

**M.Tech SOFTWARE ENGINEERING
(Four Semesters / Full time)
CURRICULUM**

SL No	Code	Course	L	T	P	C	TC
Semester – I							
Theory							
1	MA621	Statistical Methods and Queuing Theory	3	1	0	4	
2	CS621	Object Oriented Software Engineering	3	0	0	3	
3	CS622	Software Requirements Analysis And Estimation	3	0	0	3	
4	CS623	System Dynamics	3	0	0	3	
5	CS624	Computer Networks and Management	3	0	0	3	
6	CS625	Operating Systems	3	0	0	3	
Practical							
1	CS626	Case Tools Lab	0	1	3	2	
2	CS627	System Development Platforms and Languages	0	1	3	2	
Total							23
Semester – II							
Theory							
1	CS628	Software Design and Architecture	3	0	0	3	
2	CS629	Integrated Software Project Management	3	0	0	3	
3	CS630	Software Testing and Quality Assurance	3	0	0	3	
4	CS631	Advanced Database Technologies	3	0	0	3	
5		Elective –I	3	0	0	3	
6		Elective – II	3	0	0	3	
Practical							
1	CS632	Case Study 1: Software Design	0	0	2	1	
2	CS633	Case Study 2: Software Project Management	0	0	2	1	
3	CS634	Software Testing and Measurements Lab	0	1	3	2	
Total							22

Semester – III

Theory

1	CS721	Information Security	3	0	0	3
2	CS722	Cloud Computing	3	0	2	4
3		Elective – III	3	0	0	3
4		Elective – IV	3	0	0	3

Practical

1	CS723	Project – Phase I	0	0	12	6*
		Total				13

Semester – IV

Practical

1	CS723	Project – Phase II	0	0	24	18*
		Total				18

*Credits for Project Work(Phase I) of III semester will be accounted along with Project Work (Phase II) of IV semester”

Total Credits = 76

Total Number of Theory Courses : 16
Total Number of Case Studies : 2
Total Number of Practical Courses : 3

LIST OF ELECTIVE COURSES

SL No	Code	Course	L	T	P	C
1	CSY101	Theory of Computation	3	0	0	3
2	CSY102	Soft Computing	3	0	0	3
3	CSY103	Mobile Computing	3	0	0	3
4	CSY104	Distributed Systems	3	0	0	3
5	CSY105	Web Technology	3	0	0	3
6	CSY106	XML and Web Services	3	0	0	3
7	CSY107	Formal Methods in Software Engineering	3	0	0	3
8	CSY108	Multimedia Systems	3	0	0	3
9	CSY109	Software Agents	3	0	0	3
10	CSY110	Embedded Systems	3	0	0	3
11	CSY111	IT Systems Management	3	0	0	3
12	CSY112	Mobile Adhoc Networks	3	0	0	3
13	CSY113	Data Warehousing and Data Mining	3	0	0	3
14	CSY114	Performance Evaluation of Computer Systems and Networks	3	0	0	3
15	CSY115	Agent Based Intelligent Systems	3	0	0	3
16	CSY116	Personal Software Process	3	0	0	3
17	CSY117	Team Software Process	3	0	0	3
18	CSY118	Software Engineering for Image Processing	3	0	0	3
19	CSY119	Service Oriented Architecture	3	0	0	3
20	CSY120	Grid Computing	3	0	0	3
21	CSY121	Pervasive Computing	3	0	0	3
22	CSY122	User Interface Design	3	0	0	3
23	CSY123	Software Maintenance	3	0	0	3
24	CSY124	Multimodal Computing	3	0	0	3
25	CSY019	Research Methodology for computer Scientist	3	0	0	3

SEMESTER – I

MA621 STATISTICAL METHODS AND QUEUING THEORY 3 1 0 4

UNIT I PROBABILITY AND RANDOM VARIABLES 10

Probability – Random variables – Binomial, Poisson, Geometric, Uniform, Normal, Exponential distributions – Moments – Moments generating functions and their properties – Function of random variables.

UNIT II ESTIMATION THEORY 8

Partial and Multiple correlations – Partial and multiple regressions – Estimation of parameters using maximum likelihood estimator and method of moments.

UNIT III TESTING OF HYPOTHESIS 9

Basic definitions of statistical hypothesis – Tests based on Normal, T, Chi – square and F distributions for mean, variance and proportion.

UNIT IV DESIGN OF EXPERIMENTS 9

Analysis of variance – One way and two way classifications – Completely randomized design – Randomized block design – Latin square design – 2² factorial design.

UNIT V QUEUING THEORY 9

Single and Multiple server Markovian Queuing models – Customer impatience – Queuing applications.

TOTAL = 45

TEXT BOOKS

1. Gupta S.C. and Kapoor V.K, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons, New Delhi, 2001.
2. Taha H.A, “Operations Research: An Introduction”, 7th edition, Pearson Education Edition, Asia, New Delhi, 2002.

REFERENCES

1. Walpole R.E., Myer R.H, Myer S.L. and Ye. K, “Probability and Statistics for Engineers and Scientists”, 7th edition, Pearson Education, Delhi, 2002.
2. Goel B.S. and Mittal S.K, “Operations Research”, Pragati Prakashan, Meerut, 2000.
3. Freund J.E. and Miller I.R, “Probability and Statistics for Engineers”, Prentice Hall of India, 5th edition, New Delhi, 1994.
4. Gupta, S.C. and Kapur V.K., “Fundamentals of Mathematical Statistics”, Sultan Chand & Sons, New Delhi, 1999.

CS 621 OBJECT ORIENTED SOFTWARE ENGINEERING 3 0 0 3

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING 9

Software engineering development – Software life cycle models – Standards for developing life cycle models.

UNIT II OBJECT METHODOLOGY & REQUIREMENT ELICITATION 9

Introduction to Object Oriented Methodology – Overview of requirements elicitation, Requirements model – Action & use cases – Requirements elicitation activities, Managing requirements elicitation.

UNIT III ARCHITECTURE AND MODELING WITH UML 9

Model architecture – Requirements model – Analysis model – Design model – Implementation model–Test model. Modeling with UML: Basic building blocks of UML– A conceptual model of UML– Basic structural modeling – UML diagrams.

UNIT IV SYSTEM ANALYSIS AND DESIGN 9

Analysis model – Dynamic modeling and testing – System design: Design concepts and activities – Design models – Block design –Testing.

UNIT V TESTING OBJECT ORIENTED SYSTEMS 9

Introduction –Testing activities and techniques – The testing process – Managing testing –State based testing and Data flow testing for classes – Case studies.

TOTAL = 45

REFERENCES

1. Stephen R. Scach, “Classical & Object Oriented Software Engineering with UML and Java”, 4th edition, McGraw Hill, 2001.
2. Ivar Jacobson and Magnus Christenson, “Object Oriented Software Engineering: A use Case Driven approach”, Addison Wisely, 1992.
3. Bernd Bruegge and Alan H Dutoit, “Object - Oriented Software Engineering”, 2nd edition, Pearson Education, 2004.
4. Timothy C.Lethbridge and Robert Laganieri, “Object oriented Software Engineering: Practical Software development using UML and Java”, McGraw Hill, 2004.

UNIT I REQUIREMENTS ENGINEERING OVERVIEW**9**

Software requirement overview – Software development roles – Software development process kernels – Commercial life cycle model – Vision development – Stakeholders needs & analysis.

UNIT II REQUIREMENTS ELICITATION**9**

The process of requirements elicitation – Requirements elicitation problems – Problems of scope – Problems of understanding – Problems of volatility – Current elicitation techniques – Information gathering – Requirements expression and analysis – Validation – An elicitation methodology framework – A requirements elicitation process model – Methodology over method – Integration of techniques – Fact – finding – Requirements gathering – Evaluation and rationalization – Prioritization – Integration and validation.

UNIT III REQUIREMENTS ANALYSIS**9**

Identification of functional and non functional requirements – Identification of performance requirements – Identification of safety requirements – Analysis – Feasibility and internal compatibility of system requirements – Definition of human requirements baseline.

UNIT IV REQUIREMENTS DEVELOPMENT**9**

Requirements analysis – Requirements documentation – Requirements development workflow – Fundamentals of requirements development – Requirements attributes guidelines document – Supplementary specification document – Use case specification document – Methods for software prototyping – Evolutionary prototyping – Throwing away prototyping.

UNIT V SOFTWARE ESTIMATION & COSTING**9**

Software Requirements Management - Requirements management Principles and practices – Requirements - attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

TOTAL = 45**REFERENCES**

1. Ian Sommerville and Pete Sawyer, "Requirements Engineering: A Good Practice Guide", 6th edition, Pearson Education, 2004.
2. Dean Leffingwell and Don Widrig, "Managing Software Requirements: A Use Case Approach", 2nd edition, Addison Wesley, 2003.
3. Karl Eugene Wiegers, "Software Requirements", Word Power Publishers, 2000.
4. Ian Graham, "Requirements Engineering and Rapid Development", Addison Wesley, 1998.

5. McConnell, S. "Software Project: Survival Guide", Microsoft Press, 1998.
6. Royce W, "Software Project management: A Unified Framework", Addison Wesley, 1998.
7. Cooper .R, "The Rise of Activity – Based Costing – Part One: What is an Activity – Based Cost System?" Journal of Cost Management, Vol.2, No.2 Summer, 1988.

