AFFILIATED INSTITUTIONS

ANNA UNIVERSITY CHENNAI, CHENNAI

REGULATIONS - 2009

M.E. SOFTWARE ENGINEERING

I TO VI SEMESTERS (PART TIME) CURRICULUM AND SYLLABUS

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	**MA9219**	Operations Research	3	1	0	4
2	**CS9213**	Computer Networks and Management	3	0	0	3
3	**SE9213**	Object Oriented Software Engineering	3	0	0	3
PRACTICAL						
4	CS9216	Networking Lab	0	0	3	2
		TOTAL	**9**	**1**	**3**	**12**

SEMESTER II

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	SE9221	Software Design	3	0	0	3
2	SE9223	Software Testing and Quality Assurance	3	0	0	3
3	SE9224	Software Metrics	3	0	0	3
PRACTICAL						
4	SE9227	Software Testing Lab	0	0	3	2
		TOTAL	**9**	**0**	**3**	**11**

SEMESTER III

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	SE9214	Software Architecture	3	0	0	3
2	SE9215	Formal Methods in Software Engineering	3	0	0	3
PRACTICAL						
3	SE9217	Case Tools Laboratory	0	0	3	2
		TOTAL	**6**	**0**	**3**	**8**

SEMESTER IV

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	SE9222	Software Project Management	3	0	0	3
2	CS9224	Information Security	3	0	0	3
3	E1	Elective I	3	0	0	3
PRACTICAL						
	SE9228	Software Development Lab	0	0	3	2
		TOTAL	9	0	3	11

SEMESTER V

SL. NO	COURSE CODE	COURSE TITLE	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	SE9234	Project Work (phase I)	0	0	12	6
		TOTAL	9	0	12	15

SEMESTER VI

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
PRACTICAL						
1	SE9241	Project Work (Phase II)	0	0	24	12
		TOTAL	0	0	24	12

Total credit 12+11+8+11+15+12 = 69

LIST OF ELECTIVES FOR M.E. SOFTWARE ENGINEERING

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
1.	SE9251	Software Agents	3	0	0	3
2.	CS9251	Mobile Computing	3	0	0	3
3.	SE9252	Requirement Engineering for Real Time Systems	3	0	0	3
4.	CS9260	Embedded Systems	3	0	0	3
5.	SE9255	Software Reuse	3	0	0	3
6.	CS9268	Advanced Databases	3	0	0	3
7.	SE9256	Design Patterns	3	0	0	3
8.	SE9258	Software Quality Management	3	0	0	3
9.	CS9270	Component Based Technology	3	0	0	3
10.	SE9259	Team Software Process and Personal Software Process	3	0	0	3
11.	SE9260	Software Reliability	3	0	0	3
12.	CS9264	Data Warehousing and Data Mining	3	0	0	3
13.	SE9261	Language Technologies	3	0	0	3
14.	CS9263	Ad-hoc Networks	3	0	0	3
15.	CS9257	XML and Web Services	3	0	0	3
19.	CS9258	Bio informatics	3	0	0	3

MA9219   **OPERATIONS RESEARCH**   **LT P C**
                                                                            3 1 0 4

UNIT I   QUEUEING MODELS   12
Poisson Process – Markovian Queues – Single and Multi-server Models – Little's formula – Machine Interference Model – Steady State analysis – Self Service Queue.

UNIT II   ADVANCED QUEUEING MODELS   12
Non- Markovian Queues – Pollaczek Khintchine Formula – Queues in Series – Open Queueing Networks –Closed Queueing networks.

UNIT III   SIMULATION   12
Discrete Even Simulation – Monte – Carlo Simulation – Stochastic Simulation – Applications to Queueing systems.

UNIT IV   LINEAR PROGRAMMING   12
Formulation – Graphical solution – Simplex method – Two phase method - Transportation and Assignment Problems.

UNIT V   NON-LINEAR PROGRAMMING   12
Lagrange multipliers – Equality constraints – Inequality constraints – Kuhn – Tucker conditions – Quadratic Programming.

                                                         TOTAL: 60 PERIODS
TEXT BOOKS:
1. Winston.W.L. "Operations Research", Fourth Edition, Thomson – Brooks/Cole, 2003.
2. Taha, H.A. "Operations Research: An Introduction", Ninth Edition, Pearson
   Education Edition, Asia, New Delhi, 2002.

REFERENCES:
1. Robertazzi. T.G. "Computer Networks and Systems – Queuing Theory and
   Performance Evaluation", Third Edition, Springer, 2002 Reprint.
2. Ross. S.M., "Probability Models for Computer Science", Academic Press, 2002.

CS9213   **COMPUTER NETWORKS AND MANAGEMENT**   **LT P C**
                                                                3 0 0 3

UNIT I   HIGH SPEED NETWORKS   9
Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's.

UNIT II   CONGESTION AND TRAFFIC MANAGEMENT   9
Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III   TCP AND ATM CONGESTION CONTROL   10

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

UNIT IV   INTEGRATED AND DIFFERENTIATED SERVICES   9

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services.

UNIT V   PROTOCOLS FOR QoS SUPPORT   8

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

                                                        TOTAL: 45 PERIODS

TEXT BOOKS:
1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.

