Dr. Mahalingam College of Engineering and Technology

(An Autonomous Institution)

Pollachi - 642003

Curriculum and Syllabus for

M.E. COMPUTER SCIENCE AND ENGINEERING

REGULATIONS 2014

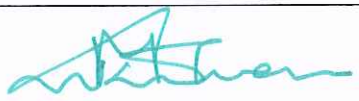
DR MAHALINGAM

MCET

COLLEGE OF ENGINEERING AND TECHNOLOGY

Enlightening Technical Minds

Programme : M.E. – Computer Science and Engineering
Curriculum and Syllabus
Approved by Academic Council on i. 9th May 2014 for Semester – I & II ii. 3rd July 2015 for Semester – III & IV

Action	Responsibility	Signature of Authorized Signatory
Designed and Developed by	BoS Computer Science and Engineering	
Compiled by	Office of COE	
Approved by	Principal	

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2014 REGULATION

Curriculum for M.E Computer Science and Engineering from Semester I to IV

SEMESTER I

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
THEORY						
140CP0101	Advanced Computer Architecture	3	1	0	4	100
140CP0102	Advanced Data Structures and Algorithms	3	1	0	4	100
140CP0103	Communication and Networking	3	0	0	3	100
140CP0104	Database Technology	3	0	0	3	100
140CP0105	Human Computer Interaction	3	0	0	3	100
140CP0106	Mathematics for Computing	3	1	0	4	100
PRACTICAL						
140CP0107	Data Structures and Networks Laboratory	0	0	4	2	100
TOTAL		**18**	**3**	**4**	**23**	**700**

Total Hours in a Week: 25

SEMESTER II

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
THEORY						
140CP0201	Advanced Operating Systems	3	0	0	3	100
140CP0202	Security in Computing	3	0	0	3	100
140CP0203	Text and Web Mining	3	0	0	3	100
140CP0204	Web Engineering	3	0	0	3	100
xxx	Elective I	3	1	0	4	100
xxx	Elective II	3	0	2	4	100
PRACTICAL						
140CP0207	Software Design Laboratory	0	0	4	2	100
TOTAL		**18**	**1**	**6**	**22**	**700**

Total Hours in a Week: 25

SEMESTER III

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
THEORY						
xxx	Elective III	3	0	2	4	100
xxx	Elective IV	3	0	2	4	100
xxx	Elective V	3	1	0	4	100
PRACTICAL						
140CP0307	Project Work Phase I	0	0	12	6	200
TOTAL		**9**	**1**	**16**	**18**	**500**

Total Hours in a Week: 26

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SEMESTER IV

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
140CP0407	Project Work Phase II	0	0	24	12	400
TOTAL		0	0	24	12	400

Total Hours in a Week: 24

Total Credits: 75

SEMESTER II – ELECTIVES

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
140CP9111	Advanced Compiler Design	3	1	0	4	100
140CP9112	Cloud Computing	3	0	2	4	100
140CP9113	Multimedia System Design	3	1	0	4	100
140CP9114	Object Oriented Software Engineering	3	0	2	4	100
140CP9115	Open Source Software	3	0	2	4	100
140CP9116	Parallel Computing	3	1	0	4	100
140CP9117	Software Quality Assurance and Testing	3	1	0	4	100
140CP9118	Wireless Communication and Networks	3	0	2	4	100

SEMESTER III – ELECTIVES

Course Code	Course Title	Hours/week			Credits	Marks
		L	T	P		
140CP9119	Big Data and Analytics	3	0	2	4	100
140CP9120	Cyber Security & Computer Forensics	3	1	0	4	100
140CP9121	Information Retrieval Techniques	3	0	2	4	100
140CP9122	Information Visualization	3	0	2	4	100
140CP9123	Machine Learning Techniques	3	0	2	4	100
140CP9124	Social Network Analysis	3	0	2	4	100
140CP9125	Soft Computing	3	0	2	4	100
140CP9126	Software Project Management	3	1	0	4	100
140CP9127	Wireless Security	3	1	0	4	100

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SEMESTER I

		L T P C M
140CP0101	ADVANCED COMPUTER ARCHITECTURE	3 1 0 4 100

AIM:

This course aims to impart knowledge on the various aspects of computer architecture and design.

OBJECTIVES:

At the end of the course, the students should be able to:

- Comprehend computer design principles
- Understand the various memory technologies
- Appreciate the various aspects of Instruction level parallelism
- Grasp the significant aspects of Data level parallelism
- Understand advanced topics like thread level parallelism, embedded systems and interconnection systems.

UNIT I FUNDAMENTALS OF COMPUTER DESIGN **9+3**

Classes of Computers – Computer Architecture – Trends – Dependability – Measuring, Reporting, and Summarizing Performance – Quantitative Principles of Computer Design – Instruction Set Principles and Examples – Classifying Instruction Set Architectures – Memory Addressing –Type and Size of Operands – Operations in the Instruction Set – Instructions for Control Flow – Encoding an Instruction Set.

UNIT II MEMORY HIERARCHY DESIGN **9+3**

Introduction – Advanced Optimizations of Cache Performance – Memory Technology and Optimizations – Protection: Virtual Memory and Virtual Machines – The Design of Memory Hierarchies – Case Study – Cache Performance – Six Basic Cache Optimizations – Virtual Memory – Protection and Examples of Virtual Memory.

UNIT III INSTRUCTION-LEVEL PARALLELISM **9+3**

Pipelining Concepts – Pipeline Hazards – Implementation of Pipelining – ILP : Concepts and Challenges – Basic Compiler Techniques for Exposing ILP – Advanced branch Prediction – Dynamic Scheduling – Hardware-Based Speculation – Exploiting ILP – Advanced Techniques for Instruction Delivery and Speculation – Limitations of ILP.

UNIT IV DATA-LEVEL PARALLELISM **9+3**

Vector Architecture – SIMD Instruction Set Extensions for Multimedia – Graphics Processing Units – Detecting and Enhancing Loop-level parallelism – Warehouse Scale Computers: Programming Models, Workloads and Architecture – Physical Infrastructure and costs.

UNIT V THREAD-LEVEL PARALLELISM **9+3**

Centralized Shared Memory Architectures – Performance of Symmetric Shared Memory Multiprocessors – Distributed Shared Memory and Directory Based Coherence – Synchronization – Models of Memory Consistency – Case Study: Multi-core Processors and their Performance – Storage Systems – Embedded Systems – Interconnection Networks.

