
11. Implementation of Shortest Path Routing Algorithm.
12. Implementation of Sliding Window Protocol.

CS5157 – DATABASE AND WEB TECHNOLOGY LABORATORY

L T P C
0 0 3 2

1. Study of all SQL commands.
2. Implement the concept of Normalization.
3. Implement the inventory control system with a reorder level.
4. Develop a package for a bank to maintain its customer details.
5. Develop a package for the payroll of a company.
6. Designing a web site using HTML– DHTML and Client side scripting.
7. te a program in Java for getting time and data information from the server using TCP/UDP.
8. te a program in Java to implement Database Connectivity.
9. Write a JSP program for order processing.
10. Write an ASP program using the components.

ELECTIVES

CS5001 – THEORY OF COMPUTATION

	L	T	P	C
	3	0	0	3

UNIT I   FINITE AUTOMATA AND REGULAR LANGUAGES   9

Finite Automata and Regular Languages – Regular Expressions and Regular Languages – Non Determinism and Kleenes Theorem – Equivalence of DFA and NFA – Finite Automation with E–moves – Equivalence of Regular Expression and NFA with E–moves – Pumping Lemma for Regular Sets.

UNIT II   CONTEXT FREE LANGUAGES   9

Context Free Languages – Derivation and Languages – Relationship between Derivation and Derivation Trees – Simplification of Context Free Grammars – Normal Forms for Context Free Grammars – CNF – GNF.

UNIT III   PUSH DOWN AUTOMATA (PDA)   9

Acceptance by PDA – Pushdown Automata and Context Free Languages – Pumping Lemma for CFL – Deterministic Context Free Languages and Deterministic Pushdown Automata.

UNIT IV   TURING MACHINE   9

Context Sensitive Languages and LBA – Turing Machine (Definition And Examples) – Computable Languages and Functions – Church Turing Hypothesis – Universal Turing Machine – P and NP Problems – NP – Complete.

UNIT V   UNSOLVABLE PROBLEMS   9

Unsolvable Problems – Rice Theorem – Post's Correspondence Problem – Recursive and Recursively Enumerable Languages.

Total: 45

TEXT BOOKS

1. Hopcroft and Ullman, "Introduction to Automata, Languages and Computation", 2nd Edition, Narosa Publishers, 2000.
2. John C. Martin, "Introduction to languages and the Theory of Computation", 2nd Edition, McGraw Hill, 1997.

REFERENCES

1. A. M. Natarajan, A. Tamilarasi & P. Balasubramani, "Theory of Computation", New Age International publishers, 2002.
2. K.L.P.Mishra, N.Chandrasekaran, "Theory of Computation", 2nd Edition, EEE, Prentice Hall of India, 1998.
3. Peter Linz, "An Introduction to formal languages and Automata", Narosa Publishing House, 2001.
4. Harry R. Lewis, Christos H. Papadimitriou, "Elements of Theory of Computation", Prentice Hall, 2002.

CS5002 – SOFT COMPUTING

L   T   P   C
3   0   0   3

UNIT I   FUZZY SET THEORY   10

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set–Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II   OPTIMIZATION   8

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III   NEURAL NETWORKS   10

Supervised Learning Neural Networks – Perceptrons – Adaline – Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV   NEURO FUZZY MODELING   9

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V   APPLICATION OF COMPUTATIONAL INTELLIGENCE   8

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

Total: 45

TEXTBOOK
1. J. S. R. Jang, C. T. Sun and E. Mizutani, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, 2004.

REFERENCES
1. Timothy J. Ross,"Fuzzy Logic with Engineering Application ", McGraw Hill, 1977.
2. Davis E. Goldberg,"Genetic Algorithms Search, Optimization and Machine Learning", Addison Wesley, 1989.
3. S. Rajasekaran and G. A. V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
4. R. Eberhart, P. Simpson and R. Dobbins, "Computational Intelligence PC Tools", AP Professional, Boston, 1996.