CS623 SYSTEM DYNAMICS 3 0 0 3

UNIT I COMPLEXITY IN REAL WORLD 9

Complexity – Characteristics of complex problems – Learning in and about complex systems – Structure and behavior of dynamic systems.

UNIT II SYSTEM THINKING MINDSET 9

Holistic thinking – Multi levels of reasoning: Event – Pattern – Structure – Learning organization.

UNIT III MULTI MODELING APPROACH 9

Multi - perspective – Stakeholder needs – Alterable and Constraints – Problem understanding – Discovery and diagnosis.

UNIT IV TOOLS FOR SYSTEM THINKING 9

Causal loop diagram – Stocks and flows – Dynamics of simple structure.

UNIT V SYSTEM ARCHETYPES 9

Limit to growth – Escalation – Drifting goals – Success to the successful – Fixes that fail – Shifting the burden.

TOTAL = 45

REFERENCES

1. Senge P.M, "The fifth Discipline: The Art and Practice of learning Organization", Doubleday, 1990.
2. Joseph O'Connor and Ian McDermott, "The Art of System Thinking," Thorsons, 1997.
3. John D.Sterman, "Business Dynamics: Systems Thinking and Modeling from Complex World", McGraw Hill/Irwin, 2000.
4. Dennis Sherwood, "Seeing the forest for the trees: A Manager's Guide to Applying Systems Thinking", Nicolas Brealey, 2002.

UNIT I COMPUTER NETWORKS AND THE INTERNET**9**

The network edge – The network core – Delay, loss, and throughput in packet – Switched networks – Protocol layers and their service models – Networks under attack – History of computer networking and the internet.

UNIT II APPLICATION AND TRANSPORT LAYER**9**

Principles of network applications – The Web and HTTP – File Transfer: File transfer protocol – DNS – Peer - to - peer applications – Socket programming –transport – Layer and services – Multiplexing and demultiplexing – Connectionless transport: User Datagram Protocol – Principles of reliable data Transfer – Connection - oriented transport: Principles of congestion control – Congestion control mechanism.

UNIT III THE NETWORK LAYER AND THE LINK LAYER AND LOCAL AREA NETWORKS**9**

Introduction – Virtual circuit and datagram networks – The Internet Protocol (IP): Routing algorithms – Routing in the internet – Broadcast and multicast routing – Link Layer: Services – Error Detection and Correction Techniques – Multiple access protocols – Link – Layer addressing – Ethernet – Link – Layer switches – The Point - to -Point protocol – Link virtualization: A Network as a link layer.

UNIT IV WIRELESS AND MOBILE NETWORKS AND MULTIMEDIA NETWORKING**9**

Introduction – Wireless Links and Network Characteristics – WiFi: 802.11 Wireless LANs – Cellular Internet access – Mobility Management: Mobile IP – Managing Mobility in Cellular Networks – Impact on higher - layer protocols – Multimedia networking applications – Streaming stored audio and video – Making the best of the best – Effort service – Protocols for real-time interactive applications – Quality of service guarantees.

UNIT V SECURITY IN COMPUTER NETWORKS & NETWORK MANAGEMENT**9**

Introduction – Principles of cryptography – Message integrity – End -Point authentication – Securing e-mail – Securing TCP connections: SSL – Network layer security: Ipsec – Securing wireless LANs – Operational security: Firewalls and intrusion detection systems – Network management – The Infrastructure for network management – The Internet – Standard management framework – ASN.1.

TOTAL = 45**TEXT BOOK**

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top – Down Approach”, 4th edition, Addison Wesley, 2007.

REFERENCES

1. Larry Peterson and Bruce Davie, "Computer Networks: A System Approach", 4th edition, Morgan Kaufmann, 2007.
2. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall, 2004.
3. William Stallings, "Wireless Communications & Networks", 2nd edition, Prentice Hall, 2005.
4. Jochen Schiller, "Mobile Communications", 2nd edition, Addison Wesley, 2003.

CS625 OPERATING SYSTEMS

3 0 0 3

UNIT I OPERATING SYSTEMS OVERVIEW

9

Introduction – Operating system structures – Processes – Threads – CPU scheduling.

UNIT II PROCESS MANAGEMENT

9

Process Management – The critical-section problem – Peterson's solution – Synchronization hardware – Semaphores – Classic problems of synchronization– Monitors – Synchronization examples – Atomic transactions –System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

UNIT III STORAGE MANAGEMENT

9

Memory management – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging – Example: The Intel Pentium virtual memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing – Memory – Mapped files – Allocating kernel memory – Other considerations – Operating system examples.

UNIT IV STORAGE MANAGEMENT & I/O SYSTEMS

9

File concept – Access methods – Directory structure – File - system mounting – Protection – Directory implementation – Allocation methods – Free-space management – Efficiency and Performance – Recovery – NFS-example: The WAFL File System – Disk scheduling – Disk management – Swap-space management – RAID structure stable – Storage implementation – Tertiary – Storage structure – I/O hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O requests to hardware operations – Streams.

UNIT V PROTECTION AND SECURITY AND CASE STUDY

9

Goals of protection – Principles of protection – Domain of protection – Access Matrix – Implementation of access matrix – Access control – Revocation of access rights – Capability – Based systems – Language – Based protection – Security: The Security problem – Program threats – System and network threats – Cryptography as a security tool – User authentication – Implementing security defenses – Fire walling to protect systems and networks – Computer -security classifications – An example: Windows

XP.Case Study : The Linux/System – Design principles – Kernel modules – Process management. – Scheduling – Memory management – File systems – Windows XP – Design principles – System components – Environmental subsystems – File system.

TOTAL = 45

REFERENCES

1. Abraham Silberschatz, Peter B. Galvin and Greg Gagne, “Operating System Concepts” ,8th edition, Addison Wesley, 2009.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, 2nd edition, Addison Wesley, 2001.
3. Gary Nutt, “Operating Systems”, 2nd edition, Addison Wesley, 2001.

CS 626 CASE TOOLS LAB

0 1 3 2

The student is expected to take up about Five mini – projects and model them and produce Use Cases, Analysis documents – both static and dynamic aspects, Sequence Diagrams and State-Charts, Database Design using Rational Products.

1. Online Bookshop
2. Simulation of a small manufacturing Company.
3. A Content Management System.
4. Air traffic Simulation.
5. Automated Community Portal.
6. File Management System
7. Medical Imaging System

CS627 SOFTWARE DEVELOPMENT PLATFORMS AND LANGUAGES LAB

0 1 3 2

Object Orientation

- Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix – vector multiplication)
- Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
- Develop a template of linked – list class and its methods.
- Design stack and queue classes with necessary exception handling.

Web

The students are advised to get exposed to web technologies like HTML, XML and their variants as well as Java Programming

- Write HTML/Java scripts to display CV in Web Browser.
- Creation and annotation of static web pages using any HTML editor.
- Write a program to use XML and JavaScript for creation of your homepage.

- Write a program in XML for creation of DTD which specifies a particular set of rules.
- Create a Style sheet in CSS/XSL and display the document in Web Browser.
- Write a Java Servlet for HTTP Proxy Server.
- Use JSP pages for sharing session and application data of HTTP Server.
- Write a program to use JDBC connectivity program for maintaining database by sending queries.

Applications

Develop Software for the applications like:

- Online railway reservation system
- Payroll processing application
- Inventory system

Software required:

- Development Platform: Eclipse, Delphi, Web sphere, Net beans, .NET etc.
- Languages: C/C++/Java/JSDK/Web browser.
- Any front end tool (like VB, VC++, Developer 2000) etc
- Any back end tool (Oracle, MS – Access, SQL) etc.

SEMESTER – II

CS628 SOFTWARE DESIGN AND ARCHITECTURE

3 0 0 3

UNIT I DESIGN FUNDAMENTALS

9

The nature of design process – Objectives – Building modules, constructs, design qualities – Assessing the design – Design viewpoints for software.

UNIT II DESIGN METHODOLOGIES

9

Design practices – Rational for method – Design strategies – Top down and bottom up – Organizational methods and design – Jackson structural programming – Jackson system development – Object-Oriented and Object - based design – Structured system analysis and structured design method.

UNIT III DESIGN MODELS

9

Traditional approach to design – SADT organizational design practices – SSADM and design for real time systems – MASCOT.

UNIT IV INTRODUCTION TO SOFTWARE

9

Introduction – Software architecture – Definition – Prospects – State of art – Architectural styles – Pipes and filters – Layered systems – Architecture design patterns – Object oriented organization – User interface architecture.

UNIT V SHARED INFORMATION SYSTEMS

9

Shared information systems – DB integration – Integration in software development environments – Integration and design of building – Architecture structures for shared information systems.

TOTAL = 45

REFERENCES

1. David Budgen, "Software Design ", Addison Wesley, 1994.
2. Pressman R.S, "Software Engineering ", 4th edition, McGraw Hill Inc, 1996.
3. Ed Downs, Peter Clare and Jan Coe, "Structured System Analysis and Design Methods Application and Context ", Prentice Hall, 1998.
4. Mary Shaw David Garlan, "Software Architectural Perspectives on an Emerging Discipline ", EEE, PHI, 1996.
5. Bass L, Clements P, and Kazman R, "Software Architecture in Practices", 2nd edition, SEI series in Software Engineering, PEI, Addison Wesley, 2003.