REFERENCES:

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

SE9213   OBJECT ORIENTED SOFTWARE ENGINEERING   LT P C
                                                              3 0 0 3

UNIT I   INTRODUCTION   9

System Concepts – Software Engineering Concepts – Development Activities – Managing Software Development – Unified Modeling Language – Project Organization – Communication

UNIT II   ANALYSIS   9

Requirements Elicitation – Concepts – Activities – Management – Analysis Object Model – Analysis Dynamic Models

UNIT III   SYSTEM DESIGN   9

Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design

UNIT IV   OBJECT DESIGN AND IMPLEMENTATION ISSUES   9

Reusing Pattern Solutions – Specifying Interfaces – Mapping Models to Code – Testing

UNIT V   MANAGING CHANGE   9
Rationale Management – Configuration Management – Project Management – Software Life Cycle

TOTAL:45 PERIODS

REFERENCES:

1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2004.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
3. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007.

CS9216   NETWORKING LAB   LT P C
**   0 0 3 2**

1. Socket Programming

    a. TCP Sockets

    b. UDP Sockets

    c. Applications using Sockets

2. Simulation of Sliding Window Protocol

3. Simulation of Routing Protocols

4. Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat

5. Simulation of Network Management Protocols

6. Study of Network Simulator Packages – such as opnet, ns2, etc.

TOTAL: 45 PERIODS

SE9221   SOFTWARE DESIGN   LT P C
**   3 0 0 3**

UNIT I   GENERAL DESIGN FUNDAMENTALS   9
The nature of Design process – Objectives – Building Models – Constructs, Design qualities – Assessing the design – Design viewpoints for software – The object Model – Classes and Objects – Complexity – Classification – Notation – Process – Pragmatics.

UNIT II   STRUCTURED SYSTEM ANALYSIS AND DESIGN   9
Structured Design – Design Principles – Problem Partitioning and Hierarchy – Abstraction, Modularity – Top-down and Bottom-up Strategies – Transformation of a DFD to a Structure Chart – Transform Analysis – Transaction Analysis – Coupling – Cohesion – Multiple types of Cohesion in a module – Data Design – Normalization – Denormalization – Procedural Design.

UNIT III   OBJECT ORIENTED ANALYSIS AND DESIGN   9

Overview of Object Oriented Analysis – Shaler/Mellor – Coad/ Yourdon – Rumbaugh – Booch – UML – Use case – Conceptual model – Behaviour – Class Analysis Patterns – Overview – Diagrams – Aggregation – UML – Diagrams – Collaboration – Sequence – Class – Design patterns and Frameworks – Comparison with other design methods – Managing analysis and design – Evaluation testing – Coding – Maintenance – Metrics.

UNIT IV   DESIGN METHODS   9

The Architecture Concepts – Design Methods – Design Patterns – Rationale for Methods – Design Processes and Strategies – Design by Template – Designing with Patterns – Stepwise Refinement – Incremental Design – Prototyping – DSDM – Structured Systems Analysis and Structured Design – JSP – JSD.

UNIT V   CASE STUDIES   9

Domain Name System – Email – World Wide Web (HTTP) – Simple Network Management Protocol – File Transfer Protocol – Security – Mutimedia applications.

TOTAL: 45 PERIODS

REFERENCES:

1. David Budgen, "Software Design", Second Edition, Pearson Education, 2004.
2. R. S. Pressman, "Software Engineering", Sixth Edition, McGraw Hill Inc., 2005.
3. Steve McConnell, "Code Complete ", Word Power Publishers, 2001.
4. Ed Downs, Peter Clare, Jan Coe, "Structured System Analysis and Design Methods Application and Context ", Prentice Hall, 1998.
5. A. G. Suteliffe, "Human Computer Interface Design ", Second Edition Macmillan, 1995.

SE9223   SOFTWARE TESTING AND QUALITY ASSURANCE   LT P C
3 0 0 3

UNIT I   FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE   8

Ethical Basis for Software Quality – Total Quality Management Principles – Software Processes and Methodologies.

UNIT II   QUALITY STANDARDS   8

Quality Standards, Practices and Conventions – Software Configuration Management – Reviews and Audits – Enterprise Resource Planning Software.

UNIT III   QUALITY METRIC SYSTEM   8

Measurement Theory – Software Quality Metrics – Designing Software Measurement Programs – Complexity Metrics and Models – Organizational Learning – Improving Quality with Methodologies – Structured/Information Engineering.

UNIT IV   SOFTWARE TESTING - INTRODUCTION   10

Testing as an Engineering Activity - Role of Process in Software Quality – Testing as a Process – Basic Definitions, Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT V   TESTING ISSUES   11

Introduction to Testing Design Strategies – The Smarter Tester –Test Case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Equivalence Class Partitioning – Boundary Value Analysis – Other Black-box Test Design Approaches – Black-box testing and COTS – Using White-Box Approach to Test design – Test Adequacy Criteria – Coverage and Control Flow Graphs – Covering Code Logic – Paths – White-box Based Test Design – Additional White Box Test Design Approaches – Evaluating Test Adequacy Criteria.