L: 45, T: 15, Total: 60

REFERENCES:

1. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann, Fifth Edition, 2012.
2. Richard Y. Kain, "Advanced Computer Architecture - A Systems Design Approach", Prentice Hall, 2011.
3. Kai Hwang, Naresh Jotwani, "Advanced Computer Architecture", Tata McGraw-Hill, Second Edition, 2010.

BOS CHAIRMAN

140CP0102	ADVANCED DATA STRUCTURES AND ALGORITHMS	L T P C M 3 1 0 4 100

AIM:

To provide knowledge about tree, graph data structures and various aspects of Algorithms such as complexity analysis and alternate design paradigms.

OBJECTIVES:

At the end of the course, the students should be able to:

- Analyze the time complexity of recursive and non-recursive algorithms
- Understand the organization and working of Balanced tree structures
- Deploy Search data structures for efficient range searching and string matching
- Understand the concepts of NP-Completeness and Randomized Algorithms
- Deduce the working of Approximation Algorithms and Online Algorithms

UNIT I ALGORITHM ANALYSIS **9+3**

Computational Complexity – Asymptotic Notations – Best, Average and Worst Case Analysis – Amortized Complexity. Recursion: Recursive Calls – Types of Recursion – Backtracking.

UNIT II BALANCED TREES **9+3**

AVL Trees - Treaps – Multiway Search Trees: B-Trees – B* Trees – B+ Trees.

UNIT III SEARCH STRUCTURES **9+3**

k-d Trees – R-Trees – Tries – Suffix Trees and Arrays – String Matching: KMP and Boyer Moore algorithms.

UNIT IV NP-COMPLETENESS AND RANDOMIZED ALGORITHMS **9+3**

Theory of NP Completeness – Decision problems – Satisfiability problem – NP Problems – Cooks Theorem – NP Complete problems. Randomized Algorithms: Closest pairs problem – Primality Testing – Minimum Spanning Trees.

UNIT V APPROXIMATION AND ONLINE ALGORITHMS **9+3**

Approximation Algorithms: Node Cover – Euclidean TSP – Bin-packing – Polynomial Time Approximation Schemes: 0/1 Knapsack problem. Online Algorithms: Euclidean Spanning Tree – Convex Hull problem.

L: 45, T: 15, Total: 60

REFERENCES:

1. Adam Drozdek, "Data Structures and Algorithms in Java", Cengage Learning, Fourth Edition, 2013.
2. R.C.T. Lee, S.S. Tseng, R.C. Chang and Y.T.Tsai, "Introduction to the Design and Analysis of Algorithms A Strategic Approach", Tata McGraw Hill, 2012.
3. Charles E. Leiserson, Ronald Rivest, Thomas H. Cormen, and Clifford Stein, "Introduction to Algorithms", Prentice Hall India, 2012.

BOS CHAIRMAN

140CP0103	COMMUNICATION AND NETWORKING	L T P C M 3 0 0 3 100

AIM:

The course aims to introduce the concepts of computer networking along with the study of Internet's architecture, protocols & advanced topics including High Speed Networks and Quality of Service. The course also aims to highlight the current research directions of computer networks.

OBJECTIVES:

At the end of the course, the students should be able to:

- Gain familiarity in the structure and elements of communication, concepts of application protocols and transport layer protocol design
- Have in-depth knowledge of network layer concepts routing algorithms, principles, router architecture , network interconnections and link layer
- Gain expertise in network management functionalities, information structure and security principles
- Identify research problems based on QoS in High Speed Networks, traffic control and packet scheduling techniques.
- Have knowledge and become aware of research directions in various queuing techniques and achieving QoS routing in ATM networks

UNIT I NETWORKS AND INTERNET **8**

Computer Networks and the Internet: Application layer protocols – Web and HTTP – FTP – E-mail – DNS. Transport Layer: Connection-less Transport – Principles of Reliable Data Transfer – Connection Oriented Transfer – Principles of Congestion Control – TCP congestion control.

UNIT II ROUTING AGLORITHMS **10**

Routing Principles – Internet protocols – IPv4 – IPv6 – Routing Algorithms – Intra-AS and Inter-AS routing protocols – Broadcast and Multicast Routing Data link layer – Multiple Access Protocols – LAN addresses and ARP – VLAN – Link Virtualization – Data Center Networking and Load Balancing.

UNIT III NETWORK MANAGEMENT **7**

Infrastructure for Network Management – Structure of Management Information (SMI) – Management Information Base (MIB) – SNMP protocol – Security and Administration – ASN.1.

UNIT IV QoS IN HIGH SPEED NETWORKS **9**

Network Technologies – Admission control for ATM VBR Services and Integrated Services Internet – ATM Traffic Contract and Control Algorithms – ATM Shaping Multiplexer – Integrated Packet Shaper – Packet Scheduling Algorithms.

UNIT V QUEUING IMPLEMENTATIONS **9**

Packet Fair Queuing – Buffer Management – Flow and Congestion Control in ATM networks – ATM Signaling and Routing – QoS Routing for Integrated Services Networks – Differentiated Services – MultiProtocol Labeled Switching.

L: 45, T: 0, Total: 45

REFERENCE BOOKS:

1. James F. Kurose, Keith W. Ross, "Computer Networking – A top down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2013
2. H. Jonathan Chao, Xiaolei Guo, "Quality of Service Control in High-Speed Networks", John Wiley & Sons, Inc, 2002
3. William Stallings, "Data and Computer Communication", Ninth Edition, Pearson Education, 2011.
4. Peterson, Larry L, and Davie, Bruce S, "Computer Networks - A System Approach", Morgan Kaufmann - Harcourt Asia, Fifth Edition, 2011.

BOS CHAIRMAN

140CP0104	DATABASE TECHNOLOGY	L T P C M 3 0 0 3 100

AIM:

To provide an understanding on the role of database concepts and to design and implement real information systems.

OBJECTIVES:

At the end of the course, the students should be able to:

- Outline the database architecture and discuss the issues related to transaction and concurrency
- Examine the issues in distributed & parallel databases such as transaction processing and concurrency control mechanisms
- Appreciate the usage and applications of Object based and XML databases
- Understand the issues and usage of mobile databases
- Comprehend the concepts related to advanced , recent databases and applications

UNIT I DATABASE SYSTEM CONCEPTS 9

Overview of Database systems and architecture – E-R Model – Transactions – Serializability – Concurrency control mechanisms – Deadlock Handling.