CS629 INTEGRATED SOFTWARE PROJECT MANAGEMENT

3 0 0 3

UNIT I PROJECT MANAGEMENT CONCEPTS

9

Evolution of software economics – Software management process framework (Phases, Artifacts, Workflows, Checkpoints) – Software management disciplines (Planning / Project Organization and Responsibilities / Automation / Project Control) – Modern project profiles.

UNIT II SOFTWARE ESTIMATION & COSTING

9

Problems in software estimation – Algorithmic cost estimation process, Function points, SLIM (Software Life cycle Management), COCOMO II (Constructive Cost Model) – Estimating web application development – Concepts of finance – Activity Based Costing and Economic Value Added (EVA) – Balanced score card.

UNIT III RISK MANAGEMENT

9

Risk definition – Risk categories – Risk assessment (Identification / Analysis / Prioritization) – Risk control (Planning / Resolution / Monitoring) – Failure Mode and Effects Analysis (FMEA).

UNIT IV METRICS

9

Need for software metrics – Classification of software metrics: Product metrics (Size Metrics, Complexity Metrics, Halstead's Product Metrics, Quality Metrics), and Process metrics (Empirical Models, Statistical Models, Theory-based Models, Composite Models, and Reliability Models).

UNIT V PEOPLE MANAGEMENT

9

Team Management – Client Relationship Management – Function organization – Project organization – Matrix organization – Staffing quality replacement – Turnover management.

TOTAL = 45

REFERENCES

1. McConnell's, "Software Project: Survival Guide", Microsoft Press, 1998.
2. Royce W, "Software Project Management: A Unified Framework", Addison Wesley, 1998.
3. Cooper R, "The Rise of Activity - Based Costing - Part One: What is an Activity – Based Cost System?" Journal of Cost Management, Vol.2, No.2 Summer, 1988.
4. Grant J.L, "Foundations of Economic Value Added", John Wiley & Sons, 1997.
5. Kaplan R.S and Norton D.P, "The Balanced Scorecard: Translating Strategy into Action", Harvard Business School Press, 1996.
6. Boehm B. W, "Software Risk Management: Principles and Practices" in IEEE Software, 1991.

7. Fenton N.E and Pfleeger S.L, "Software Metrics: A Rigorous and Practical Approach, Revised", Brooks Cole, 1998.
8. Demarco T. and Lister T., "People ware: Productive Projects and Teams, 2nd edition", Dorset House, 1999.
9. Bob Hughes and Mike Cotterell, "Software Project Management", 4th edition, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2005.

CS630 SOFTWARE TESTING AND QUALITY ASSURANCE

3 0 0 3

UNIT I SOFTWARE TESTING PRINCIPLES and TESTING STRATEGIES 10

Need for testing – Psychology of testing – Testing economics – White box, Black box, Grey box testing – White box testing techniques – Statement coverage – Branch coverage – Condition coverage –Decision/Condition coverage – Multiple condition coverage – Dataflow coverage – Mutation testing – Automated code coverage analysis – Black box testing techniques – Boundary value analysis – Robustness testing – Syntax testing – Finite state testing – Levels of testing – Unit, Integration and system testing.

UNIT II TESTING OBJECT ORIENTED SOFTWARE, TESTABILITY AND RELATED ISSUES 10

Challenges – Differences from testing - Non-OO Software – Class testing strategies – Class Modality – State-based testing – Message sequence specification – Design for testability – Observability and Controllability – Built-in test – Design by contract – Precondition, Post condition and Invariant – Impact on inheritance – Applying in the real world – Regression Testing – Challenges – Test optimization.

UNIT III QUALITY ASSURANCE MODELS 8

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

UNIT IV SOFTWARE QUALITY ASSURANCE RELATED TOPICS 9

Software process – Definition and implementation – Internal auditing and assessments – Software testing – Concepts, Tools, Reviews, inspections and walkthroughs – P-CMM.

UNIT V FUTURE TRENDS 8

PSP and TSP – CMMI – OO Methodology – Clean-room software engineering –Defect injection and prevention.

TOTAL = 45

REFERENCES

1. William E.Perry, " Effective Methods for Software Testing", 2nd edition, John Wiley & Sons, 2000.

2. Robert Furtell, Donald Shafer and Linda Shafer, "Quality Software Project Management", Prentice Hall, 2001.
3. Boris Bezier, "Black – Box Testing: Techniques for Functional Testing of Software and Systems", John Wiley & Sons, 1995.
4. Marc Roper, "Software Testing", McGraw – Hill Book Co., London, 1994.
5. Robert V.Binder, "Testing Object – Oriented Systems: Models Patterns and Tools", Addison Wesley, 2000.
6. Philip B Crosby, "Quality is Free: The Art of Making Quality Certain", Mass Market, 1992.

CS631 ADVANCED DATABASE TECHNOLOGY 3 0 0 3

UNIT I DATABASE MANAGEMENT 9

Relational data model – SQL – Database design – Entity-Relationship model – Relational normalization – Embedded SQL – Dynamic SQL – JDBC – ODBC.

UNIT II ADVANCED DATABASES 10

Object databases – Conceptual object data model – XML and Web Data – XML Schema – Distributed data bases – OLAP and Data Mining – ROLAP and MOLAP

UNIT III QUERY AND TRANSACTION PROCESSING 8

Query processing basics – Heuristic optimization – Cost, size estimation – Models of transactions – Architecture – Transaction processing in a centralized and distributed system – TP monitor.

UNIT IV IMPLEMENTING AND ISOLATION 9

Schedules – Concurrency control – Objects and semantic commutativity – Locking – Crash, Abort and Media failure – Recovery – Atomic termination – Distributed deadlock – Global serialization – Replicated databases – Distributed transactions in real world.

UNIT V DATABASE DESIGN ISSUES 9

Security – Encryption – Digital signatures – Authorization – Authenticated RPC – Integrity – Consistency – Database tuning – Optimization and research issues.

TOTAL = 45

REFERENCES

1. Philip M. Lewis, Arthur Bernstein and Michael Kifer, "Databases and Transaction Processing: An Application Oriented Approach", Addison Wesley, 2002.
2. R. Elmasri and S.B. Navathe, "Fundamentals of Database Systems", 3rd edition, Addison Wesley, 2004.
3. Abraham Silberschatz, Henry. F. Korth and S.Sudharsan, "Database System Concepts", 4th edition, Tata McGraw Hill, 2004.

4. Raghu Ramakrishna and Johannes Gehrke, "Database Management Systems", 3rd edition, TMH, 2003.

CS 632 CASE STUDY I: SOFTWARE DESIGN

0 0 2 1

Objective : To train the students for a systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest by applying the principles and practices of Software Engineering.

The objective can be categorized as

- a) Use of the Software Engineering (SE) course learning goals to derive a set of parameters for objective assessment
- b) Soft skills such as communication, Team building, art of technical writing and presentation.

Learning Goals and Evaluation

Learning Goal	Scoring Parameter
Knowledge	Can state or identify Software engineering principles
Understand	Can summarize the case study correctly, Restate SE knowledge in own words
Application	Can state all pre – conditions and post – conditions related to application of SE knowledge and skills, Successful and complete application of SE procedure (skill) or tool to produce the specified deliverables
Analyze	Can identify patterns, problems, issues, good and bad practices. Differentiate root cause from symptom of a problem/issue, Identify components of a software system, Explain how patterns/ideas connect or do not connect to each other
Synthesis	Can state the relation between two different things, Refers to previous discussions/learning, Combine ideas to produce an explanation, Justify the application of some knowledge/skill
Evaluation	Can state <i>n</i> number of correct and most important pros and cons (from SE point) of two different proposals
Communication	Clarity of presentation, Use of example Use of case studies for assessment

Methodology of Assessment:

- The class can be grouped into sets of students comprising of not more than five members each.
- Each group should present their own case study observations, based on the parameters discussed above and other groups will act as the critics and can give their suggestions.
- Should prepare and submit the deliverable documents such as Requirement Document, SRS, Design document, Test plan document and so on.

Following are the sample case study examples. Any other real time case study problems can also be considered.

1. Warehouse Management System

The system will support warehouse management. A warehouse worker loads goods from a truck and logs in and out, goods using a database. The goods are delivered by a truck driver between warehouses, and distributed within a warehouse by a forklift truck driver. Each warehouse is managed by a foreman, who is able to move goods between warehouses with or without a customer order. A foreman is also able to check the status of a customer order

2. Four way traffic intersection, traffic light controller system

The system is designed to control the four way traffic control system. The signals are designed to glow for fixed time duration. The variation can be for free left turns, adjustable pedestrian crossing time. Provide a feature for emergency mode, where there must be an option to set particular traffic direction to be considered on a priority basis for emergency situations.

3. Day Care Center Maintenance System

Your company has been awarded a contract to develop Child Care Software for a Day Care Center (DCC). The software should maintain a database of Family, Child, and Payroll information. Users of the software shall have the ability to add/update/delete all information based on their access levels. All employees (managers, teachers, admin staff, etc.) will be identified by a unique login ID and given a default password.