TOTAL: 45 PERIODS

REFERENCES:

1. Schulmeyer, G. Gordon, James McManus, "Handbook of Software Quality Assurance", Second Edition, Van Nostrand Reinhold, 1992.
2. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 2004.
3. William E.Perry , "Effective methods for Software Testing", Second Edition, Wiley, 2000.

SE9224   SOFTWARE METRICS   LT P C
3 0 0 3

UNIT I   MEASUREMENTS THEORY   9

Fundamentals of Measurement - Measurements In Software Engineering - Scope of Software Metrics - Measurements Theory - Goal Based Framework - Software Measurement Validation.

UNIT II   DATA COLLECTION AND ANALYSIS   9

Empirical Investigation - Planning Experiments - Software Metrics Data Collection - Analysis Methods – Statistical Methods.

UNIT III   PRODUCTS METRICS   9

Measurement of Internet Product Attributes - Size And Structure - External Product Attributes - Measurement Of Quality.

UNIT IV   QUALITY METRICS   9

Software Quality Metrics - Product Quality - Process Quality - Metrics For Software Maintenance - Case Studies oOf Metrics Program - Motorola - Hp And IBM.

UNIT V   MANAGEMENT METRICS   9

Quality Management Models - Rayleigh Model - Problem Tracking Report (PTR) Model - Reliability Growth Model - Model Evaluation - Orthogonal Classification.

TOTAL: 45 PERIODS

REFERENCES:

1. Norman E – Fentar, Share Lawrence Pflieger, "Software Metrics", International Thomson Computer Press, 1997.
2. Stephen H. Kin, "Metric and Models in Software Quality Engineering", Addison Wesley, 1995.

SE9227   **SOFTWARE TESTING LAB**   **LT P C**
                                                                          0 0 3 2

1. Study of various tools Study various tools such as WinRunner, LoadRunner, TestDirector, Rational Rose Suite etc.

2. Perform various types of testing:

a. Unit Testing

b. Regression Testing

c. Integration Testing

d. Validation Testing

e. Acceptance Testing

f. System Testing

3. Prepare test plan and develop test case hierarchy

4. Generate Test cases and Test Documentation in the following case studies

a. Library System

b. Course Registration System

c. Implement a Quiz System

d. Student Marks Analyzing System

e. Online Ticket Reservation System

f. Stock Manegment System

g. Real-Time Scheduler

TOTAL: 45 PERIODS

SE9214   **SOFTWARE ARCHITECTURE**   **LT P C**
                                                                          3 0 0 3

UNIT I   **8**
Introduction – software design levels – software engineering discipline – architecture business cycle – architectural patterns – reference models – architectural structures, views

UNIT II   **9**
Architectural styles – pipes and filters – object-orientation – invocation – layered systems – repositories – interpreters – process control – heterogenous architectures – case studies

UNIT III 10

Architecture and functionality – architecture qualities – architecture in the lifecycle - Architectural design - Shared information systems – database integration – integration in software development environments – architectural structures for shared information systems

UNIT IV 9

Architectural design guidance – design space – design rules – applying design space – quantified design space – formal models and specification – formalizing architectural style, design space - z - notation

UNIT V 9

Linguistic issues – requirements for architectural description languages – first class connectors – adding implicit invocation to traditional programming languages – tools for architectural design – universal connector language - Software architecture Documentation – reconstruction

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Mary shaw and David Garlan, Software Architecture – Perspectives on an emerging discipline, Pearson education, 2008. (unit 1 to 5)
2. Len Bass, Paul Clements, Rick Kazman, Software Architecture in Practice, Addison-Wesley, 2003. (unit 1, 3, 5)

REFERENCES:
1. Christine Hofmeister, Robert Nord, Dilip Soni, Applied Software Architecture: A Practical Guide for Software Designers, Addison-Wesley, 1999
2. David M. Dikel, David Kane, James R. Wilson, Software Architecture: Organizational Principles and Patterns, Prentice Hall, 2001
3. Jan Bosch, Morven Gentleman, Christine Hofmeister, Juha Kuusela, Software Architecture: System Design, Development and Maintenance, Springer, 2002

SE9215   FORMAL METHODS IN SOFTWARE ENGINEERING   LT P C
3 0 0 3

UNIT I   INTRODUCTION 8

Why Formal methods were developed – Problems in Natural Language Specifications, Formal Versus Informal Programming – Advantages of Formal Methods – Requirements of Formal System – Types – Prepositional Logic – Predicate Logic – Relationships and Functions.

UNIT II   FORMAL SPECIFICATION STYLE 8

Model-Oriented – Specifications – Concurrency-Based Specifications –Example Specification Languages.

UNIT III   VDM 10

Introduction to VDM – Basic Types – Quote Types – Compound Types – Optional Types – Functions – Operations – Additional Constructs – Modules.

UNIT IV   THE Z NOTATION   10
The Interchange Language – User-Defined Identifiers – Data Types – Basic Types –
Compound Types – Schemas – Additional Constructs.

UNIT V   FORMAL SEMANTICS AND TOOLS   9
Operational Semantics – Denotational Semantics – Axiomatic Semantics Proof Editors –
Proof Analyser – Symbolic Simulators –Translators – Test Generation Tools.

TOTAL: 45 PERIODS

TEXT BOOK:
1. Andrew Harry, " Formal Methods: Fact File VDM and Z", John Wiley and   Sons,
    1996.