UNITII DISTRIBUTED AND PARALLEL DATABASES 9

Centralized and C/S architectures – Server system architecture – Parallel and Distributed systems – Distributed transactions – Locking and Commit protocols – Distributed concurrency Control – Parallel databases.

UNITIII OBJECT-BASED DATABASES AND XML 9

Complex data types – Structured types and Inheritance – Table Inheritance – Array, Multiset types – Object Identity and Reference types – Implementation – Persistent PL – XML: Structure – Document schema – querying – transformation – Storage – Applications.

UNITIV MOBILE DATABASES 9

Mobile Databases: Location and Handoff Management – Effect of Mobility on Data Management – Location Dependent Data Distribution – Mobile Transaction Models – Concurrency Control – Transaction Commit Protocols – Mobile data recovery schemes.

UNIT V ADVANCED DATA MODELS 9

Active database and Triggers – Introduction to Temporal database and spatial database – Multimedia databases – Geographic Information systems – Overview of Data mining – Data warehousing.

L: 45, T: 0, Total: 45

REFERENCES:

1. Abraham Silberschatz, Henry. F. Korth, S.Sudharsan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2010.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Addison Wesley, 2010.
3. Vijay Kumar, "Mobile Database Systems", John Wiley & Sons, 2006
4. C.J.Date, "An Introduction to Database system", Pearson Education, Eighth Edition, 2003.
5. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw-Hill, 2003.

BOS CHAIRMAN

140CP0105	HUMAN COMPUTER INTERACTION	L T P C M 3 0 0 3 100

AIM:

The course aims in providing knowledge about the interplay among users, tasks, task contexts, IT, and the environments in which the systems are used, comprising the basis of human computer interaction. The course also aims in preparing graduate students for research in human-computer interaction.

OBJECTIVES:

At the end of the course, the students should be able to:

- Comprehend the foundations and design aspects of Human Computer Interaction
- Appreciate the importance of user feedback and to articulate HCI implications for designing multimedia/ ecommerce/ e-learning Web sites
- Gain awareness on various aspects of mobile HCI
- Infer the guidelines for user interface design and visualization
- Relate to various applications of HCI intended for diversified users with specific requirements.

UNIT I FOUNDATIONS & DESIGN OF HCI **12**

Interaction Models – Frameworks – Ergonomics – Styles – Elements – Interactivity – Paradigms. HCI in software process – Software life cycle – Usability engineering – Prototyping – Design Rationale – Design rules – Evaluation Techniques.

UNIT II WEB HCI **7**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow, In Page Editing, Static Invitations, Dynamic Invitations – Case Studies on Web Applications.

UNIT III MOBILE HCI **8**

Mobile Ecosystem – Mobile Applications – Mobile Information Architecture (MIA) – Mobile 2.0 – Mobile Design Elements – Case studies on MIA.

UNIT IV INTERFACES **9**

Mobile User Interface Building and Advances – Universal Design – Best Practices in Mobile UI – Mobile Application Distribution and Development Guidelines – Case Studies.

UNIT V APPLICATIONS **9**

Conversational speech interfaces and technologies – Multimodal interfaces – Multimedia User Interface Design – Decision-Support Systems – Online Communities – Privacy, Security, and Trust.

L: 45, T: 0, Total: 45

REFERENCES:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", Third Edition, Perason Education, 2004
2. Brian Fling, "Mobile Design and Development", O'Reilly Media Inc., First Edition, 2009
3. Andrew Sears, Julie A. Jacko, "The Human Computer Interaction Handbook", Second Edition, Lawrence Erlbaum Associates, New York, 2008.
4. Bill Scott and Theresa Neil, "Designing Web Interfaces", O'Reilly, First Edition, 2009.

BOS CHAIRMAN

140CP0106	MATHEMATICS FOR COMPUTING	L T P C M 3 1 0 4 100

AIM:

To enrich mathematical maturity and to impart knowledge on concepts required for solving computing problems.

OBJECTIVES:

At the end of the course, the students should be able to:

- Understand the basics of random variables and standard distributions
- Apply Estimation theory and regression analysis
- Apply testing of hypothesis to infer outcome of experiments
- Understand Graph Structures and their applications
- Solve counting problems

UNIT I RANDOM VARIABLES **9+3**

Random variables – Bernoulli Trials: Binomial, Poisson, Exponential, Erlang and Normal distributions – Function of a Random variable - Moments, Moment generating function.

UNIT II ESTIMATION THEORY **9+3**

Unbiased Estimators – Method of Moments – Maximum Likelihood Estimation – Curve fitting by Principle of least squares.

UNIT III TESTING OF HYPOTHESIS **9+3**

Sampling distributions, Statistical hypothesis – Tests based on Normal, t, Chi-square and F distributions for mean, variance and proportion, ANOVA, One way and Two way classification, LSD, RDD.

UNIT IV GRAPH STRUCTURES **9+3**

Graph representations – Regular graph structures – Random graphs – Connectivity – Cycles – Graph Coloring – Cliques, Vertex Covers, Independent sets – Spanning Trees – Network flows – Matching.

UNIT V COMBINATORICS **9+3**

Basics of counting – Counting arguments – Pigeonhole principle – Permutations and Combinations – Recursion and Recurrence relations – Generating functions.

L: 45, T: 15, Total: 60

REFERENCES:

1. Johnson, R.A. Miller and Freund's, "Probability and Statistical for Engineers", Prentice Hall of India Pvt., Ltd., New Delhi, Seventh Edition, 2005.
2. Jay L. Devore, "Probability and Statistics for Engineering and the Sciences", Cengage Learning, Seventh Edition, 2009.
3. Murray R.Spiegel, Jhon J Schiller, R. Alu Srinivasan, "Schaum's Outlines Probability & Statistics", Tata McGraw Hill, New Delhi, 3rd Edition, 2010.
4. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Fifth Edition, Tata McGraw Hill, 2003.
5. Edgar G. Goodaire, Michael M. Parmenter, "Discrete Mathematics with Graph Theory", Pearson Education, 3rd Edition, 2003.

BOS CHAIRMAN

140CP0107 DATA STRUCTURES AND NETWORKS LABORATORY

L	T	P	C	M
0	0	4	2	100

AIM:

To create the ability to design and write programs for implementing concepts in the areas of Data Structures and Algorithms, Computer Networks and Database Technology.