4. University Admission System

Design a system to automate the admission procedures of the University system with automatic counseling feature. Depending on the parameters such as Qualifications, entrance test marks and choice of course, the student is given the options for selecting a course. The constraints to be considered are availability of course for that academic session, Number of seats (available) and eligibility criteria.

5. Hotel Reservation System

Design a system for hotel reservation system for optimum space usage. The hotel consists of 5 numbers of ten bed dormitories, 3 numbers of executive suites, 4 numbers of family rooms, 16 numbers of double bed rooms and 10 numbers of single bedrooms. Design must take care of the various issues such as cost, optimum usage of room space, future reservation and cancellations, the charges for reservation, cancellation. Discounts and season time offers may also be considered.

CS633 CASE STUDY 2: SOFTWARE PROJECT MANAGEMENT 0 0 2 1

The case studies Software Project Management cover the following topics: Project management – Configuration management – Project Planning – Project management for India and Geographic distribution issues.

Objective :

To train the students for a systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest by applying the principles and practices of Software Engineering.

The objective can be categorized as

- a) Use of the SE course learning goals to derive a set of parameters for objective assessment
- b) Soft skills such as communication, Team building, art of technical writing and presentation.

Learning Goals and Evaluation

Learning Goal	Scoring Parameter
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Evaluation	Can state n number of correct and most important pros and cons (from SE point) of two different proposals
Communication	Clarity of presentation, Use of example Use of case studies for assess

Methodology of Assessment:

1. The class can be grouped into sets of students comprising of not more than five members each.
2. Each group should present their own case study observations, based on the parameters discussed above and other groups will act as the critics and can give their suggestions.
3. Should prepare and submit the deliverable documents such as Requirement Document, SRS, Design document, Test plan document and so on. The students can also try this case studies using Free Open Source Software.

Following are the sample case study examples. Any other real time case study problems can also be considered.

1. Vessel Tracking System

Vessel tracking network used to track vessels to enhance maritime safety and security, environmental protection and emergency response. Current vessel tracking systems have their roots in the shipping industry. Corporations with large fleets of vessels required some sort of system to determine where each vessel was at any given time. Vessel tracking systems can now also be found in consumers vessels as a theft prevention and retrieval device. The navigation technology follows the basic principle of transmission and receiving the signals which are then stored in the database. The database thus records the data about the positions of the vessels from the port.

2. Time table Management System

The time table production in university is very serious work. The time table management system using the macro processing of the spreadsheet in a general personal computer system. This system is able not only to check the contradiction of the time table but also to make the management table concerning the lecturer, the classroom, the core class, and the lecture subject at the same time. By applying this management system, the time table production work was decreased and the check mistake became none at all.

3. Warehouse Management System

The system will support warehouse management. A warehouse worker loads goods from a truck and logs in and out goods using a database. The goods are delivered by a truck driver between warehouses, and distributed within a warehouse by a forklift truck driver. Each warehouse is managed by a foreman, who is able to move goods between

warehouses with or without a customer order. A foreman is also able to check the status of a customer order.

4. Four way traffic intersection, traffic light controller system

The system is designed to control the four way traffic control system. The signals are designed to glow for fixed time duration. The variation can be for free left turns, adjustable pedestrian crossing time. Provide a feature for emergency mode, where there must be an option to set particular traffic direction to be considered on a priority basis for emergency situations.

Group Discussion is also used in the Course

CS 634 SOFTWARE TESTING AND MEASUREMENTS LAB

0 1 3 2

SOFTWARE TESTING LAB

1. Study of various tools Study various tools such as Win Runner, Load Runner, Test Director, 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 TestingPrepare test plan and develop test case hierarchy.
3. 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 Management System
 - g) Real – Time Scheduler

MEASUREMENTS LAB

Software measurements help to improve the understanding of software. It provides the necessary information for the assessment and management of software project. As the assessment plays an extremely important role in the software development process the grab of measurement are as follows

- Assessment: as evaluation of given situation in special environment
 - Comprehension of used methods
 - Identification of development problems
- Indication as determination of certain factors or indicators for special characteristics

- Performance evaluation
 - Lines of code analysis
 - Reviews
 - CMM level 5 as a model for the integration of software measurement in the process important
 - Measurement based method comparison
1. For example in object oriented programming development
 - Compute method inheritance factor weighted method for class.
 2. For a typical web application to calculate the following
 - i. Weighted Method Count (WMC)
 - ii. No of Children (NoC)
 - iii. Depth of Inheritance (DIT)
 - iv. Response for a Class (RFC)
 - v. Coupling and Cohesion between Objects (CCBO)

SEMESTER III

CS721 INFORMATION SECURITY

3 0 0 3

UNIT I

12

Security Attacks (interruption, interception, modification and fabrication) – Security Services (confidentiality, authentication, integrity, non-repudiation, access control and availability) and mechanisms – A model for Internet work security – Internet Standards and RFCs – Buffer overflow & format string vulnerabilities – TCP session hijacking – ARP attacks– Route table modification – UDP hijacking and man-in-the-middle attacks. Security Models: Military and civil security– vulnerability and threat models– End-end security (COMSEC) – Link encryption (TRANSEC) – Compartments – Privacy – Authentication– Denial of service – Non repudiation.

UNIT II

8

Conventional encryption principles – Conventional encryption algorithms – Cipher block modes of operation– Location of encryption devices – Key distribution approaches of Message Authentication, Secure Hash Functions and HMAC. Public key cryptography principles – Public key cryptography algorithms – Digital signatures – Digital Certificates.

UNIT-III

8

Certificate authority and key management – Kerberos– X.509 directory authentication – Service Email privacy: Pretty Good Privacy (PGP) and S/MIME– IP security overview– IP security architecture – Authentication Header – Encapsulating security payload – Combining security associations and Key management web security requirements.

UNIT-IV

8

Secure Socket Layer (SSL) and Transport Layer Security (TLS) – Secure Electronic Transaction (SET) – Basic concepts of SNMP– SNMPv1 community facility and SNMPv3 – Intruders, viruses and related threats.

UNIT V

9

Intruders, Viruses and related threats – Firewall design principles – Trusted systems – Intrusion detection systems – Key and certificate management – Secure binding of public and private values: DNS certificates – Making and distributing key media: randomization, lifetime issues– Key agreement protocols: STS protocol and IETF work orders– Key Escrow: the Clipper chip – One-time passwords: schemes based on S/KEY– PKI.

TOTAL = 45

TEXT BOOKS

1. William Stallings, "Network Security Essentials (Applications and Standards)", Pearson Education, 2004.
2. Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permech, "Hack Proofing your network ", 2nd edition, Syngress, 2002.

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1. Eric Maiwald, "Fundamentals of Network Security", 1st edition, McGraw-Hill Osborne Media, 2003.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security - Private Communication in a Public World ", Pearson Prentice Hall of India, 2004.
3. Michael E. Whitman , "Principles of Information Security", Thomson Business Information, 2009
4. Stallings, "Cryptography and network Security", 3rd edition, Prentice Hall of India, 2004.
5. Robert Bragg and Mark Rhodes , "Network Security: The complete reference", Tata Mgraw Hill, 2004
6. Buchmann , "Introduction to Cryptography" , Apress / Springer (india) Pvt Ltd. , 2004
7. Schneier B., "Applied Cryptography - Protocols, Algorithms and Source Code in C", 2nd edition, John Wiley and Sons, 1995.

CS722 CLOUD COMPUTING

3 0 2 4

UNIT I UNDERSTANDING CLOUD COMPUTING

6

Cloud computing – History of cloud computing – Cloud architecture – Cloud storage – Cloud computing matters – Advantages of cloud computing – Disadvantages of cloud computing – Companies in the cloud today – Cloud services.

UNIT II DEVELOPING CLOUD SERVICES

10

Web - Based application – Pros and Cons of Cloud service development – Types of cloud service development – Software as a service – Platform as a service – Web services – On-Demand computing – Discovering cloud services Development services and tools – Amazon EC2 – Google App engine – IBM clouds.

UNIT III CLOUD COMPUTING FOR EVERYONE

10

Centralizing email communications – Collaborating on schedules – Collaborating on To - do lists – Collaborating contact lists – Cloud computing for the community – Collaborating on group projects and events – Cloud computing for the corporation.

UNIT IV USING CLOUD SERVICES

10

Collaborating on calendars, Schedules and Task Management – Exploring online scheduling applications – Exploring online planning and Task management – Collaborating on event management – Collaborating on contact management –

Collaborating on project management – Collaborating on word processing – Collaborating on databases – Storing and sharing files.

UNIT V OTHER WAYS TO COLLABORATE ONLINE

9

Collaborating via Web – Based communication tools – Evaluating web mail services – Evaluating web conference tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

TOTAL = 45

REFERENCES

1. Michael Miller, “Cloud Computing: Web – Based Applications that change the way you work and Collaborate Online”, Que Publishing, 2008.
2. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for on - demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, 2008.

ELECTIVES

CSY101 THEORY OF COMPUTATION

3 0 0 3

UNIT I AUTOMATA

9

Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions – Equivalence and minimization of automata.