REFERENCE:
1. Jim Woodcock, Jim Davies, "Using Z Specification, Refinement and Proof", Prentice
   Hall International, 1996.

SE9217   **CASE TOOLS LAB**   **L T P C**
                                                                              0 0 3 2

1. Practicing the different types of case tools such as (Rational Rose & other Open
    Source) used for all the phases of Software development life cycle.

2. Data modeling

3. Semantic data modeling

4. Source code generators

5. Re-engineering

6. Experimenting CASE Environments

    a. Toolkits
    b. Language-centered
    c. Integrated
    d. Fourth generation
    e. Process-centered

7. Implementation of the following using CASE Workbenches:

    a. Business planning and modeling
    b. Analysis and design
    c. User-interface development
    d. Programming
    e. Verification and validation
    f. Maintenance and reverse engineering
    g. Configuration management
    h. Project management

TOTAL: 45 PERIODS

SE9222   **SOFTWARE PROJECT MANAGEMENT**   **LT P C**
                                                                          3 0 0 3

UNIT I   INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT   9
Project Definition – Contract Management – Activities Covered By Software Project
Management – Overview of Project Planning – Stepwise Project Planning.

UNIT II   PROJECT EVALUATION   9
Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow
Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III   ACTIVITY PLANNING   9
Objectives – Project Schedule – Sequencing and Scheduling Activities –Network
Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project
Duration – Activity on Arrow Networks – Risk Management – Nature of Risk – Types of
Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And
Control.

UNIT IV   MONITORING AND CONTROL   9
Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring –
Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change
Control – Managing Contracts – Introduction – Types of Contract – Stages In Contract
Placement – Typical Terms of A Contract – Contract Management – Acceptance.

UNIT V   MANAGING PEOPLE AND ORGANIZING TEAMS   9
Introduction – Understanding Behavior – Organizational Behaviour:A Background –
Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation
– The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming
A Team –Decision Making – Leadership – Organizational Structures – Stress –Health
And Safety – Case Studies.

                                                            TOTAL: 45 PERIODS
REFERENCES:
1. Bob Hughes, Mikecotterell, "Software Project Management", Third Edition, Tata
    McGraw Hill, 2004.
2. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
    Royce, "Software Project Management", Pearson Education, 1999.
3. Jalote, "Software Project Manangement in Practive", Pearson Education, 2002.

CS9224   **INFORMATION SECURITY**   **LT P C**
                                                                    3 0 0 3

UNIT I   9
An Overview of Computer Security, Access Control Matrix, Policy-Security policies,
Confidentiality policies, Integrity policies and Hybrid policies.

UNIT II   9
Cryptography- Key management – Session and Interchange keys, Key exchange and
generation, Cryptographic Key Infrastructure, Storing and Revoking Keys, Digital
Signatures, Cipher Techniques

UNIT III   **9**

Systems: Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem.

UNIT IV   **9**

Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection

UNIT V   **9**

Network Security, System Security, User Security and Program Security

TOTAL: 45 PERIODS

TEXT BOOK:

1. Matt Bishop ,"Computer Security art and science ", Second Edition, Pearson Education

REFERENCES:

1. Mark Merkow, James Breithaupt " Information Security : Principles and Practices" First Edition, Pearson Education,
2 .Whitman, "Principles of Information Security", Second Edition, Pearson Education William Stallings, "Cryptography and Network Security: Principles and Practices", Third Edition, Pearson Education.
3. "Security in Computing ", Charles P.Pfleeger and Shari Lawrence Pfleeger, Third Edition.

SE9228   **SOFTWARE DEVELOPMENT LAB**   **L T P C**
                                                                      0 0 3 2

Apply the following to typical application problems:
1. Project Planning
2. Software Requirement Analysis
3. Software Estimation
4. Software Design
5. Data Modelling & Implementation
6. Software Testing
7. Software Debugging

A possible set of applications may be the following:

    a. Library System

    b. Student Marks Analyzing System

    c. Text Editor.

    d. Create a dictionary.

    e. Telephone dictionary.

    f. Simulator Software for Parallel Processing Operation.

    g. Inventory System.

TOTAL: 45 PERIODS

SE9251   **SOFTWARE AGENTS**   **LT P C**
                                                                                3 0 0 3

UNIT I   AGENTS – OVERVIEW   9
Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile
Agents – Agent Frameworks – Agent Reasoning.

UNIT II   JAVA AGENTS   9
Processes – Threads – Daemons – Components – Java Beans – ActiveX – Sockets –
RPCs – Distributed Computing – Aglets Programming – Jini Architecture – Actors and
Agents – Typed and proactive messages.

UNIT III   MULTIAGENT SYSTEMS   9
Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols
– Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization –
Self-Interested agents in Electronic Commerce Applications.

UNIT IV   INTELLIGENT SOFTWARE AGENTS   9
Interface Agents – Agent Communication Languages – Agent Knowledge
Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent
Applications**.**

UNIT V   AGENTS AND SECURITY   9
Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious
Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security
issues for Aglets.

                                                                    TOTAL: 45 PERIODS
REFERENCES:

1. Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.
2**.** Bradshaw, " Software Agents ", MIT Press, 2000.
3. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Pearson
   Education, 2003.
4. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
   Gerhard Weiss, "Multi Agent Systems – A Modern Approach to Distributed Artificial
   Intelligence", MIT Press, 2000.