OBJECTIVES:

At the end of the course, the students should be able to:

- Design efficient algorithms for searching, comparison using suitable data structures and Solve real time problems using Online Algorithm design strategy
- Configure and test a wide area network topology with suitable IP address allocation and router configuration.
- Create client server applications with database access and efficient interaction with end users.
- Gain expertise in transport layer functionalities and congestion control mechanisms
- Apply concepts such as Schema Design, Model representation and Normalization for developing applications

AREA OF EXPERIMENTS:

Data Structures

- Balanced Tree Structures
- Range Search Data Structures
- String Matching Algorithms
- Solving problems using Online Algorithms

Computer Networks

1. Establishing a network with multi-router topology along with subnetting and suitable IP address allocation. Test the network connectivity.
2. Design a multi-threaded server and client for any suitable web application that enables:
   a. Reliable communication by multiple clients to server simultaneously
   b. Proper database connectivity to process the request
   c. GUI for effective interaction
3. Analyzing the performance of transport layer protocols
4. Implementation of congestion control algorithms.

Database Technology

Design and develop Packages for any one of the following suggested topics. Requirements: a) Schema Design b) E-R Model representation c) Normalization of Relational Database d) Graphical User Interface

- Payroll Management for ABC Corporation.
- Inventory Control System
- Income Tax calculation
- University Grade Sheet Preparation

BOS CHAIRMAN

SEMESTER II

		L T P C M
140CP0201	**ADVANCED OPERATING SYSTEMS**	**3 0 0 3 100**

AIM:

To provide basic knowledge and skills in operating, managing and maintenance of various types of Operating Systems.

OBJECTIVES:

At the end of the course, the students should be able to:

- Understand the fundamentals of Operating Systems
- Gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- Gain insight on distributed resource management components viz. the algorithms for implementation of distributed shared memory and Load distribution
- Understand the components and management aspects of Real time systems

UNIT I FUNDAMENTALS OF OPERATING SYSTEMS 9

Overview – Processes – Process Scheduling – Deadlocks – Memory Management Techniques: Paging – Segmentation – Virtual Memory.

UNIT II DISTRIBUTED OPERATING SYSTEM 9

Design Issues in Distributed Operating System – Communication Primitives – Distributed Coordination – Event Ordering-Mutual Exclusion – Atomicity – Concurrency Control – Deadlock Handling – Election Algorithms – Reaching Agreement.

UNIT III DISTRIBUTED RESOURCE MANAGEMENT 9

Distributed File Systems – Design Issues – Distributed Shared Memory – Algorithms for Implementing Distributed Shared memory – Memory Coherence protocols – Issues in Load Distributing – Components – Load Distribution Algorithms – Task Migration.

UNIT IV REAL TIME SYSTEMS 9

Basic Model of Real Time Systems – Characteristics – Applications of Real Time Systems – Real Time Task Scheduling – Handling Resource Sharing.

UNIT V CASE STUDIES 9

Linux System: Design Principles – Kernel Modules – Process Management Scheduling – Memory Management – Distributed Systems: Amoeba.

L: 45, T: 0, Total: 45

REFERENCES:

1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.
2. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", Eighth Edition, John Wiley & Sons, 2009.
3. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.
4. Andrew S.Tanenbaum, "Distributed Operating Systems", Pearson Education India, Third Edition, 2009.
5. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.

BOS CHAIRMAN

140CP0202	SECURITY IN COMPUTING	L T P C M 3 0 0 3 100

AIM:

To provide knowledge on Network Security concepts including cryptographic, systemic and computational security aspects of the network / internet work systems.

OBJECTIVES:

At the end of the course, the students should be able to:

- Understand the basic concepts involved in Cryptography and symmetric ciphers.
- Analyze the working of Public Key Encryption and Hash Functions.
- Comprehend about various types of security like Program Security, Database and Data Mining Security.
- Gain awareness about issues related to Administering Security.
- Relate to legal and ethical issues in computer security and privacy in computing.

UNIT I SYMMETRIC CIPHERS **9**

Introduction – Security Attacks – Security Services – Security Mechanisms – Symmetric Ciphers: Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Advanced Encryption Standard.

UNIT II PUBLIC KEY ENCRYPTION AND HASH FUNCTIONS **9**

Asymmetric Ciphers: Mathematical Concepts – Public-Key Cryptography and RSA – Other Public-Key Cryptosystems – Message Authentication and Hash Functions: Authentication Requirements – Authentication Functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs.

UNIT III PROGRAM, DATABASE AND DATA MINING SECURITY **9**

Secure Programs – Non-malicious Program Errors – Viruses and Other Malicious Code – Targeted Malicious Code – Controls Against Program Threats – Database Security Requirements – Reliability and Integrity – Sensitive Data – Inference – Multilevel Databases – Proposals for Multilevel Security – Data Mining.

UNITIV SECURITY IN NETWORKS AND ADMINISTERING SECURITY **9**

Network Concepts – Threats in Networks – Network Security Controls – Firewalls – Security Planning – Risk Analysis – Organizational Security Policies – Physical Security.

UNIT V ISSUES IN COMPUTER SECURITY **9**

Privacy Concepts – Privacy Principles and Policies – Authentication and Privacy – Privacy on the Web – E-mail Security – Impacts on Emerging Technologies – Protecting Programs and Data – Information and the Law – Rights of Employees and Employers – Redress for Software Failures – Computer Crime – Ethical Issues in Computer Security.

L: 45, T: 0, Total: 45

REFERENCES:

1. W. Stallings, "Cryptography and Network Security", Fifth Edition, Prentice Hall, 2010.
2. Charles P.Pfleeger and Shari Lawrence Pfleeger, "Security in computing", Fourth Edition, Pearson Education, 2007.
3. Behrouz A Forouzan & Debdeep Mukhopadhyay, "Cryptography and Network Security", Second Edition, Tata Mc Graw Hill Education Pvt Ltd Publication, 2010.
4. Marjie T. Britz, "Computer Forensics and Cyber Crime-An Introduction", Third Edition, Pearson Education, 2013.
5. Bernard L. Menezes,"Network Security and Cryptography", First Edition, Cengage Learning India, 2010.