CS5003 – MOBILE COMPUTING

L   T   P   C
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UNIT I   FUNDAMENTALS   9

Medium Access Control – Motivation for Specialized MAC – SDMA – FDMA – TDMA – CDMA – Comparison of Access Mechanisms – Tele communications   GSM – DECT – TETRA – UMTS – IMT – 200 – Satellite Systems Basics – Routing – Localization – Handover – Broadcast Systems Overview – Cyclic Repetition of Data – Digital Audio Broadcasting – Digital Video Broadcasting.

UNIT II   WIRELESS NETWORKS   9

Wireless LAN Infrared Vs Radio Transmission – Infrastructure Networks– Ad hoc Networks – IEEE 802.11 – HIPERLAN – Bluetooth – Wireless ATM Working Group– Services – Reference Model – Functions – Radio Access Layer – Handover – Location Management – Addressing Mobile Quality of Service – Access Point Control Protocol.

UNIT III   MOBILE NETWORK LAYER   9

Mobile IP Goals – Assumptions and Requirement – Entities – IP Packet Delivery – Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP – Ad hoc Networks.

UNIT IV   MOBILE TRANSPORT LAYER   9

Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit/ Fast Recovery – Transmission/ Timeout Freezing – Selective Retransmission – Transaction Oriented TCP.

UNIT V   WAP   9

Architecture – Datagram Protocol – Transport Layer Security – Transaction Protocol – Session Protocol – Application Environment – Wireless Telephony Application.

Total: 45

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1.   J.Schiller, "Mobile Communication", Addison Wesley, 2000.

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1.   William Stallings, "Wireless Communication and Networks", Pearson Education, 2003.
2.   Singhal, "WAP: Wireless Application Protocol", Pearson Education, 2003.
3.   Lother Merk, Martin S. Nicklaus and Thomas Stober, "Principles of Mobile Computing", 2nd Edition, Springer, 2003.
4.   William C. Y. Lee, "Mobile Communication Design Fundamentals", John Wiley, 1993.

CS5004 – DISTRIBUTED COMPUTING

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UNIT I   FUNDAMENTALS   9

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies.

UNIT II   PROCESSES AND DISTRIBUTED OBJECTS   9

Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client–Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication between Distributed Objects – Remote Procedure Call – Events and Notifications – Java RMI – Case Study.

UNIT III   OPERATING SYSTEM ISSUES   I   9

The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System.

UNIT IV   OPERATING SYSTEM ISSUES   II   9

Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – Synchronizing Physical Clocks – Logical Time and Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT V   DISTRIBUTED TRANSACTION PROCESSING   9

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication and Distributed Multimedia Systems.

Total: 45

TEXT BOOKS

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Pearson Education, 3rd Edition, 2002.
2. Sape Mullender, "Distributed Systems", Addison Wesley, 2nd Edition, 1993.

REFERENCES

1. Albert Fleishman, "Distributed Systems Software Design and Implementation", Springer Verlag, 1994.
2. M. L .Liu, "Distributed Computing Principles and Applications", Pearson Education, 2004.
3. Andrew S Tanenbaum, Maartenvan Steen, "Distributed Systems, Principles and Pardigms", Pearson Education, 2002.
4. Mugesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating Systems", Tata McGraw Hill Edition, 2001.

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UNIT I   FUNDAMENTALS AND QOS   9

Introduction – QOS Requirements and Constraints – Concepts – Resources – Establishment Phase – Run Time Phase – Management Architectures.

UNIT II   OPERATING SYSTEMS   9

Real–Time Processing – Scheduling – Interprocess Communication – Memory and Management – Server Architecture – Disk Management.

UNIT III   FILE SYSTEMS AND NETWORKS   9

Traditional and Multimedia File Systems – Caching Policy – Batching – Piggy backing –Ethernet – Gigabit Ethernet – Token Ring – 100VG Any LAN – Fiber Distributed Data Interface (FDDI) – ATM Networks – MAN – WAN.

UNIT IV   COMMUNICATION   9

Transport Subsystem – Protocol Support for QOS – Transport of Multimedia – Computer Supported Cooperative Work – Architecture – Session Management – MBone Applications.

UNIT V   SYNCHRONIZATION   9

Synchronization in Multimedia Systems – Presentation–Synchronization Types – Multimedia Synchronization Methods – Case Studies – MHEG – MODE – ACME.