CS9251   **MOBILE COMPUTING**   **LT P C**
                                                                                3 0 0 3

UNIT I   WIRELESS COMMUNICATION FUNDAMENTALS   9
Introduction – Wireless transmission – Frequencies for radio transmission – Signals –
Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC
– SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II   TELECOMMUNICATION SYSTEMS   11
GSM – System Architecture – Protocols – Connection Establishment – Frequency
Allocation – Routing – Handover – Security – GPRS.

UNIT III   WIRELESS NETWORKS   9

Wireless LAN – IEEE 802.11 Standards – Architecture – Services – HIPERLAN – Adhoc Network – Blue Tooth.

UNIT IV   NETWORK LAYER   9

Mobile IP – Dynamic Host Configuration Protocol – Routing – DSDV – DSR – AODV – ZRP – ODMR.

UNIT V   TRANSPORT AND APPLICATION LAYERS   7

TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing – Selective Retransmission – Transaction Oriented TCP – WAP – WAP Architecture – WDP – WTLS – WTP – WSP – WML –WML Script – WAE – WTA.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
2. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.

REFERENCES:
1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks",First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
4. Burkhardt, "Pervasive Computing", First Edition, Pearson Education, 2003.

SE9252   REQUIREMENT ENGINEERING FOR REAL TIME SYSTEMS   LT P C
3 0 0 3

UNIT I   9

Real-Time Systems – Introduction – Real Time computer system characteristics – Computing elements of real time system – Software for real-time applications – Timing issues and Control issues – Software errors – basics of good software – Software life cycle – Requirements in the Iterative model

UNIT II   9

Requirements Engineering – Good practices for Requirements engineering – Importance of requirements stage – Common mistakes and causes – The process of requirements elicitation – Requirements evaluation and rationalization – Prioritization – Requirements Validation – Requirements Analysis

UNIT III 9

Software requirements management – Requirement management Principles and Practices – Requirement management techniques – Managing change requirements – links in the requirements chain – Tools for requirements management

UNIT IV 9

Design and Developing real-time softwares – fundamental design and construction methods – Software analysis and design – Requirements analysis using view point techniques – CORE – Object-oriented analysis and design – Code related issues

UNIT V 9

Mission critical and safety critical systems - Introduction – System specification aspects – Application software issues – Real world interfacing - Operating system aspects – Processor Problem – Hardware based fault tolerance – Performance engineering – requirements, targets and achievables – Topdown (requirements driven) – Bottomup and middle out performance modelling

TOTAL: 45 PERIODS

TEXTBOOKS:
1. Jim Cooling,"software engineering for real time system", Pearson Education, England, 2007
2. Karl Engene Wiegener,"Software requirements", Microsoft Press WP Publishers and Distributors, Bangalore 2000.

REFERENCES:
1. Dean Leffingvell and Don Widnig,"Managing software requirements", Pearson Education, India 2003.
2. Suzanne Robertson and James Robertson,"Mastering the Requirements Process", Pearson Education, India 2007.

CS9260   **EMBEDDED SYSTEMS**   **LT P C**
                                                  3 0 0 3

UNIT I   **EMBEDDED COMPUTING** 9

Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets

UNIT II   **EMBEDDED C PROGRAMMING** 9

C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

UNIT III   **OPTIMIZING ASSEMBLY CODE** 9

Profiling and cycle counting – instruction scheduling – Register allocation – conditional execution – looping constructs – bit manipulation – efficient switches – optimized primitives.

UNIT IV   PROCESSES AND OPERATING SYSTEMS   9
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT V   EMBEDDED SYSTEM DEVELOPMENT   9
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.

TOTAL: 45 PERIODS

REFERENCES
1. Andrew N Sloss, D. Symes, C. Wright, " ARM System Developers Guide", Morgan Kaufmann / Elsevier, 2006.
2. Michael J. Pont, "Embedded C", Pearson Education , 2007.
3. Wayne Wolf, "Computers as Components : Principles of Embedded Computer System Design", Morgan Kaufmann / Elsevier, 2nd. edition, 2008.
4. Steve Heath, "Embedded System Design" , Elsevier, 2nd. edition, 2003.

SE9255   **SOFTWARE REUSE**   **LT P C**
                                                                             3 0 0 3

UNIT I   INTRODUCTION   9
Organizing Reuse – Introduction – Motivation for Reuse – Framework for Reuse- Evolution of Reuse - Reuse in industry – Managing a reuse project – Software Reuse Products- Software Reuse Processes and paradigms – Reuse tools.

UNIT II   REUSE MANAGEMENT   9
Managing a repository – The REBOOT component model – Classification – Configuration management of the repository – Managerial aspects of software Reuse– Software Reuse Metrics – Software Reuse Cost estimation – Forming a reuse Strategy – Assessing reuse maturity.

UNIT III   REUSABLE COMPONENTS   9
Practicing reuse – Reuse Techniques- Generic reuse development processes – Develop for reuse – Testing reusable components – Object oriented components – Object oriented development for reuse – Reuse Techniques- Reuse Technologies- Detailed design for reuse – Implementation for reuse – Verification, test and validation.