BOS CHAIRMAN

140CP0203	TEXT AND WEB MINING	L T P C M 3 0 0 3 100

AIM:

To provide an understanding of the issues, processes and applications of Text and Web data mining

OBJECTIVES:

At the end of the course, the student will be able to:

- Understand the basic issues and types of text mining
- Comprehend the different aspects of text categorization and clustering
- Interpret the fundamentals of Web Content Mining
- Analyze the working of link mining approaches
- Appreciate the various aspects of web usage mining

UNIT I TEXT MINING **8**

Text Mining Tasks – Converting Text to Numerical Vectors: Document standardization – Tokenization – Lemmatization – Vector Generation – POS Tagging – Word Sense Disambiguation – Phrase and named entity recognition – Parsing – Feature generation.

UNIT II TEXT CATEGORIZATION AND CLUSTERING **10**

Text Categorization: Document Classification – Learning to Predict from Text – Performance Evaluation and Applications. Clustering: Document Similarity – Clustering Techniques – Applications and Performance Evaluation.

UNIT III WEB CONTENT MINING **9**

Information Retrieval Models – Relevance Feedback and Evaluation – Web Page Preprocessing – Inverted Index – Latent Semantic Indexing – Web Search – Meta Search – Spamming.

UNIT IV WEB LINK MINING **10**

Social Networks Analysis – Co-Citation and Bibliographic Coupling – Page Rank – HITS Algorithm – Community Discovery. Web Crawlers: Crawling Algorithm – Implementation Issues – Universal and Focused Crawlers – Evaluation and Ethics.

UNIT V WEB USAGE MINING **8**

Data Collection and Preprocessing – Data Modeling – Discovery and Analysis of Web Usage Patterns – Recommender Systems – Collaborative Filtering – Query Log Mining – Computational Advertising.

L: 45, T: 0, Total: 45

REFERENCES:

1. Sholom M. Weiss, Nitin Indurkhya, Tong Zhang, "Fundamentals of Predictive Text Mining", Springer-Verlag London Limited, 2010
2. Bing Liu, "Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data", Springer, Second Edition 2011.
3. Charu C. Aggarwal and Cheng Xiang Zhai, "Mining Text Data", Springer, 2012.

BOS CHAIRMAN

140CP0204	WEB ENGINEERING	L T P C M 3 0 0 3 100

AIM:

To provide knowledge on the various aspects of Web Engineering and enable students to develop effective Web Applications.

OBJECTIVES:

At the end of the course, the student will be able to:

- Outline Web Engineering Components, Principles and Practices
- Analyze Web Engineering models and design Web Applications
- Gain in-depth knowledge about Technologies and Tools for developing Web applications
- Gain expertise in Web Programming Languages
- Appreciate aspects of Web Project Management and Usability Engineering

UNIT I WEB ENGINEERING COMPONENTS **9**

Web Engineering – Framework- Principles – Components – Best Practices – Process Flow – Generic Action and Tasks – Web Communication and Collaboration – Planning and Building Web Engineering Team – Case Studies.

UNIT II WEB ENGINEERING MODELS **12**

Modeling Analysis – Modeling for Web Applications: Content Model , Interaction Model , Function Model and Configuration Model. Web Application Design – Interactive design – Information Design – Function Design – Case Studies.

UNIT III TECHNOLOGIES AND TOOLS **9**

Design Patterns – Technologies and Tools – Testing Web Applications – Change and Content management of Web Application – Construction and Deployment of Web Applications.

UNIT IV WEB PROGRAMMING **9**

HTML 5: New Structural Elements – Making up Figures, Captions and Text – Web Pages with WAI-ARIA – Forms. CSS3: Page Layout – CSS Box Model. JavaScript: Handling Scripts and Adding Embedded Script – DOM – Event Listener.

UNIT V USABILITY ENGINEERING **6**

Web Project Management – Objectives, Tasks and Challenges. Web Application Development Process: Requirements, Analysis and Programming. Usability – Characteristics – Design Guidelines – Engineering Methods and Trends.

L: 45, T: 0, Total: 45

REFERENCES:

1. Gerti Kappel, Brigit Proll, Siegfried Reich, Werner Retschitzegger , "Web Engineering", John Wiley & Sons Ltd., 2006.
2. Roger Pressman and David Lowe, "Web Engineering – A Practitioner's Approach", Tata McGraw Hill, First Edition, 2008.
3. Douglas Corner, "The Internet Book: Everything you need to know About Computer Networking and How the Internet Works", Prentice Hall, Fourth Edition, 2006.
4. Jennifer Niederst Robbins, "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics", O'Reilly, Fourth Edition, 2012.

BOS CHAIRMAN

140CP0207	SOFTWARE DESIGN LAB	L T P C M 0 0 4 2 100

AIM:

To guide the students in designing software by using advanced tools and techniques of Java programming.

OBJECTIVES:

At the end of the course, the students should be able to:

- Gain proficiency in usage of advanced functions and procedures of Java Programming
- Develop applications using Java Swing and Bean programming
- Design Web Applications using Java
- To provide practical hands-on experience in web and text mining techniques

AREA OF EXPERIMENTS:

1. Accessing web pages of a remote server using response redirection
2. Networking applications using socket programming with necessary user interfaces using Java Swings.
3. Web Applications using Java Servlets.
4. Execution of stored procedure in the database by using Callable Statement.
5. Encryption and Decryption Algorithms.
6. Implementation of Wikis.
7. Applications using Java Beans
8. Text and Web Mining Applications using Java

Suggested Text Mining Applications

- Named Entity Recognition
- Document Clustering
- Summarization
- Question Answering

Suggested Web Mining Applications

- Web Crawlers
- Spam Detection
- Link Prediction
- Recommender Systems

BOS CHAIRMAN

SEMESTER II - ELECTIVES

140CP9111	ADVANCED COMPILER DESIGN	L T P C M 3 1 0 4 100

AIM:

To provide knowledge in the area of compiler design and develop awareness on the function and complexity of modern compilers.

OBJECTIVES:

At the end of the course, the students should be able to:

- Gain awareness on the working of various phases of the compiler and the specification and recognition of language tokens
- Construct top-down and bottom-up parsers for simple grammars
- Apply Syntax directed translation schemes for the generation of intermediate code
- Understand run time memory management and code generation techniques
- Apply optimization strategies to improve the code generated by compilers

UNIT I LEXICAL ANALYSIS **9+3**

Grammars and Languages – Structure of the Compiler – Applications of Compiler Technology. Lexical Analysis: Input Buffering – Specification of Tokens – Recognition of Tokens – Finite automata – Regular expression to finite automaton – Optimization of DFA – Based pattern matchers – Lexical Analyzer Generator – LEX.