Total : 45

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1.   Ralf Steinmetz and Klara Nahrstedt, "Multimedia Systems", Ist Edition, Springer, 2004.
2.   Ralf Steinmetz and Klara Nahrstedt, "Media Coding and Content Processing", Prentice Hall, 2002.

REFERENCES
1.   Vaughan T, "Multimedia", Tata McGraw Hill, 1999.
2.   J. B. Mark, K. M. Sandra, "Multimedia Applications Development using DVI Technology", McGraw Hill, 1992.
3.   K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovacovic, D. A. Milovacovic, "Multimedia Communication Systems Techniques, Standards and Networks", 1st Edition, Prentice Hall, 2002.
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CS5006 – XML AND WEB SERVICES

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UNIT I   FUNDAMENTALS   9

Role Of XML – XML and the Web – XML Language Basics – SOAP – Web Services – Revolutions of XML – Service Oriented Architecture (SOA).

UNIT II   XML TECHNOLOGY   9

XML – Name Spaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation – XML Infrastructure.

UNIT III   SOAP   9

Overview of SOAP – HTTP – XML–RPC – SOAP Protocol – Message Structure – Intermediaries – Actors – Design Patterns and Faults – SOAP with Attachments.

UNIT IV   WEB SERVICES   9

Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web Services in E–Com – Overview of .NET and J2EE.

UNIT V   XML SECURITY   9

Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML in Practice.

Total : 45

TEXT BOOKS
1.   Frank. P. Coyle, "XML Web Services and the Data Revolution", Pearson Education, 2002.
2.   Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, "Developing Java Web Services", Wiley Publishing Inc., 2004.

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1.   Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
2.   McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.

CS5007 – BIO INFORMATICS

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UNIT I   FUNDAMENTALS   7
The Central Dogma – Killer Application – Parallel Universes – Watson's Definition – Top Down Vs Bottom Up Approach – Information Flow – Conversance – Communications.

UNIT II   DATABASE AND NETWORKS   9
Definition – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

UNIT III   SEARCH ENGINES AND DATA VISUALIZATION   10
Search Process – Technologies – Searching and Information Theory – Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs Simulation.

UNIT IV   STATISTICS– DATA MINING AND PATTERN MATCHING   11
Statistical Concepts – Micro Arrays – Imperfect Data – Basics – Quantifying – Randomness – Data Analysis – Tools Selection – Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals – Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

UNIT V   MODELING SIMULATION AND COLLABORATION   8
Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration and Communication – Standards – Issues – Case Study.

Total: 45

TEXT BOOK
1.   Bryan Bergeron, "Bio Informatics Computing", Prentice Hall, 2003.

REFERENCES
1.   T.K. Affward, D.J. Parry Smith, "Introduction to Bio Informatics", Pearson Education, 2001.
2.   Pierre Baldi, Soren Brunak, "Bio Informatics The Machine Learning Approach", 2nd Edition, First East West Press, 2003

CS5008 – GRID COMPUTING

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UNIT I   GRID COMPUTING   9

Introduction – Definition – Scope of Grid Computing.

UNIT II   GRID COMPUTING INITIATIVES   9

Grid Computing Organizations and their Roles – Grid Computing Analog – Grid Computing road map.

UNIT III   GRID COMPUTING APPLICATIONS   9

Merging the Grid sources – Architecture with the Web Devices Architecture.

UNIT IV   TECHNOLOGIES   9

OGSA – Sample Use Cases – OGSA Platform Components – OGSI – OGSA Basic Services.

UNIT V   GRID COMPUTING TOOL KITS   9

Globus Toolkit – Architecture– Programming Model – High Level Services – OGSI .Net Middleware Solutions.

Total: 45

TEXT BOOK

1.   Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR, 2003.

REFERENCES

1.   Ahmar Abbas, "Grid Computing A Practical Guide to technology and Applications",Charles River media , 2003.

CS5009 – NETWORK SECURITY

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UNIT I   FUNDAMENTALS   9

Attacks – Services – Mechanisms – Conventional Encryption – Classical and Modern Techniques – Encryption Algorithms – Confidentiality.