UNIT IV   REUSE PHASES   9
Development with reuse – with reuse specific activities – Common reuse processes – Phases of development with reuse – Impact of reuse on development cycle- Reuse Technologies.

UNIT V   CLEANROOM SOFTWARE ENGINEERNG   9
Re–engineering for reuse – Methodology – Retrieving objects in non–object oriented code–Measurements – Tools support for re–engineering – Overview of clean room software engineering – Phases in clean room method – Box structures algorithms – Adapting the box structures.

TOTAL: 45 PERIODS

REFERENCES:

1. Wayne C.Lim, " Managing Software Reuse", Prentice Hall, 2004.
2. Hafedh Mili, Ali Mili, Sherif Yacoub, "Reuse based Software Engineering: Techniques, Organizations and Controls", John Wiley and Sons, 2002.
3. Karma Mcclure, "Software Reuse Techniques – Additional Reuse To The Systems Development Process ", Prentice Hall, 1997.
4. Even-Andre Karisson, "Software Reuse – A Holistic Approach", John Wiley And Sons, 1996.

CS9268	ADVANCED DATABASES	LT P C
		3 0 0 3

UNIT I   PARALLEL AND DISTRIBUTED DATABASES   9
Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies**.**

UNIT II   OBJECT AND OBJECT RELATIONAL DATABASES   9
Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational feature sin SQL/Oracle – Case Studies.

UNIT III   XML DATABASES   9
XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining

UNIT IV   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 Database Recovery Schemes

UNIT V   MULTIMEDIA DATABASES   9
Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.

TOTAL: 45 PERIODS

REFERENCES
1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", fifth edition, pearson education/addison wesley, 2007.
2. Thomas cannolly and carolyn begg, " Database Systems, a practical approach to design, implementation and management", third edition, pearson education, 2007.
3. Henry F. korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", fifth edition, McGraw hill, 2006.
4. C.J. Date, A. Kannan and S. Swamynathan,"an introduction to Database Systems", eighth edition, pearson education, 2006.
5. V.S. Subramanian, "Principles of Multimedia Database Systems", harcourt india pvt ltd., 2001.
6. Vijay kumar, " Mobile Database Systems", John Wiley & Sons, 2006.

SE9256	DESIGN PATTERNS	LT P C
		3 0 0 3

UNIT I   INTRODUCTION   9
History and Origin of Patterns – Applying Design Patterns – Prototyping –Testing.

UNIT II   DESIGN PATTERNS   9
Kinds of Pattern – Quality and Elements – Patterns and Rules – Creativity and Patterns– Creational Patterns – Structural Patterns – Behavioral Patterns, Factory Patterns.

UNIT III   FRAMEWORKS   9
State and Strategy of Patterns. Singleton, Composite, Functions and The Command Patterns, Adaptor, Proxy Pattern, Decorator Pattern – Pattern Frameworks and Algorithms.

UNIT IV   CATALOGS   9
Pattern Catalogs and Writing Patterns, Patterns and Case Study.

UNIT V   ADVANCED PATTERNS   9
Anti-Patterns - Case Studies In UML and CORBA, Pattern Community.

TOTAL: 45 PERIODS

REFERENCES:

1 Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,"Design patterns: Elements of Reusable object-oriented software", Addison-Wesley, 1995.
2. James W- Cooper, Addison-Wesley," Java Design Patterns – A Tutorial", 2000.
3. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and the unified process", Second Edition, Prentice Hall, 2001.
4. Thomas Mow bray and Raphael Malveaux, " CORBA and Design Patterns ", John Wiley, 1997.
5. William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.

SE9258   **SOFTWARE QUALITY MANAGEMENT**   **L T P C**
                                                                        3 0 0 3

UNIT I   INTRODUCTION TO PRINCIPLES OF PRODUCT QUALITY   8
Ethical Basis for Software Quality – Total Quality Management Principles – Software
Processes and Methodologies – Quality Standards, Practices & Conventions – Software
Configuration Management – Reviews and Audits – Improving Quality with
Methodologies – Structured/Information Engineering – Measuring Customer Satisfaction
– Reliability Models – Reliability Growth Models – Software Quality Engineering –
Defining Quality Requirements –
Management Issues for Software Quality – Data Quality Control – Benchmarking and
Certification.

UNIT II   SOFTWARE QUALITY ASSURANCE PLAN   11
Writing Software Requirements and Design Specifications – Analyzing Software
Documents using Inspections and Walkthroughs – Software Configuration Management
– Software Metrics – Lines of code, Cyclomatic Complexity, Function Points, Feature
Points – Software Cost Estimation (COCOMO) – Quality Management Standards – ISO
and TickIt initiative – Accepted process models, (eg CMM) – Reliability.

UNIT III   TEST MANAGEMENT   12
Introductory Concepts, Testing and Debugging Goals and Policies, Test Planning, Test
Plan Components, Test Plan Attachments, Locating Test Items, Reporting Test Results,
The role of three groups in Test Planning and Policy Development, Process and the
Engineering Disciplines, Introducing the test specialist, Skills needed by a test specialist,
Building a Testing Group, Testing as an Engineering Activity, Role of Process in
Software Quality, Testing as a Process, Basic Definitions, Software Testing Principles,
The Tester's Role in Software Development Organization, Origins of Defects, Defect
Classes, The Defect Repository and Test Design, Test Case Design Strategies, Using
Black Box Approach to Test Case Design, Random Testing, Black-Box testing and
COTS, Using White-Box Approach to Test design, Test Adequacy Criteria.