UNIT II SYNTAX ANALYSIS **9+3**

Role of a parser – Context-free grammars – Top-down parsing – Bottom-up parsing – LR parser – Introduction to language for specifying parser – YACC – Implementation of parser using YACC.

UNIT III SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION **9+3**

Syntax Directed Translation: Syntax-direct definitions – Evaluation Order – Applications and Schemes. Intermediate Code Generation: Intermediate languages – Types and Declarations – Expressions – Type-Checking – Control Flow – Backpatching – Switch statements - Procedures.

UNIT IV CODE GENERATION **9+3**

Run-time Environments: Storage Organization – Stack Allocation – Access to Non local data – Heap Management – Introduction to Garbage Collection. Code Generation: Issues in designing a code generator – Target machine – Basic blocks and flow graphs – Next-use information – A Simple code generator – Register allocation and assignment – Peephole optimization.

UNIT V CODE OPTIMIZATION **9+3**

Principal sources of optimization – Data Flow Analysis – Optimizing for Parallelism and Locality – Matrix Multiplication – Iteration Spaces – Affine Array Indexes – Data Reuse – Array Data-Dependence Analysis – Finding Synchronization free parallelism.

L: 45, T: 15, Total: 60

REFERENCES:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman, "Compilers - Principles, Techniques and Tools", Second Edition, Addison- Wesley, 2006.
2. Kenneth C.Louden, "Compiler Construction Principles and Practice", Vikas publishing House, 2003.
3. Andrew W.Appel, "Modern Compiler Implementation in Java", Second Edition, Cambridge University Press, 2002.

BOS CHAIRMAN

140CP9112	CLOUD COMPUTING	L T P C M 3 0 2 4 100

AIM:

This course gives an idea on evolution of cloud computing its services and program models. It also focused on key challenges and issues around cloud computing.

OBJECTIVES:

At the end of the course, the students should be able to:

- Gain awareness on the current trends and basics of cloud computing and cloud services
- Understand the various aspects related to virtualization
- Comprehend the concept of cloud infrastructure and appreciate the design challenges
- Understand the various programming models in cloud computing
- Appreciate the security issues in cloud computing

UNIT I INTRODUCTION **9**

Cloud Computing – Cloud Types – Characteristics – Assessing the Cloud's Value – Cloud Architecture: Cloud Computing Stack – Connecting to the Cloud – Cloud Services – IaaS – PaaS – SaaS – IDaaS – CaaS.

UNIT II VIRTUALIZATION **9**

Implementation Levels of Virtualization – Virtualization Structures , Tools and Mechanisms – Virtualization of CPU, Memory, I/O Devices – Virtual Clusters and Resource management – Virtualization for Data – Centre Automation – Desktop Virtualization – Server Virtualization.

UNIT III CLOUD INFRASTRUCTURE **9**

Data-Centre Design and Interconnection Networks – Architectural Design of Compute and Storage Clouds – Public Cloud – Inter Cloud Resource Management – Security and Trust Management.

UNIT IV PROGRAMMING MODEL **9**

Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments – Eucalyptus, Open Nebula, Open Stack.

UNIT V CLOUD SECURITY AND ISSUES **9**

Cloud computing security architecture: Architectural Considerations – Identity Management and Access control – Autonomic Security. Cloud computing security challenges: Virtualization security management.

L: 45, P: 30, Total: 75

REFERENCES:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley Publishing, 2011.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", MorganKaufmann Publishers, 2012.
3. Ronald L. Krutz and Russell Dean Vines "Cloud Security", Wiley Publishing, 2010.
4. John W. Rittinghouse and James F. Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
5. TobyVelte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, APractical Approach", TMH, 2009.
6. Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper, "Cloud Computing for Dummies", Wiley India Edition, 2010.
7. Brian J.S. Chee and Curtis Franklin, Jr, "Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center", CRC Press, 2010.

BOS CHAIRMAN

140CP9113	MULTIMEDIA SYSTEM DESIGN	L T P C M 3 1 0 4 100

AIM:

Multimedia has become an indispensable part of modern computer technology. In this course, students will be familiarized to content production, compression and storage, distribution to various end users and platforms

OBJECTIVES:

At the end of the course, the students should be able to:

- Understand the fundamentals of multimedia.
- Deduce the working of Lossless and Lossy compression algorithms
- Understand image and video compression standards
- Comprehend the design issues of multimedia databases and role of semantic queries and the complication involved in formulating and processing semantic queries
- Perceive the importance of multimedia networks

UNIT I MULTIMEDIA AND CONTENT CREATION **8**

Multimedia Data and Multimedia Systems – Digital Data Acquisition – Media Representation and Formats – Color Theory – Multimedia Authoring.

UNIT II IMAGE COMPRESSION **9**

Need for Compression – Basics of Information Theory Taxonomy of Compression – Lossless Compression – Lossy Compression – Redundancy and Relevancy of Image Data – Classes of Image Compression Techniques – Lossless Image Coding – Transform Image Coding – Wavelet Based coding – Fractal Based coding – Transmission issues in Compressed Images.

UNIT III VIDEO AND GRAPHICS COMPRESSION **10**

General Theory of Video Compression – Types of Predictions – Complexity of Motion Compensation – Video – Coding Standards – VBR Encoding, CBR Encoding, and Rate Control – 2D and 3D Graphics objects – Graphics Compression in Relation to other Media Compression – Mesh Compression using Connectivity Encoding – Mesh Compression using Polyhedral Simplification – Multi resolution Techniques – Wavelet-Based Encoding – 3D Graphics Compression Standards.

UNIT IV MULTIMEDIA DATABASES AND FRAMEWORK **10**

Multimedia Data versus Multimedia Content – Multimedia Metadata – Multimedia Systems and Databases – Standards for Metadata – User Interface and Browsing Paradigms – Examples of Media Database Projects – Need for a Unified Framework – MPEG – 21 Objectives – Digital Items – Digital Item Identification (DII) – Digital Item Adaptation – Digital Item Processing – Digital Rights Management in Digital Items.