UNIT II   PUBLIC KEY ENCRYPTION   9

RSA – Elliptic Curve Cryptography – Number Theory Concepts.

UNIT III   MESSAGE AUTHENTICATION   9

Hash Functions – Digest Functions – Digital Signatures – Authentication Protocols.

UNIT IV   NETWORK SECURITY PRACTICE   9

Authentication– Applications – Electronic Mail Security – IP Security – Web Security.

UNIT V   SYSTEM SECURITY   9

Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.

Total: 45

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1.   Stallings, "Cryptography & Network Security, Principles & Practice", 3rd Edition, Prentice Hall, 2002.

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1.   Bruce, Schneier, "Applied Cryptography", 2nd Edition, Toha Wiley & Sons, 1996.
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3.   Pfleeger & Pfleeger, "Security in Computing", 3rd Edition, Pearson Education, 2003.

CS5010 – EMBEDDED SYSTEMS

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UNIT I   FUNDAMENTALS TO EMBEDDED SYSTEMS   9

Definition and Classification – Overview of Processors and Hardware Units in an Embedded System – Software Embedded into the System – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the Use of VLSI Designed Circuits.

UNIT II   DEVICES AND BUSES FOR DEVICES NETWORK   9

I/O Devices – Device I/O Types and Examples – Synchronous – ISO–synchronous and Asynchronous Communications from Serial Devices – Examples of Internal Serial–Communication Devices – UART and HDLC – Parallel Port Devices – Sophisticated interfacing features in Devices/Ports – Timer and Counting Devices – '12C'– 'USB'– 'CAN' and Advanced I/O Serial High Speed Buses – ISA – PCI – PCI – X – CPCI and Advanced buses.

UNIT III   EMBEDDED PROGRAMMING   9

Programming in Assembly Llanguage (ALP) vs. High Level Language – C Program Elements – Macros and Functions – Use of Pointers – NULL Pointers – Use of Function Calls – Multiple Function Calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ – Objected Oriented Programming – Embedded Programming in C++ – 'C' Program compilers – Cross compiler – Optimization of Memory Codes.

UNIT IV   REAL TIME OPERATING SYSTEMS – PART – 1   9

OS Services – Interrupt Routines Handling – Task Scheduling Models – Handling of Task Scheduling and Latency and Deadlines as Performance Metrics – Inter Process Communication and Synchronization – Shared Data Problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or Mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

UNIT V   REAL TIME OPERATING SYSTEMS – PART – 2   9

Study of RTOS– VxWorks – Basic Features – Task Management Library at the System – Library Header File – VxWorks System Functions and System Tasks – Inter Process (Task) Communication Functions – Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS Vxworks.

Total: 45

TEXT BOOK
1.   Rajkamal, "Embedded Systems Architecture, Programming and Design", Tata McGraw Hill, First reprint, 2003.

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1.   David E. Simon, "An Embedded Software Primer", Pearson Education Asia, First Indian Reprint, 2000.

CS5011 – DIGITAL IMAGING

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UNIT I   DIGITAL IMAGE FUNDAMENTALS   9

Image Formation – Image Transforms – Fourier Transforms – Walsh– Hadamard – Discrete Cosine – Hotelling Transforms.

UNIT II   IMAGE ENHANCEMENT & RESTORATION   9

Histogram Modification Techniques – Image Smoothening – Image Sharpening – Image Restoration – Degradation Model – Noise Models – Spatial Filtering – Frequency Domain Filtering.

UNIT III   IMAGE COMPRESSION & SEGMENTATION   9

Compression Models – Elements of Information Theory – Error Free Compression –Image Segmentation – Detection of Discontinuities – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphology.

UNIT IV   REPRESENTATION AND DESCRIPTION   9

Representation Schemes – Boundary Descriptors – Regional Descriptors – Relational Descriptors.

UNIT V   OBJECT RECOGNITION AND INTERPRETATION   9

Patterns and Pattern Classes – Decision Theoretic Methods – Structural Methods.

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TEXTBOOK
1.   Gonzalez R. C & Woods R.E., "Digital Image Processing", 2nd Edition, Pearson Education, 2002.