UNIT IV   SOFTWARE QUALITY IMPROVEMENT   6
Software Quality Improvement Techniques, Statistical Software Quality Assurance
Techniques, Quality Appraisal Programs

UNIT V   CONTROLLING AND MONITORING   8
 Defining Terms, Measurement and Milestones for Controlling and Monitoring, Status
Meetings, Reports and Control Issues, Criteria for Test Completion, SCM, Types of
reviews, Developing a review program, Components of Review Plans, Reporting review
results.

                                                            TOTAL: 45 PERIODS
REFERENCES:
1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, Chennai,
    2003.
2. Metrics and Models in Software Quality by Stephen Kan, Addison-Wesley, 1995.
3. The Capability Maturity Model: Guidelines for Improving the Software Process by
    Mark Paulik, Addison-Wesley, 1995.
4. Elfriede Dustin, "Effective Software Testing", Pearson Education, New Delhi, 2003.
5. Renu Rajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and
    Techniques", Tata McGraw Hill, New Delhi, 2003.

CS9270   **COMPONENT BASED TECHNOLOGY**   **LT P C**
                                                                  3 0 0 3

UNIT I   **INTRODUCTION**   **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 PERIODS
TEXT BOOK
1. "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003.

REFERENCE:
1. Ed Roman, "Enterprise Java Beans", Third Edition , Wiley , 2004.

SE9259   **TEAM SOFTWARE PROCESS AND PERSONAL**   **LT P C**
                       SOFTWARE PROCESS   **3 0 0 3**

UNIT I   **INTRODUCTION**   **9**
Software Engineering – Time management – Tracking Time – Period and product planning – Product planning – Product Size – Managing your time - Managing commitments – Managing Schedules.

UNIT II   **PLANNING**   **9**
The project plan – The Software Development process – Defects – Finding Defects – The Code review checklist – Design defects – Product quality – Process quality

UNIT III   TSP STRATEGY   9
Team Software process overview – The logic of the team software process – Launching a Team project - The development strategy – The Development Plan – Defining the requirement.

UNIT IV   PRODUCT IMPLEMENTATION   9
Designing with teams – Product implementation – integration & system testing - The postmortem.

UNIT V   TEAM MANAGEMENT   9
The team leader role – Development manager role – The planning manager role – The quality – Process manager role – The support manager role.

TOTAL: 45 PERIODS

TEXT BOOK
1. Watt S Humphery "Introduction to Personel Software Process, Addison Wesley,2000.

SE9260   SOFTWARE RELIABILITY   LT P C
**   3 0 0 3**

UNIT I   INTRODUCTION TO SOFTWARE RELIABILITY   8
Basic Concepts – Failure and Faults – Environment – Availability –Modeling – uses.

UNIT II   SOFTWARE RELIABILITY MODELING   12
Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson-Type Models – Binomial – Type Models – Poisson-Type models – Fault reduction factor for Poisson-Type models.

UNIT III   COMPARISON OF SOFTWARE RELIABILITY MODELS   12
Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals – Reliability Growth Model – Model Evaluation

UNIT IV   MEASUREMENTS THEORY   12
Fundamentals of Measurement – Measurements in Software Engineering – Scope of Software metrics – Measurements theory – Goal based Framework – Software Measurement Validation -- Measurement of Quality – Quality Management Models.

UNIT V   RELIABILITY ASSESSMENT   6
Ability to Test Entire System -- Software Reliability Improvement Techniques Measurement of Internet Product Attributes –– Orthogonal Classification.

TOTAL: 45 PERIODS

REFERENCES:
1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, "Software Reliability –
   Measurement, Prediction, Application, Series in Software Engineering and
   Technology", McGraw Hill, 1987.
2. John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.
3. Michael E.Whitman, Herbert J.Mattord, "Principles of Information Security", Thompson
   (Vikas Publishing House), 2003.

CS9264   DATA WAREHOUSING AND DATA MINING   L T P C
                                                            3 0 0 3

UNIT I   **9**
Data Warehousing and Business Analysis: - Data warehousing Components –Building a
Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture –
DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation
Tools –Metadata – reporting – Query tools and Applications – Online Analytical
Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II   **9**
Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data
Integration and Transformation – Data Reduction – Data Discretization and Concept
Hierarchy Generation.
Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods –
Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis
– Constraint-Based Association Mining.

UNIT III   **9**
Classification and Prediction: - Issues Regarding Classification and Prediction –
Classification by Decision Tree Introduction – Bayesian Classification – Rule Based
Classification – Classification by Back propagation – Support Vector Machines –
Associative Classification – Lazy Learners – Other Classification Methods – Prediction –
Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor –
Ensemble Methods – Model Section.

UNIT IV   **9**
Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major
Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based
Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-
Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V   **9**
Mining Object, Spatial, Multimedia, Text and Web Data:
Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial
Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

                                                            TOTAL: 45 PERIODS

REFERENCES:

1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition,
2. Elsevier, Reprinted 2008.
3. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
4. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
5. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
6. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.