UNIT V MULTIMEDIA NETWORKING **8**

Multimedia Traffic Control – Multimedia Networking Performance and Quality of Service – Multimedia Communication standards and Protocols – Wireless Multimedia Networking – Quality of Service over Wireless Networks – Digital Rights Management.

L: 45, T: 15, Total: 60

REFERENCES:

1. Parag Havaldar, Gerard Medioni, "Multimedia Systems: Algorithms, Standards, and Industry Practices", Course Technology, Cengage Learning, 2010
2. Ze-Nian Li, Mark S. Drew, "Fundamentals of Multimedia", Pearson Education, Third Impression 2008
3. Prabat K Andleigh, Kiran Thakrar, "Multimedia System Design" Prentice Hall, 1996.
4. Ralf Steinmetz, Klara Nahrstedt, "Multimedia Systems" Springer, 2004.
5. Borko Furht (Editor), "Handbook of Multimedia Computing", CRC Press, 1999.

BOS CHAIRMAN

140CP9114	OBJECT ORIENTED SOFTWARE ENGINEERING	L T P C M 3 0 2 4 100

AIM:

To provide in-depth knowledge on processes and techniques for building large object-oriented software systems.

OBJECTIVES:

At the end of the course, the students should be able to:

- Characterize the essence of object-oriented software processes and outline the usage of general purpose modeling language in the field of software Engineering
- Analyze the functional requirements for a Object Oriented system
- Understand OO Design concepts, processes, languages, databases, user interfaces, frameworks, and design patterns
- Comprehend the principles of Testing and the strategies for generating system test cases and how object orientation impacts software testing
- Appreciate the need for Configuration Management and gain awareness on SCM activities

UNIT I SOFTWARE ENGINEERING **9**

Software related problems, software Engineering concepts, development activities, modelling: Concepts, Modelling with UML, Project Organization & Communication: Project Organization & communication concepts and their activities, ARENA Case Study.

UNIT II REQUIREMENT ANALYSIS **8**

Requirements elicitation & its activities and managing requirements elicitation, Analysis: Analysis overview, concepts, activities and managing analysis, ARENA Case Study.

UNIT III SYSTEM DESIGN **12**

Design overview, concepts, and activities, addressing design goals and managing system design, Object Design: Object reuse, its activities & managing reuse, Interface specification concepts & its activities, ARENA Case Study.

UNIT IV TESTING **8**

Testing concepts: Faults, Erroneous States and Failures, Test cases, test Stubs and Drivers, Corrections, Testing Activities: Component Inspection, Usability Testing, Unit Testing, Integration Testing and System Testing, Managing Testing.

UNIT V SOFTWARE CONFIGURATION MANAGEMENT **8**

Aircraft Example, Overview of Configuration Management, Configuration Management concepts, SCM Activities: SCI, Promotion Management, Release Management, Branch Management, Variant Management , Change Management and Managing Configuration Management.

L: 45, P: 30, Total: 75

REFERENCES:

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", Third Edition, Pearson Education Asia, 2010
2. Timothy C. Lethbridge and Robert Laganiere , "Object-Oriented Software Engineering: Practical software development using UML and Java", McGraw-Hill Higher education, 2004.
3. Stephen R Schach, "An Introduction to Object Oriented Systems Analysis and Design with UML and the Unified Process", Tata McGraw-Hill, 2008.

BOS CHAIRMAN

140CP9115	OPEN SOURCE SOFTWARE	L T P C M 3 0 2 4 100

AIM:

To provide knowledge on Open source Software tools and components.

OBJECTIVES:

At the end of the course, the students should be able to:

- Comprehend the scope of Open Source distribution and understand the process of installation and configuration of Linux, Web Server and Databases
- Gain working knowledge of NoSQL databases
- Gain insight on Groovy
- Understand the basics of Grails and design patterns
- Gain working of the X windows development environment

UNIT I INTRODUCTION **9**

Open sources – Need– Advantages–Application. Apache Web server – Installation – Working with Web Server – Configuring and using apache web services. MDA: Genesis of MDA – Meta Object Facility – UML – UML Profiles – MDA Applications.

UNIT II OPEN SOURCE DATABASE **9**

Open Source data bases – MySQL Introduction – MySQL workbench – Database Design & Modeling, Visual SQL Editor, Connection Management, Database Administration. NoSQLdatabase: MongoDB – Schemaless Database, Collections, Documents, fields.

UNIT III OPEN SOURCE PROGRAMMING LANGUAGE: GROOVY **9**

Groovy as extension of Java – Data types, Control structures, Special loops& operators – List, Map, String, Date – Closure – Object Oriented groovy – Builders – Working with databases.

UNIT IV OPEN SOURCE PROGRAMMING FRAMEWORK: GRAILS **9**

Grails – commands – Web system evolution – Data Layer scaffolding – Injection Attacks – Plugin – Unit and integration testing – Service layer

UNIT V X WINDOWS DEVELOPMENT ENVIRONMENT **9**

X Window System – GTK+ and Supporting Libraries – Installing GTK+ – Basic Programs using Window, Label, Container, Layout, Events, Buttons – Dialog: Single Page, Multipage, Progress Bar – Glib Basics – Menus and Toolbars – Calendars – Printing Support – Recent Files.

L: 45, P: 30, Total: 75

REFERENCES:

1. Stephen J. Mellor, Marc Balces, "Executable UMS: A foundation for MDA", Addison, 2002.
2. Vikram Vaswani, "MYSQL: The Complete Reference", Second Edition, Tata McGraw Hill, Indian Reprint, 2009.
3. Kristina Chodorow, Michael Dirolf, "MongoDB: The Definitive Guide Powerful and Scalable Data Storage", 2nd Edition, O'Reilly Publication, 2010.
4. Bashar Jawad, "Groovy and Grails Recipes", First Edition, APress Publication, 2008.
5. Jim Shingler, Joseph Faisal Nusairat, Christopher M. Judd, "Beginning Groovy and Grails: From Novice to Professional", APress, 2008.
6. Andrew Krause, "Foundations of GTK+ Development", APress , 2007.