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1.   Anil Jain K, "Fundamentals of Digital Image Processing", Prentice Hall of India, 1989.
        Sid Ahmed, "Image Processing", McGraw Hill, 1995.

CS5012 – SOFTWARE QUALITY ASSURANCE

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UNIT I   CONCEPTS   9

Concepts of Quality Control – Quality Assurance – Quality Management – Total Quality Management– Cost of Quality – QC Tools – 7 QC Tools and Modern Tools – Other Related Topics – Business Process Re–engineering – Zero Defect – Six Sigma – Quality Function Deployment – Benchmarking – Statistical Process Control.

UNIT II   SOFTWARE ENGINEERING CONCEPTS   9

Software Engineering Principles – Software Project Management – Software Process– Project and Product Metrics – Risk Management – Software Quality Assurance; Statistical Quality Assurance – Software Reliability – Muse Model – Software Configuration Management – Software Testing; CASE (Computer Aided Software Engineering).

UNIT III   QUALITY ASSURANCE MODELS   9

Models for Quality Assurance – ISO–9000 – Series – CMM – SPICE – Malcolm Baldrige Award.

UNIT IV   SOFTWARE QUALITY ASSURANCE RELATED TOPICS   9

Software Process – Definition and Implementation – Internal Auditing and Assessments – Software Testing – Concepts – Tools – Reviews – Inspections & Walkthroughs – P–CMM.

UNIT V   FUTURE TRENDS   9

PSP – TSP – CMMI – OO Methodology – Clean Room Software Engineering – Defect Injection and Prevention.

Total: 45

TEXTBOOKS
1.   Watts Humphery, "Managing Software Process"", Addison Wesley, 1998.
2.   Roger Pressman, "Software Engineering"", 6 th Edition, McGraw Hill, 2005.

REFERENCE
1.   Philip B Crosby,   "Quality is Free the Art of Making Quality certain ", Mass Market, 1992.

CS5013 – AD HOC NETWORKS

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UNIT I   FUNDAMENTALS   9

Introduction – Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio Propagation Mechanisms – Characteristics of the Wireless Channel – IEEE 802.11a–b Standard – Origin of Ad hoc Packet Radio Networks – Technical Challenges – Architecture of PRNETs – Components of Packet Radios – Ad hoc Wireless Networks – What is an Ad Hoc Network? Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet.

UNIT II   AD HOC ROUTING PROTOCOLS   9

Introduction – Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols – Table–Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source–Initiated On–Demand Approaches – Ad hoc On–Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) –Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) –Location–Aided Routing (LAR) – Power–Aware Routing (PAR) – Zone Routing Protocol (ZRP).

UNIT III   MULTICASTROUTING IN ADHOC NETWORKS   9

Introduction – Issues in Designing a Multicast Routing Protocol – Operation of Multicast Routing Protocols – An Architecture Reference Model for Multicast Routing Protocols –Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing – Comparisons of Multicast Routing Protocols.

UNIT IV   TRANSPORT LAYER– SECURITY PROTOCOLS   9

Introduction – Issues in Designing a Transport Layer Protocol for Ad hoc Wireless Networks – Design Goals of a Transport Layer Protocol for Ad hoc Wireless Networks –Classification of Transport Layer Solutions – TCP over Ad hoc Wireless Networks – Other Transport Layer Protocols for Ad hoc Wireless Networks – Security in Ad Hoc Wireless Networks – Network Security Requirements – Issues and Challenges in Security Provisioning – Network Security Attacks – Key Management – Secure Routing in Ad hoc Wireless Networks.

UNIT V   QoS AND ENERGY MANAGEMENT   9

Introduction – Issues and Challenges in Providing QoS in Ad hoc Wireless Networks – Classifications of QoS Solutions – MAC Layer Solutions – Network Layer Solutions – QoS Frameworks for Ad hoc Wireless Networks Energy Management in Ad hoc Wireless Networks – Introduction – Need for Energy Management in Ad hoc Wireless Networks – Classification of Energy Management Schemes – Battery Management Schemes – Transmission Power Management Schemes – System Power Management Schemes.