UNIT II FINITE AUTOMATA AND REGULAR LANGUAGES

9

Finite automata and regular languages – Regular expressions and Regular languages – Non - determinism and Kleene's theorem – Pumping lemma for regular languages.

UNIT III CONTEXT – FREE GRAMMAR AND LANGUAGES

9

Context - Free Grammar (CFG) – Parse trees – Ambiguity in grammars and languages – Normal forms for CFG – Pumping lemma for CFL.

UNIT IV PUSH DOWN AUTOMATA AND TURING MACHINES

9

Definition of the Pushdown automata – Languages of a Pushdown automata – Equivalence of Pushdown automata and CFG – Turing Machines – Programming techniques for TM.

UNIT V UNSOLVABLE PROBLEMS AND UNDECIDABILITY

9

Recursive and recursively enumerable languages – Undecidable problems about Turing Machine – Universal Turing machines – Rice theorem – Post's Correspondence Problem.

TOTAL= 45

REFERENCES

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", 2nd edition, Pearson Education, 2003.
2. J.Martin, "Introduction to Languages and the Theory of Computation", 3rd edition, TMH, 2003.
3. Michael Sipser, "Introduction of the Theory and Computation", Thomson Brooke/cole, 1997.

UNIT I FUZZY SET THEORY**10**

Introduction to neuro – Fuzzy and Soft computing – Fuzzy sets – Basic definition and Terminology – Set – Theoretic operations – Member function formulation and Parameterization – Fuzzy rules and Fuzzy reasoning – Extension principle and Fuzzy relations – Fuzzy If - then rules – Fuzzy reasoning – Fuzzy inference systems – Mamdani fuzzy models – Sugeno fuzzy models – Tsukamoto fuzzy models – Input space partitioning and Fuzzy modeling.

UNIT II OPTIMIZATION**8**

Derivative – Based optimization – Descent methods – The method of steepest descent – Classical Newton’s method – Step size determination – Derivative – Free optimization – Genetic algorithms – Simulated annealing – Random search – Downhill simplex search.

UNIT III NEURAL NETWORKS**10**

Supervised learning neural networks – Perceptrons – Adaline – Back propagation – Multilayer perceptrons – Radial basis function networks – Unsupervised learning and Other neural networks – Competitive learning networks – Kohonen self – Organizing networks – Learning vector quantization – Hebbian learning.

UNIT IV NEURO FUZZY MODELING**9**

Adaptive neuro – Fuzzy inference systems – Architecture – Hybrid learning algorithm – Learning methods that cross - fertilize ANFIS and RBFN – Coactive neuro-fuzzy modeling framework – Neuron functions for adaptive networks – Neuro fuzzy spectrum.

UNIT V APPLICATION OF COMPUTATIONAL INTELLIGENCE**8**

Printed character recognition – Inverse kinematics problems – Automobile fuel efficiency prediction – Soft computing for color recipe prediction.

TOTAL= 45**REFERENCES**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro - Fuzzy and soft computing”, PHI, Pearson Education, 2004.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Application”, McGraw Hill, 1977.
3. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y, 1989.
4. S.Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
5. R.Eberhart, P.simpson and R.Dobbins, “Computational Intelligence, PC Tools”, AP Professional, Boston 1996.

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**9**

GSM & GPRS:GSM features and Architecture – Network aspects in GSM – GSM frequency allocation – Mobility management – Hand-off mechanisms – Cell splitting – Security issues used in GSM – GPRS features and Architecture – Network operations – Data services in GPRS – Applications and Limitations – SMS and MMS services architecture and operation details.

UNIT III WIRELESS NETWORKS**9**

Wireless LAN – IEEE 802.11 standards – Architecture – Services – HIPERLAN – Adhoc network – Blue tooth – EDGE – UMTS – Wireless broadband (WiMAX) – Adhoc networks – Sensor networks – Third generation networks and applications.

UNIT IV NETWORK LAYER AND TRANSPORT LAYER**9**

Mobile IP – Dynamic host configuration protocol – Routing – DSDV – DSR – AODV – 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.

UNIT V SECURITY ISSUES IN MOBILE COMPUTING**9**

Introduction – Information security – Security techniques and Algorithms – security Protocols – Public key infrastructure – Trust – Security models – Security frameworks for mobile environment.

TOTAL = 45**REFERENCES**

1. Jochen Schiller, "Mobile Communications", 2nd edition, Pearson Education, 2003.
2. Asoke. K Talukder and Roopa R. Yavagal ,"Mobile Computing (Technology, Applications and Service Creation)",TATA McGraw Hill, 2006.
3. Brian Mennecke and Troy J. Strader ,"Mobile Commerce: Technology, Theory and Applications ", Idea Group Publishing,2002.
4. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.

5. Kaveh Pahlavan, Prasanth Krishnamurthy, "Principles of Wireless Networks", 1st edition, Pearson Education, 2003.
6. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
7. C.K.Toh, "AdHoc Mobile Wireless Networks", 1st edition, Pearson Education, 2002.
8. Burkhardt, "Pervasive Computing", 1st edition, Pearson Education, 2003.

CSY104 DISTRIBUTED SYSTEMS

3 0 0 3

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT

8

Introduction – Various paradigms in distributed applications – Remote Procedure Call – Remote Object Invocation – Message Oriented communication – Unicasting, multicasting and broadcasting – Group communication.

UNIT II DISTRIBUTED OPERATING SYSTEMS

12

Issues in distributed operating system – Threads in distributed systems – Clock synchronization – Causal ordering – Global states – Election algorithms – Distributed mutual exclusion – Distributed transactions – Distributed deadlock – Agreement protocols.

UNIT III DISTRIBUTED RESOURCE MANAGEMENT

10

Distributed shared memory – Data Centric consistency models – Client Centric consistency models: Ivy – Munin – Distributed scheduling – Distributed file systems – Sun NFS.

UNIT IV FAULT TOLERANCE AND CONSENSUS

7

Introduction to fault tolerance – Distributed commit protocols – Byzantine fault tolerance – Impossibilities in fault tolerance.

UNIT V CASE STUDIES

8

Distributed object – Based system – CORBA – COM+ – Distributed coordination based system – JINI.

TOTAL = 45

REFERENCES

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", 3rd edition, Pearson Education Asia, 2002.
2. Hagit Attiya and Jennifer Welch, "Distributed Computing: Fundamentals, Simulations and Advanced Topics", Wiley publications, 2004.
3. Mukesh Singhal, "Advanced Concepts in Operating systems", McGraw – Hill Series in Computer Science, 1994.

4. A.S.Tanenbaum and M.Van Steen, "Distributed Systems", Pearson Education, 2004.
5. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.

CSY105 WEB TECHNOLOGY 3 0 0 3

UNIT I INTRODUCTION 9

History of the internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, and IMAP. Introduction to Java Scripts – Object based scripting for the web. Structures – Functions–Arrays–Objects.

UNIT II DYNAMIC HTML 9

Introduction – Objects - Reference, Children, Collection - Dynamic style- Dynamic position, Frames, Navigator, Event Model – On check – On load – Mouse rel –Form process – Event bubblers – Filters — Creating images – Adding shadows — Creating motion with blur – Data binding – Simple data binding – Moving with a record set – Sorting table data – Binding of an Image – table.

UNIT III MULTIMEDIA 9

Audio and video speech synthesis and recognition – Electronic commerce – E -Marketing – Online payments and security – Web servers – HTTP request types – System architecture – Client side scripting and Server side scripting – Accessing Web servers – IIS – Apache–web server.

UNIT IV DATABASE – ASP – XML 9

Database, Relational database model – Overview, SQL – ASP – Working of ASP – Objects – File system_objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active -X components – XML – Structure in data – Name spaces – DTD–Vocabularies–DOM Methods.

UNIT V SERVLETS AND JSP 9

Introduction – Servlet overview architecture – Handling HTTP request – Get and post request – Redirecting request – Multi-tier applications – JSP – Overview – Objects – Scripting – Standard actions – Directives.

TOTAL = 45

TEXTBOOK

1. Deitel & Deitel and Goldberg, "Internet and World Wide Web – How to program", Pearson Education Asia, 2001.
2. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2002

REFERENCES

1. R. Krishnamoorthy and S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
2. Thomno A. Powell, "The Complete Reference HTML and XHTML", 4th edition, Tata McGraw Hill, 2003.
3. Naughton, "The Complete Reference – Java2", Tata McGraw – Hill, 3rd edition, 1999.
4. Eric Ladd and Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India - QUE, 1999.
5. Aferganatel, "WebProgramming:", PHI,2004.
6. Rajkamal, "Web Technology", Tata McGraw – Hill, 2001.
7. Sebesta, "Programming the World Wide Web", 3rd edition, Addison - Wesley, 2006.
8. Basham, Sierra and Bates, "Head First Servlets and JSP", O'Reilly, 2004.
9. Elisabeth Freeman and Eric Freeman, "Head first HTML with CSS & XHTML", 1st edition, 2005.

CSY106 XML AND WEB SERVICES UNIT I XML TECHNOLOGY FAMILY

**3 0 0 3
9**

XML – Benefits – Advantages of XML – DTD – XML schemas – X -Files – XML processing – DOM – SAX – Presentation technologies – XSL – XFORMS – XHTML – Voice XML – Transformation – XSLT – XLINK – XPATH – XQuery – Service Oriented Architecture (SOA).