BOS CHAIRMAN

140CP9116	PARALLEL COMPUTING	L T P C M 3 1 0 4 100

AIM:

To impart knowledge on various aspects of parallel computing including hardware models, algorithm design, performance analysis and implementation

OBJECTIVES:

At the end of the course the students should be able to:

- Comprehend the models and issues related to parallel computing
- Design and Analyze parallel algorithms
- Develop parallel programs using the message passing paradigm
- Develop Shared Memory programs using PThreads and OpenMP

UNIT I PARALLEL HARDWARE AND PARALLEL SOFTWARE 9+3

Need for Parallel Computing – Concurrency in computing – Von Neumann Architecture and modifications – Parallel Hardware – Parallel Software.

UNIT II PARALLEL ALGORITHM DESIGN 9+3

Task / Channel Model – Foster's Design Methodology – Examples – Adding Data Input – Performance Analysis – Speedup and Efficiency – Metrics and Laws.

UNIT III MESSAGE PASSING PARADIGM 9+3

MPI programming – MPI communicators – Single Program Multiple Data programs – Communication – Message matching – MPI I/O – Collective communication – Performance evaluation of MPI programs.

UNIT IV SHARED MEMORY PROGRAMMING WITH PTHREADS 9+3

Processes, Threads and PThreads - Thread synchronization – Critical Sections – Busy-Waiting – Mutexes – Semaphores – Barriers and Condition variables – Read-Write locks – Cache coherence – Thread safety.

UNIT V SHARED MEMORY PROGRAMMING WITH OPENMP 9+3

OpenMP programming – Scope of variables – Reduction clause – Loops in OpenMP – Scheduling loops – Synchronization – Producer-Consumer problem – Cache issues – Thread safety in OpenMP.

L: 45, T: 15, Total: 60

REFERENCES:

1. Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan Kaufmann, 2011.
2. M. J. Quinn, "Parallel programming in C with MPI and OpenMP", Tata McGraw Hill, 2003.
3. Kai Hwang and Zhi Wei Xu, "Scalable Parallel Computing", Tata McGraw Hill, 2003.

BOS CHAIRMAN

140CP9117 100	SOFTWARE QUALITY ASSURANCE AND TESTING	L T P C M 3 1 0 4

AIM:

To provide basic knowledge on Software Quality Assurance and Testing concepts and to introduce the practical aspects related to this area.

OBJECTIVES:

At the end of the course, the students should be able to:

- Analyze the various concepts, metrics, and models of Software Quality Assurance
- Outline the components and frameworks of SQA
- Describe about basics of software testing and test generation strategies
- Understand the need for test generation from Requirements and assessing the adequacy in Testing

UNIT I SOFTWARE QUALITY ASSURANCE **8**

Introduction to Software Quality – Challenges – Objectives – Quality factors – Components of SQA – Contract Review – Development and Quality plans – SQA Components in Project life cycle – SQA Defect Removal Policies – Reviews.

UNIT II SOFTWARE QUALITY ASSESSMENT **9**

Hierarchical models of software quality – Software quality metrics – Function points – Software product quality – Software maintenance quality – Effect of case tools – Software quality infrastructure – Procedures – Certification – Configuration management – Documentation control.

UNIT III PROJECT MANAGEMENT **9**

Project progress control – Costs – Quality management standards – Project process standards – Management and its role in SQA –SQA unit.

UNIT IV SOFTWARE TESTING **10**

Principles of Testing strategies – White box and Black box approach – Integration testing – System and Acceptance testing – Performance Testing – Regression testing – Internationalization Testing – ad-hoc testing – Website testing – Usability testing – Accessibility testing.

UNIT V TEST GENERATION AND ADEQUACY **9**

Test Generation from Requirement- Test Generation from Finite state models- Test Generation from Combinatorial Designs – Test Adequacy assessment using control flow and Data Flow.

L: 45, T: 15, Total: 60

REFERENCES:

1. Daniel Galin, "Software Quality Assurance – From Theory to Implementation", Pearson Education, 2009.
2. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Second Edition, Pearson education, 2006.
3. Aditya Mathur, "Foundations of Software Testing", Pearson Education, 2008.
4. Ron Patton, "Software Testing", Second Edition, Pearson education, 2007.

BOS CHAIRMAN

140CP9118	WIRELESS COMMUNICATION AND NETWORKS	L T P C M 3 0 2 4 100

AIM:

The course aims to provide knowledge about wireless transmission technology and medium access schemes. The course provides an overview of various wireless networks and standards. The course also covers the mobility management and security issues in research perspective.

OBJECTIVES:

At the end of the course, the students should be able to:

- Outline the working of various wireless communication mediums and channels.
- Characterize different medium access techniques and modulation schemes
- Understand the working principle of Wireless LAN standards and architecture
- Appreciate the functionality of various wireless wide area networking concepts
- Gain awareness on research directions in mobility management and wireless security issues.

UNIT I WIRELESS TRANSMISSION **9**

Overview of Wireless Systems – Antennas and Propagation – Radio Propagation and Path-Loss Models – Signal Encoding Techniques – Spread Spectrum – Cellular Communication

UNIT II MEDIA ACCESS CONTROL **9**

Coding and Error Control – Modulation Schemes – Multiple Access Techniques – Narrowband Access Systems – Spectral Efficiency – FDMA – TDMA – CDMA – Wideband Systems –Orthogonal Frequency Division Multiplexing – Random Access Methods – Reservation schemes.

UNIT III WIRELESS LAN **9**

Wireless PAN – Bluetooth – Protocol Stack – Link types – Connection Establishment – Wireless Sensor Networks – Network model – Protocol Stack – Zigbee Technology - IEEE 802.15.4 LR-WPAN – IEEE 802.11 WLAN – Architecture – Power Management – HIPERLAN – WiMAX.

UNIT IV WIDE AREA WIRELESS NETWORKS **9**

Wide-Area Wireless Networks (WANs) — GSM Evolution – 3G Systems – UMTS – HSDPA – CDMA-2000 Evolution – Satellite Communications – Wireless Application Protocols – Programming model and Architecture

UNIT V MOBILITY AND SECURITY **9**

Mobility Management Functions – Location Management – Registration – Handoff – Security and Privacy needs – Wireless Security and Standards – Security in IEEE 802.11, GSM, GPRS, UMTS – Data Security – Authentication Methods - Mobile Network and Transport Layer

L: 45, P: 30, Total: 75

REFERENCES:

1.Vijay Garg, "Wireless Communication and Networking", Morgan Kaufmann Publications, First Edition, 2010.

2.William Stallings, "Wireless Communications and Networks", Pearson Education, Second Edition, 2009.

3.Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2010.

4.Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2009.

BOS CHAIRMAN