Total: 45

TEXT BOOK

1. C. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks Architectures and Protocols", Prentice Hall, PTR, 2004.

REFERENCES

1. C. K. Toh, "Ad Hoc Mobile Wireless Networks Protocols and Systems", Prentice   Hall, PTR, 2001.
2. Charles E. Perkins, "Ad Hoc Networking", Addison Wesley, 2000

CS5014 – DATA WAREHOUSING AND DATA MINING

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UNIT I   FUNDAMENTALS   9

Relation to Statistics – Databases – Data Mining Functionalities – Steps in Data Mining Process – Architecture of a Typical Data Mining Systems – Classification of Data Mining Systems – Overview of Data Mining Techniques.

UNIT II   DATA PREPROCESSING AND ASSOCIATION RULES   9

Data Preprocessing – Data Cleaning – Integration – Transformation – Reduction – Discretization Concept Hierarchies – Concept Description Data Generalization and Summarization Based Characterization – Mining Association Rules in Large Databases.

UNIT III   PREDICTIVE MODELING   9

Classification and Prediction Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Other Classification Methods – Prediction – Clusters Analysis – Types of Data in Cluster Analysis – Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods.

UNIT IV   DATA WAREHOUSING   9

Data Warehousing Components – Multi Dimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation – Mapping the Data Warehouse to Multiprocessor Architecture – OLAP – Need – Categorization of OLAP Tools.

UNIT V   APPLICATIONS   9

Applications of Data Mining – Social Impacts of Data Mining – Tools – An Introduction to DB Miner – Case studies – Mining WWW – Mining Text Databases – Mining Spatial Databases.

Total: 45

TEXT BOOK
1.   Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

REFERENCES
1.   Alex Berson, Stephen J Smith, "Data Warehousing, Data Mining & OLAP",   Tata Mcgraw Hill, 2004.
2.   Usama M. Fayyad, Gregory Piatetsky , Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.
3.   Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4.   Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

CS5015 – PERFORMANCE EVALUATION OF COMPUTER SYSTEMS AND NETWORKS

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UNIT I   FUNDAMENTALS   9

Need for Performance Evaluation – Role of Performance Evaluation – Performance Evaluation Methods – Performance Metrics and Evaluation Criteria – CPU and I/O Architectures – Distributed and Network Architectures – Secondary Storage – Topologies – Computer Architecture – Fundamental Concepts and Performance Measures.

UNIT II   PROBABILITY AND STOCHASTIC PROCESSES   9

Scheduling Algorithms – Workloads – Random Variables – Probability Distributions – Densities – Expectation – Stochastic Processes – Poisson Process – Birth Death Process – Markov Process.

UNIT III   QUEUING THEORY   9

Queuing Systems – Networks of Queues – Estimating Parameters and Distributions – Computational Methods – Simulation Process – Time Control – Systems and Modeling.

UNIT IV   PETRI NETS AND SYSTEM PERFORMANCE   9

Petri Nets – Classical Petri Nets – Timed Petri Nets – Priority–based Petri Nets – Colored Petri Nets – Generalized Petri Nets – Tool Selection – Validation of Results – Performance Metrics – Evaluation – Multiple Server Computer System Analysis.

UNIT V   ANALYSIS   9

OS Components – System Architecture – Workloads – Design – Simulation – Analysis – Database System Performance – Computer Networks Components – Simulation Modeling of LAN.

Total: 45

TEXTBOOK

1.   Paul J. Fortier, Howard E. Michael, "Computer Systems Performance Evaluation and Prediction", Elsevier Science 2003.

REFERENCES

1.   Thomas G. Robertazzi, "Computer Networks and Systems Queing theory and Performance Evaluation", 3rd Edition, Springer, 2000.
2.   Domenico Ferrari , Giuseppe Serazzi ,Alexandro Zeijher, "Measurement & Tuning of Computer Systems ", Prentice Hall Inc, 1983.
3.   Michael F. Mories and Paul F. Roth, "Tools and techniques Computer Performance Evaluation", Van Nostrand, 1982.