UNIT II WEB SERVICES BUILDING BLOCKS

9

Architecting web services – 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.

UNIT III BUILDING XML – BASED APPLICATIONS

9

Parsing XML – Integrating XML with databases – Formatting XML for the web – Leveraging XML in Visual Studio .NET – Applied XML – Understanding XML standards – Delivering wireless and Voice services with XML – Applied XML in vertical Industry.

UNIT IV XML SECURITY

9

Security overview – Canonicalization – XML security framework – XML encryption – XML Digital Signature – XKMS structure – Guidelines for Signing XML documents – XML in practice.

UNIT V SEMANTIC WEB

9

Semantic web – Role of Meta data in web content – Resource description framework – RDF schema – Architecture of semantic web – Content management workflow.

TOTAL = 45

REFERENCES

1. Andrew Harry, "Formal Methods: Fact File VDM and Z", John Wiley and Sons, 1996.
2. Jim Woodcock, Jim Davies, "Using Z Specification, Refinement and Proof", Prentice Hall International, 1996.

CSY108 MULTIMEDIA SYSTEMS 3 0 0 3

UNIT I INTRODUCTION 9

Multimedia applications – System architecture – Objects of multimedia systems – Multimedia databases.

UNIT II COMPRESSION AND FILE FORMATS 9

Types of compression – Image compression – CCITT – JPEG – Video image compression – MPEG – DVI technology – Audio compression – RTF format – TIFF file format – RIFF file format – MIDI – JPEG DIB – TWAIN.

UNIT III INPUT/OUTPUT TECHNOLOGIES 9

Traditional devices – Pen input – Video display systems – Scanners – Digital audio – Video images and animation.

UNIT IV STORAGE AND RETRIEVAL 9

Magnetic media – RAID – Optical media – CD ROM – WORM – Juke box – Cache management.

UNIT V APPLICATION DESIGN 9

Application classes – Types of systems – Virtual reality design – Components databases – Authoring systems – Hyper media – User interface design – Display/Playback issues – Hypermedia linking and embedding.

TOTAL = 45

REFERENCES

1. Andleigh P.K and Thakrar .K, "Multimedia Systems Design", Prentice Hall, 1996.
2. Vaughan T, "Multimedia", Tata McGraw Hill, 1999.
3. Koegel Buford JFK, "Multimedia Systems", Addison Wesley Longman, 1999.

CSY109 SOFTWARE AGENTS 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 MULTI AGENT 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

REFERENCES

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

UNIT I INTRODUCTION**9**

Embedded computing: Introduction, complex systems and Microprocessor, The Embedded system design processor, Formalisms for system design, Design examples. Terminology - Gates – Timing diagram – Memory – Microprocessors Buses – Direct Memory Access – Interrupts – Built-ins on the microprocessor – Conventions used on schematic – Schematic. Interrupts microprocessor architecture – Interrupt basics – Shared data problem – Interrupt latency.

UNIT II PIC MICROCONTROLLER AND INTERFACING**9**

Introduction – CPU architecture – Registers – Instruction sets – Addressing modes – Loop timing – Timers – Interrupts – Interrupt timing– I/O Expansion – I 2C Bus operation serial EEPROM – Analog to digital converter –UART – Baud Rate – Data handling – Initialization – Special features – Serial programming – Parallel slave port.

UNIT III EMBEDDED MICROCOMPUTER SYSTEMS**9**

Motorola MC68H11 family architecture registers – Addressing modes Programs. Interfacing methods parallel I/O interface – Parallel port interfaces – Memory Interfacing– High speed I/O interfacing– Interrupts – Interrupt Service Routine – Features of interrupts – Interrupt vector and Priority– Timing generation and measurements – Input capture, output compare, frequency measurement – Serial I/O devices Rs.232, Rs.485. – Analog interfacing and applications.

UNIT IV SOFTWARE DEVELOPMENT TOOLS**9**

Embedded system evolution trends. Round-robin, Robin with Interrupts, function – One-Scheduling Architecture, Algorithms. Introduction to assembler – Compiler – Cross compilers and Integrated Development Environment (IDE). Object Oriented Interfacing– Recursion – Debugging strategies – Simulators.

UNIT V REAL TIME OPERATING SYSTEMS**9**

Task and task states, tasks and data, semaphores and shared data operating system services – Message queues – Timer function – Events – Memory management– Interrupt routines in an RTOS environment – Basic design using RTOS.Multi-tasking in real time systems–Scheduling.

TOTAL= 45**TEXT BOOKS**

1. David E Simon," An Embedded Software Primer", Pearson Education Asia, 2001.
2. Jonarthan W. Valvano Brooks / cole, "Embedded Micro computer Systems Real time Interfacing ", Thomson learning, 2001.
3. John B Peat man," Design with Microcontroller ", Pearson education Asia, 1998.

4. Wayne Wolf, "Computers as Components; Principles of Embedded Computing System Design", Harcourt India, Morgan Kaufman Publishers, 1st indian reprint, 2001.
5. Alan C. Shaw, "Real Time Systems and software", John Wiley & Sons Inc, 2001.

REFERENCE BOOKS

1. Rajkamal, "Embedded systems architecture, Programming and Design", TATA McGraw Hill, 1st reprint, 2003.
2. Burns, Alan and Wellings, Andy, "Real -Time Systems and Programming Languages ", 2nd edition, Harlow: Addison Wesley Longman, 1997.
3. Raymond J.A. Bhur and Donald L.Bialek, " An Introduction to real time systems: Design to networking with C/C++ ", Prentice Hall Inc., New Jersey, 1999.
4. Grehan Moore and Cyliax, " Real time Programming: A guide to 32 Bit Embedded Development. Reading ", Addison Wesley Longman, 1998.
5. Frank Vahid and Tony Givargis, " Embedded Systems Design – A Unified Hardware/Software introduction", John Wiley, 2002.

CSY111 IT SYSTEMS MANAGEMENT

3 0 0 3

UNIT I INTRODUCTION

5

Introduction to IT Systems management – Scope and definitions, current and future technology – Hardware, software, storage, networks, systems management frameworks.

UNIT II CHANGE MANAGEMENT

10

Change management processes – Identifying the need for change, making a business case and measuring return on investment, managing change – People, tools, processes.

UNIT III CONFIGURATION MANAGEMENT

10

Configuration management processes – Current and target architecture definitions, vendor selection, solution deployment.

UNIT IV OPERATIONS MANAGEMENT I

10

Operations management processes – Application management, Performance management, Capacity planning.

UNIT V OPERATIONS MANAGEMENT II

10

Operations management processes – Business continuity and Disaster recovery, Problem management, Exception management.

TOTAL = 45

REFERENCES

1. Schiesser and Rich, "IT Systems Management", Prentice Hall of India, New Delhi, 2002.
2. Frenzel and Carol W, "Management of Information Technology", Boyd and Fraser, 1992.
3. Davenport and Thomas H, "Information Ecology - Mastering the information and Knowledge environment", Oxford University Press, 1997.
4. Phillips and Joseph, "IT Project Management - On track from start to finish", Tata McGraw Hill, 2002.
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6. Turban, Efraim, Rainer, R. Kelly, Potter and Richard E., "Introduction to InformationTechnology", John Wiley, 2003.

CSY112 MOBILE AD HOC NETWORKS

3 0 0 3

UNIT I WIRELESS LAN, PAN, WAN AND MAN

9

Characteristics of wireless channel – Fundamentals of WLANs – IEEE 802.11 standard – HIPERLAN standard – First , second and third generation cellular systems– WLL– Wireless ATM– IEEE 802.16 standard– HIPERACCESS– Ad Hoc Wireless Internet.

UNIT II MAC, ROUTING AND MULTICAST ROUTING PROTOCOLS

9

MAC protocols: Design issues, goals and classification – Contention – Based protocols with reservation and scheduling mechanisms – Protocols using directional antennas. Routing protocols: Design issues and classification – Table-driven, On-demand and Hybrid routing protocols – Routing protocols with efficient flooding mechanisms– Hierarchical and power – Aware routing protocols. Multicast Routing Protocols: Design issues and operation– Architecture reference model – Classification – Tree – based, Mesh - based protocols – Energy – Efficient multicasting.

UNIT III TRANSPORT LAYER AND SECURITY PROTOCOLS

9

Transport layer protocol: Design issues– Goals and Classification – TCP over AdHoc wireless networks – Security – Security requirements – Issues and challenges in security provisioning – Network security attacks– Security routing. Quality of Service: Issues and challenges in providing QoS – Classification of QoS solutions– MAC layer solutions– Network layer solutions–QoS frameworks.

UNIT IV ENERGY MANAGEMENT

9

Need, Classification of battery management schemes – Transmission power management schemes – System power management schemes. Wireless Sensor Networks: Architecture – Data dissemination – Data gathering, MAC protocols – Location discovery – Quality of a sensor network.

UNIT V PERFORMANCE ANALYSIS

9

ABR beaconing, Performance parameters, Route – Discovery time – End - to - End delay performance – Communication throughput performance – Packet loss performance – Route reconfiguration/repair time – TCP/IP based applications.