SE9261 **LANGUAGE TECHNOLOGIES** **LT P C**
3 0 0 3

UNIT I INTRODUCTION 9
Natural Language Processing – Linguistic Background- Spoken language input and output Technologies – Written language Input - Mathematical Methods - Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing – Parsing – Semantic and Logic Form – Ambiguity Resolution – Semantic Interpretation.

UNIT II INFORMATION RETRIEVAL 9
Information Retrieval architecture - Indexing- Storage – Compression Techniques – Retrieval Approaches – Evaluation - Search engines- commercial search engine features- comparison- performance measures – Document Processing - NLP based Information Retrieval – Information Extraction.

UNIT III TEXT MINING 9
Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering- Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV GENERIC ISSUES 9
Multilinguality – Multilingual Information Retrieval and Speech processing - Multimodality – Text and Images – Modality Integration - Transmission and Storage – Speech coding- Evaluation of systems – Human Factors and user Acceptability.

UNIT V APPLICATIONS 9
Machine Translation – Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing – Dialog and Conversational Agents – Natural Language Generation – Surface Realization and Discourse Planning.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Daniel Jurafsky and James H. Martin, " Speech and Language Processing" , 2000.
2. Ron Cole, J.Mariani, et.al "Survey of the State of the Art in Human Language Technology", Cambridge University Press, 1997.
3. Michael W. Berry " Survey of Text Mining: Culstering, Classification and Retrieval", Springer Verlag, 2003.
4. Christopher D.Manning and Hinrich Schutze, " Foundations of Statistical Natural Language Processing ", MIT Press, 1999.

REFERENCES:

1. James Allen "Natural Language Understanding", Benjamin/ Cummings Publishing Co. 1995.
2. Gerald J. Kowalski and Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer academic Publishers, 2000.
3. Tomek Strzalkowski "Natural Language Information Retrieval", Kluwer academic Publishers, 1999.
4. Christopher D.Manning and Hinrich Schutze, " Foundations of Statistical Natural Language Processing ", MIT Press, 1999.

CS9263   **AD-HOC NETWORKS**   **LT P C**
                                                                            3 0 0 3

UNIT I   AD-HOC MAC   9
Introduction – Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

UNIT II   AD-HOC NETWORK ROUTING & TCP   9
Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP.

UNIT III   WSN -MAC   9
Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

UNIT IV   WSN ROUTING, LOCALIZATION & QOS   9
Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.

UNIT V   MESH NETWORKS   9
Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

                                                              TOTAL: 45 PERIODS

REFERENCES:

1. C.Siva Ram Murthy and B.Smanoj, " Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
3. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
4. Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

CS 9257   **XML AND WEB SERVICES**   **L T P C**

                                                                          3 0 0 3

UNIT I   XML TECHNOLOGY FAMILY   9
XML – benefits – Advantages of XML over HTML – EDL –Databases – XML based standards – DTD –XML Schemas – X- Files – XML processing – DOM –SAX-presentation technologies – XSL – XFORMS – XHTML – voice XML – Transformation – XSLT – XLINK – XPATH –XQ

UNIT II   ARCHITECTING WEB SERVICES   9
Business motivations for web services – B2B – B2C- Technical motivations – limitations of CORBA and DCOM – Service – oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime

UNIT III   WEB SERVICES BUILDING BLOCK   9
Transport protocols for web services – messaging with web services – protocols – SOAP – describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI – Anatomy of UDDI- Web service inspection – Ad-Hoc Discovery – Securing web services.

UNIT IV   IMPLEMENTING XML IN E-BUSINESS   9
B2B - B2C Applications – Different types of B2B interaction – Components of e-business XML systems – ebXML – Rosetta Net Applied XML in vertical industry – Web services for mobile devices.

UNIT V   XML AND CONTENT MANAGEMENT   9
Semantic Web – Role of Meta data in web content – Resource Description Framework – RDF schema – Architecture of semantic web – content management workflow – XLANG –WSFL.

                                                          TOTAL: 45 PERIODS

TEXT BOOK
1. Ron schmelzer et al, "XML and Web Services", Pearson Education, 2002.
2. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2004.

REFERENCES:
1. Frank P. Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002.
2. Keith Ballinger, ".NET Web Services Architecture and Implementation", Pearson Education, 2003.
3. Henry Bequet and Meeraj Kunnumpurath, "Beginning Java Web Services", Apress, 2004.
4. Russ Basiura and Mike Batongbacal, "Professional ASP.NET Web Services", Apress,2.

CS9258	BIO INFORMATICS	LT P C
		3 0 0 3

UNIT I INTRODUCTORY CONCEPTS 9

The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

UNIT II SEARCH ENGINES AND DATA VISUALIZATION 9

The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies.

UNIT III STATISTICS AND DATA MINING 9

Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

UNIT IV PATTERN MATCHING 9

Pairwise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases.

UNIT V   MODELING AND SIMULATION   9

Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property.

TOTAL: 45 PERIODS

REFERENCES

1. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.
2. T.K.Attwood and D.J. Perry Smith, "Introduction to Bio Informatics, Longman Essen, 1999.