CS5016 – AGENT BASED INTELLIGENT SYSTEMS

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UNIT I   FUNDAMENTALS   9

Definitions – Foundations – History – Intelligent Agents – Problem Solving – Searching – Heuristics – Constraint Satisfaction Problems – Game playing.

UNIT II   KNOWLEDGE REPRESENTATION AND REASONING   9

Logical Agents – First Order Logic – First Order Inference – Unification – Chaining – Resolution Strategies – Knowledge Representation – Objects – Actions – Events.

UNIT III   PLANNING AGENTS   9

Planning Problem – State Space Search – Partial Order Planning – Graphs – Nondeterministic Domains – Conditional Planning – Continuous Planning – MultiAgent Planning.

UNIT IV   AGENTS AND UNCERTAINITY   9

Acting under uncertainty – Probability Notation – Bayes Rule and Use – Bayesian Networks – Other Approaches – Time and Uncertainty – Temporal Models – Utility Theory – Decision Network – Complex Decisions.

UNIT V   HIGHER LEVEL AGENTS   9

Knowledge in Learning – Relevance Information – Statistical Learning Methods – Reinforcement Learning – Communication – Formal Grammar – Augmented Grammars– Future of AI.

Total: 45

TEXT BOOK

1.   Stuart Russell and Peter Norvig, "Artificial Intelligence A Modern Approach", 2nd Edition, Prentice Hall, 2002.

REFERENCES

1.   Michael Wooldridge, "An Introduction to Multi Agent System", John Wiley, 2002.
2.   Patrick Henry Winston, "Artificial Intelligence", 3nd Edition, AW, 1999.
3.   Nils.J.Nilsson, "Principles of Artificial Intelligence", Narosa Publishing House, 1992.

CS5017 –   VISUALIZATION TECHNIQUES

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UNIT I   FUNDAMENTALS   9

Introduction to Visualisation – Principles of 2D & 3D Computer Graphics – Models and Simulation Strategies.

UNIT II   POPULAR TECHNIQUES   9

Surface Plots – City Scopes – Fish Eye Views – Benediktine Space – Perspective walls – Cone Trees and Cam Trees – Sphere Visualisation – Rooms – Emotical Icons.

UNIT III   ADVANCED TECHNIQUES   9

Self Organising Graphs – Spatial Data Arrangements – Benediktine Cyberspace – Statistical Clustering and Proximity Measures – Hyper Structures – Human Centered Approaches – Information Cube.

UNIT IV   VISUALIZATION SYSTEMS   9

Database Visualization – Populated Information Terrains – Legibility Enhancement – Hyper Structure Visualization – Information Visualization.

UNIT V   SOFTWARE VISUALIZATION   9

Rapid Prototyping – Models for User Interaction – Formal Specification of Software – DFD – Software Architecture.

Total: 45

TEXTBOOK
1.   Chaomei Chan, "Information Visualization and Virtual Environment", Springer, Verlag, 1999.

REFERENCES
1.   Benedikt. M, "Cyberspace First Steps", MIT Press, 1991.
2.   Pauline Wills, "Visualisation A Beginner's Guide", Hodder & Stoughton, 1999.
3.   Sheryl A Sorby exal, "3D Visualization for Engineering Graphics", Prentice Hall, 1998.

C 5018 – ADVANCED DATABASES

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UNIT I   DATABASE MANAGEMENT   9

Relational Data Model – SQL – Database Design – Entity Relationship Model – Relational Normalization – Embedded SQL – Dynamic SQL – JDBC – ODBC.

UNIT II   ADVANCED DATABASES   10

Object Databases – Conceptual Object Data Model – XML and Web Data – XML Schema – Distributed Data bases – OLAP and Data Mining – ROLAP and MOLAP

UNIT III   QUERY AND TRANSACTION PROCESSING   8

Query Processing Basics – Heuristic Optimization – Cost Size Estimation – Models of Transactions – Architecture – Transaction Processing in a Centralized and Distributed System – TP Monitor.

UNIT IV   IMPLEMENTING AND ISOLATION   9

Schedules – Concurrency Control – Objects and Semantic Commutativity – Locking – Crash – Abort and Media Failure – Recovery – Atomic Termination – Distributed Deadlock – Global Serialization – Replicated Databases – Distributed Transactions in Real World.