TOTAL = 45

REFERENCES

1. C. Siva Ram Murthy and B.S. Manoj, "AdHoc Wireless Networks: Architectures and protocols", Prentice Hall PTR, 2004.
2. C. K.Toth, "AdHoc Mobile Wireless Networks: Protocols and Systems", Prentice Hall PTR, 2001.
3. Mohammad Ilyas, "The Handbook of AdHoc Wireless Networks", CRC press, 2002.
4. Charles E. Perkins, "AdHoc Networking", Addison Wesley, 2000.
5. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan Stojmenovic, Mobile AdHoc Networking, Wiley IEEE press, 2004.

CSY113 DATA WAREHOUSING AND DATA MINING

3 0 0 3

UNIT I INTRODUCTION

9

Relation to statistics, Databases – Data mining functionalities – Steps in data mining process – Architecture of a typical data mining systems – Classification of data mining systems – Overview of data mining techniques.

UNIT II DATA PREPROCESSING AND ASSOCIATION RULES

9

Data preprocessing – Data cleaning, Integration, Transformation, Reduction – Discretization concept hierarchies – Concept description: Data Generalization and Summarization based characterization – Mining association rules in large databases.

UNIT III PREDICTIVE MODELING

9

Classification and Prediction: Issues Regarding Classification and Prediction – Classification by decision tree induction – Bayesian classification – Other classification methods – Prediction – Clusters analysis: types of data In cluster analysis – Categorization of major clustering methods: partitioning methods – Hierarchical methods.

UNIT IV DATA WAREHOUSING

9

Data warehousing components – Multi dimensional data model – Data warehouse architecture – Data warehouse implementation – Mapping the data warehouse to multiprocessor architecture – OLAP – Need – Categorization of OLAP Tools.

UNIT V APPLICATIONS

9

Applications of data mining WWW – Mining text database – Mining spatial databases.

TOTAL= 45

REFERENCES

1. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.
2. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata Mcgraw Hill, 2004.
3. Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances in Knowledge discovery and Data Mining", The M.I.T Press, 1996.
4. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
5. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

CSY114 PERFORMANCE EVALUATION OF COMPUTER SYSTEMS AND NETWORKS

3 0 0 3

UNIT I FUNDAMENTALS

9

Need for performance evaluation – Role of performance evaluation – Performance evaluation methods – Performance metrics and Evaluation criteria – CPU and I/O architectures – Distributed and Network architectures – Secondary storage – Topologies – Computer architecture – Fundamental concepts and performance measures.

UNIT II PROBABILITY AND STOCHASTIC PROCESSES

9

Scheduling algorithms – Workloads – Random variables – Probability distributions – Densities – Expectation – Stochastic processes – Poisson process – Birth death process – Markov process. Discrete Time Markov chains (DTMC) – Bayes theorem – Conditional probability – Total probability – Discrete and Continuous random variables – Common distributions – Probability generating functions (PGF) and Laplace Transforms (LST) numerous examples from computer networking.

UNIT III QUEUING THEORY

9

Queuing systems – Networks of queues – Estimating parameters and Distributions – Computational methods – Simulation process – Time control – Systems and Modeling.

UNIT IV PETRI NETS AND SYSTEM PERFORMANCE 9

Petri nets – Classical petri nets – Timed petri nets – Priority-based petri nets – Colored petri nets – Generalized petri nets – Tool selection – Validation of results – Performance metrics – Evaluation – Multiple server computer system analysis.

UNIT V ANALYSIS 9

OS components – System architecture – Workloads – Design – Simulation – Analysis – Database system performance – Computer networks components – Simulation modeling of LAN.

TOTAL= 45

TEXTBOOK

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

REFERENCES

1. Thomas G. Robertazzi, “Computer Networks and Systems Queing theory and Performance Evaluation”, 3rd edition, Springer, 2000.
2. Domenico Ferrari, Giuseppe Serazzi and Alexandra Zeijher, “Measurement & Tuning of Computer Systems “, Prentice Hall Inc, 1983.
3. Michael F. Mories and Paul F. Roth, “Tools and techniques Computer Performance Evaluation”, Van Nostrand, 1982.
4. K.Kant and M.M.Srinivasan, “Introduction to computer system performance Evaluation”, McGraw Hill, 1992.
5. Herbert Hellerman and Thomas F.Conroy, “Computer system performance”, McGraw –Hill, 1992.

CSY115 AGENT BASED INTELLIGENT SYSTEMS 3 0 0 3

UNIT I INTRODUCTION 9

Definitions – History – Intelligent agents – Structure – Environment – Basic problem solving agents – Complex problem solving – Formulating – Search strategies – Intelligent search – Game playing as search.

UNIT II KNOWLEDGE BASED AGENTS 9

Representation – Logic – First order logic – Reflex agent – Building a knowledge base – General ontology – Inference – Logical recovery.

UNIT III PLANNING AGENTS 9

Situational calculus – Representation of planning – Partial order planning – Practical planners – Conditional planning – Preplanning agents.

UNIT IV AGENTS AND UNCERTAINTY 9

Acting under uncertainty – Probability Bayes rule and use – Belief networks – Utility theory – Decision network – Value of information – Decision theoretic agent design.

UNIT V HIGHER LEVEL AGENTS 9

Learning agents – General model – Inductive learning – Learning decision trees – Reinforcement learning – Knowledge in learning – Communicative agents – Types of communicating agents – Future of AI.

TOTAL= 45

REFERENCES

1. Zhang, Zili Zhang, “Agent–Based Hybrid Intelligent Systems”, Vol. 2938, Chengqi (editions.) 2004.
2. Stuart Russell and Peter Norvig, ” Artificial Intelligence - A Modern Approach”, Prentice Hall, 1995.
3. Patrick Henry Winston, “Artificial Intelligence”, 3rd edition, AW, 1999.
4. Nils.J.Nilsson, ”Principles of Artificial Intelligence”, Narosa Publishing House, 1992.

CSY116 PERSONAL SOFTWARE PROCESS 3 0 0 3

UNIT I INTRODUCTION 9

Software engineer's job – Time management – Tracking time – Period and Product planning.

UNIT II ESTIMATION AND MANAGEMENT 9

Case study – Product size – Function points – Managing your time – Managing commitments.

UNIT III PLANNING 9

Managing schedules – Project plan – Software development process –Defects – Updated PSP.

UNIT IV DEFECT HANDLING 9

Finding defects – Code review checklist – Projecting defects – Economics of defect removal

UNIT V QUALITY 9

Design defects – Product quality – Process quality – A personal commitment to quality.

TOTAL = 45

REFERENCES

1. Humphrey, Watts S. "Introduction to the Personal Software Process", Addison – Wesley, 1997.
2. Humphrey, Watts S., "PSP: A Self – Improvement Process for Software Engineers", Boston, MA: Addison – Wesley, 2005.
3. Steve McConnell, "Code Complete: A Practical Handbook of Software Construction", Microsoft Press, 2004.
4. Roger S Pressman, "Software Engineering: A Practitioner's Approach", 6th edition, R.S. Pressman and Associates, 2005.

CSY117 TEAM SOFTWARE PROCESS

3 0 0 3

UNIT I INTRODUCTION

8

PSP overview – TSP overview – Logic of the TSP – Need statements for sample exercises – Launching a Team Project – SCM.

UNIT II TEAM ROLES

9

Team leader – Development Manager – Planning Manager – Quality/Process Manager – Support Manager.

UNIT III STRATEGY & PLANNING

10

Development strategy – Development plan – Software inspections.

UNIT IV DEVELOPMENT

10

Defining the requirements – Integration and System testing – Designing with teams – Product implementation.

UNIT V WRAPPING UP

8

Documentation – Postmortem – Managing yourself – Being on a team – Teamwork.

TOTAL = 45

REFERENCES

1. Humphrey, Watts S., "Introduction to the Team Software Process", Boston, MA: Addison – Wesley, 2000.
2. Humphrey, Watts S., "TSP – Leading a Development Team", Boston, MA: Addison – Wesley, 2005.
3. Humphrey, Watts S., "Introduction to the Personal Software Process", Boston, MA: Addison – Wesley, 1997.
4. Roger S Pressman, "Software Engineering: A Practitioner's Approach", 6th edition, R.S. Pressman and Associates, 2005.

CSY118 SOFTWARE ENGINEERING FOR IMAGE PROCESSING 3 0 0 3

UNIT I 6

Software engineering an overview: Introduction – A case for a software engineering approach to building an imaging system – The role of the software engineer– The nature of software for imaging system– Case study: A visual inspection system. Imaging software and its properties: Classification of software qualities – Basic software engineering principles.

UNIT II 9

Software Process and life cycle models: Software processes and methodologies – Software life cycle models – V model – The spiral model– Evolutionary model– Fountain model – Lightweight methodologies– Unified process mode – CMM Software standards. Software Requirements: Requirements engineering process– Types of requirements – Requirements users–Formal methods in software specifications– Specification of imaging systems – Case study – Object oriented analysis– organizing the requirements document– Requirements validation and reviews.