UNIT V   DATABASE DESIGN ISSUES   9

Security – Encryption – Digital Signatures – Authorization – Authenticated RPC – Integrity – Consistency – Database Tuning – Optimization and Research Issues.

Total: 45

TEXT BOOK
1.   Philip M. Lewis, Arthur Bernstein, Michael Kifer, "Databases and Transaction
2.   Processing An Application Oriented Approach", Addison, Wesley, 2002.

REFERENCES
1.   R.Elmasri and S.B. Navathe, "Fundamentals of Database Systems", 3rd Edition,Addison Wesley, 2004.
2.   Abraham Silberschatz, Henry F. Korth, S. Sudharsan, "Database System Concepts", 4th Edition., Tata McGraw Hill, 2004.
3.   Raghu Ramakrishnan & Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2003.

CS5019 – SOFTWARE PROJECT MANAGEMENT

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UNIT I   FUNDAMENTALS   9

Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Conventional versus Modern Software Project Management.

UNIT II   SOFTWARE MANAGEMENT PROCESS FRAMEWORK   9

Lifecycle Phases – Artifacts of the Process – Model Based Software Architectures – Workflows of the Process – Checkpoints of the Process.

UNIT III   SOFTWARE MANAGEMENT DISCIPLINES   9

Iterative Process Planning – Organization and Responsibilities – Process Automation – Process Control and Process Instrumentation – Tailoring the Process.

UNIT IV   MANAGED AND OPTIMIZED PROCESS   9

Data Gathering and Analysis – Principles of Data Gathering – Data Gathering Process – Software Measures – Data Analysis – Managing Software Quality – Defect Prevention.

UNIT V   CASE STUDIES   9

COCOMO Cost Estimation Model – Change Metrics – CCPDS–R.

Total: 45

TEXT BOOKS
1.   Walker Royce "Software Project Management A Unified Framework", Pearson Education, 2004
2.   Humphrey Watts, "Managing the software process", Addison Wesley, 1989. (Unit IV)

REFERENCES
1.   Ramesh Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2.   Bob Hughes, Mikecotterell, "Software Project Management", 3rd Edition, Tata McGraw Hill, 2004.

CS5020 – COMPONENT BASED TECHNOLOGY

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UNIT I   FUNDAMENTALS   9

Software Components – Objects – Fundamental Properties of Component Technology – Modules – Interfaces – Callbacks – Directory Services – Component Architecture – Components and Middleware.

UNIT II   JAVA COMPONENT TECHNOLOGIES   9

Threads – Java Beans – Events and Connections – Properties – Introspection – JAR files – Reflection – Object Serialization – Enterprise Java Beans – Distributed Object Models – RMI and RMI – IIOP.

UNIT III   CORBA TECHNOLOGIES   9

Java and CORBA – Interface Definition language – Object Request Broker – System Object Model – Portable Object Adapter – CORBA Services – CORBA Component Model – Containers – Application Server – Model Driven Architecture.

UNIT IV   COM AND .NET TECHNOLOGIES   9

COM – Distributed COM – Object Reuse – Interfaces and Versioning – Dispatch Interfaces – Connectable Objects – OLE Containers and Servers – Active X controls – .NET Components – Assemblies – Appdomains – Contexts – Reflection – Remoting.

UNIT V   COMPONENT FRAMEWORKS AND DEVELOPMENT   9

Connectors – Contexts – EJB Containers – CLR Contexts and Channels – Black Box Component Framework – Directory Objects – Cross–Development Environment – Component Oriented Programming – Component Design and Implementation Tools – Testing Tools – Assembly Tools.

Total: 45

REFERENCES

1.   Clemens Szyperski, "Component Software Beyond Object, Oriented Programming", Addison Wesley, 2nd Edition 2002.
2.   Ed Roman, "Enterprise Java Beans", 3rd Edition, Wiley, 2004.
3.   Andreas Vogel, Keith Duddy, "Java Programming with CORBA", John Wiley & Sons 1998.
4.   Corry, Mayfield, Cadman, "COM/DCOM Primer Plus", 1st Edition, Tec media, 1999.