UNIT III 9

Software system design: The design activity– Procedural oriented design– Object oriented design – Hardware considerations in imaging system – Fault tolerant design.The Software production process: Programming languages– Writing and testing code– Coding standards.

UNIT IV 12

Software measurements and testing: The role of metrics – Faults – Failures and bugs– The role of testing – Testing techniques– Design of testing plans. Hardware – Software Integration and maintenance: Goals of system integration – System Unification– System verification – System integration tools– Software integration – Post integration software optimization – A software reengineering process model – A maintenance process model– Software reuse – The second system effect– code and program maintenance.

UNIT V 9

Management of software project: Software project management – General project maintenance – Managing and Mitigating risks– Personnel management– Assessment of project personnel – Tracking and reporting progress–Cost estimation using COCOMO.

TOTAL = 45

REFERENCES

1. Philip A. Laplante ,“Software Engineering for Image Processing”, CRC Press, USA,2003.

CSY119 SERVICE ORIENTED ARCHITECTURE

3 0 0 3

UNIT I SOA AND WEB SERVICES FUNDAMENTALS

5

Fundamentals of SOA – Characteristics – Common misperception – Benefits – Pitfalls of adopting SOA – Transition from XML to web service to SOA – Reshaping of XML and web service through SOA – Standards for SOA – Comparison of SOA vs Past architecture – Web services frame work – Service description – Messaging with SOA.

UNIT II SECOND GENERATION WEB SERVICES

9

Activity management and comparison – Message exchange patterns – Service activity – Coordination – Atomic transactions – Business activities – Business protocols – Process definitions – Process services – Orchestration and coordination – Collaboration. Addressing – Reliable messaging – WS policy framework – Policy assertions and alleviates policies relationship to activity management – Metadata exchange security – WS notification and eventing.

UNIT III SERVICE ORIENTATION

9

Service oriented architecture – Components – Common principles of service – Orientation – Interrelationship among principles – Service orientation VS object orientation – Service layers – Different services layers – Configuration scenarios of service layers. SOA delivery life cycle phases – Agile strategy – SOA analysis – Service modeling – guidelines – Classifications of service models.

UNIT IV TECHNOLOGIES AND DESIGN FOR SOA

11

Service oriented design – Web service description language (WSDL) – Related XML schema – WSDL language basis – SOAP language basis – Service interface design tools – SOA comparison guide lines – Industry standards – XML AWSOA – WSDL and SOA – SOAPAWAOA – SOA extension.

UNIT V SERVICE DESIGN AND SECURITY

11

Service design – Guidelines – Business process design – WS – BPEL language basics – WS – BPEL elements – WS co ordination – Service oriented process design – WS addressing language and messaging basis – WS – Meta data exchange – Security language basis – WSOA platform – SOA support in J2EE and .NET.

TOTAL = 45

TEXT BOOK

1. Thomas Erl, "Service–Oriented Architecture: Concepts, Technology & Design", Prentice Hall / Pearson, 2005.

REFERENCES

1. Thomas Erl , “Service–Oriented Architecture: A Field Guide to Integrating XML and Web Services ”, The Prentice Hall, Service–Oriented Computing Series, 2004.
2. Thomas Erl, “SOA Principles of Service Design”, Prentice Hall Service–Oriented Computing Series, 2007.
3. Shankar Kambhampaty, “Service Oriented Architecture for Enterprise Applications”, 1st edition, Wiley India Private Limited, 2008.
4. Mike Rosen, Boris Lublinsky, Kevin T. Smith and Marc J. Balcer, “Applied SOA Service Oriented Architecture And Design Strategies”, Wiley India Private Limited, 2008.
5. Eric Newcomer Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2nd edition, 2008.
6. Paul. C. Brown, “Implementing SOA Total Architecture in Practice”, Pearson Education, 2009.
7. Nicolai M. Josuttis, “SOA in Practice, The Art of Distributed System Design”, 2nd edition, 2008.

CSY120 GRID COMPUTING

3 0 0 3

UNIT I CONCEPTS AND ARCHITECTURE

9

Introduction – Parallel and distributed computing – Cluster computing – Grid Computing – Anatomy and physiology of grid – Web and grid services – Grid standards, trends, challenges and applications.

UNIT II GRID MONITORING

9

Grid Monitoring Architecture (GMA) – An Overview of Grid Monitoring Systems – Grid ICE – MDS – Service Level Agreements (SLAs) – Other monitoring systems.

UNIT III GRID SECURITY AND RESOURCE MANAGEMENT

9

Grid Security – A brief security primer – PKI – X.509 certificates – Grid security – Grid scheduling and resource management, Grid way and Grid bus broker – principles of local schedulers, QoS.

UNIT IV DATA MANAGEMENT AND GRID PORTALS

9

Data management – Categories and origins of structured data – data management challenges – Architectural approaches – Collective data management services – Federation services – Grid portals – Generations of grid portals.

UNIT V GRID MIDDLEWARE

9

List of globally available middleware – Case studies: Globus toolkit – Architecture, components and features – Features of next generation grid.

TOTAL= 45

REFERENCES

1. Ian Foster and Carl Kesselman, "The Grid 2: Blueprint for a New Computing Infrastructure", Elsevier Series, 2004.
2. Vladimir Silva, "Grid Computing for Developers", Charles River Media, 2006.
3. Parvin Asadzadeh, Rajkumar Buyya, Chun Ling Kei, Deepa Nayar, and Srikumar Venugopal, "Global Grids and Software Toolkits: A Study of Four GridMiddleware Technologies, High Performance Computing: Paradigm and Infrastructure, Laurence Yang and Minyi Guo (editors)", Wiley Press, New Jersey, USA, 2005.
4. Jarek Nabrzyski, Jennifer M. Schopf and Jan Weglarz, "Grid Resource Management: State of the Art and Future Trends", International Series in Operations Research & Management Science, Springer, 1st edition, 2003.
5. Srikumar Venugopal, Krishna Nadiminti, Hussein Gibbins and Rajkumar Buyya, "Designing a Resource Broker for Heterogeneous Grids, Software: Practice and Experience", Wiley Press, New York, USA, 2008.
6. Fran Berman, Geoffrey Fox and Anthony J.G. Hey, "Grid Computing: Making The Global Infrastructure a Reality", Wiley, 2003.
7. Maozhen Li and Mark Baker, "The Grid: Core Technologies", Wiley, 2005.
8. Joshy Joseph and Craig Fellenstein, "Grid Computing", IBM Press, 2004.
9. Borja Sotomayor and Lisa Childers, "Globus Toolkit 4: Programming Java Services. The Elsevier Series in Grid Computing", Morgan Kaufmann, 2005.

CSY121 PERVASIVE COMPUTING

3 0 0 3

UNIT I FUNDAMENTALS

9

Evolution – Ubiquitous computing – Applied pervasive computing – Pervasive computing. Principles: Decentralization – Diversification – Connectivity – Simplification – Pervasive information technology – Scenarios – Roaming Environment – Infrastructure – Personalized services and the virtual pervasive home.

UNIT II ADAPTATION IN MOBILE AND PERVASIVE COMPUTING

9

Adaptability – Mechanisms for adaptation: spectrum of adaptation – Resource monitoring – Characterizing adaptation strategies – Example application architecture: Odyssey – Incorporating adaptations in applications – Support for adaptive applications.

UNIT III DATA DISSEMINATION, MANAGEMENT AND CONTEXT AWARE COMPUTING

9

Publish subscribe mode – Information caching – Challenges for distributed data management – Data dissemination – Mobile data caching – Mobile cache maintenance schemes – Mobile web caching – Context: Definitions – Types – Core capabilities for context awareness – Types of context aware applications.

UNIT IV MIDDLEWARE AND DEVICE TECHNOLOGY

9

Middleware support – Mobile middleware – Puppeteer – Adaptation middleware – Agents – Mobile agents – Service discovery – Hardware: Batteries – Displays –

Memory – Processor – Human Machine Interface – Operating systems: Palm OS – EPOC – Windows CE – QNX Neutrino – BeOS – Embedded Linux – Comparison – Java for pervasive devices.

UNIT V PERVASIVE APPLICATION ARCHITECTURE AND EXAMPLES 9

Background – Scalability and Availability – Application architecture – Securing pervasive computing applications – Overview of classes – Use of the framework – Usage examples: Retail – Airline check in and Booking – Sales force automation – Health care – Tracking – Car information systems – E - mail access via WAP and voice.

TOTAL = 45

TEXT BOOKS

1. Frank Adelstein, Sandeep Gupta, Golde Richard and Loren Schweibert “Fundamentals of mobile and pervasive computing”, Tata McGraw – Hill, First Edition.
2. Buckhardt, J, Henn, H., Hepper, S., Rindtorff, Schack and T., “Pervasive Computing – Technology and architecture of mobile internet applications”, Pearson Education, Low Price Edition, 2002.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklous and Thomas Stober, “Pervasive Computing – The Mobile World”, Springer Professional Computing – Second Edition, 2003.

CSY122 USER INTERFACE DESIGN 3 0 0 3

UNIT I INTRODUCTION AND OVERVIEW 9

Introduction – Importance – Human – Computer interface – Characteristics of graphics interface – Direct manipulation graphical system – Web user interface – Popularity – Characteristic & principles.

UNIT II THE GUI SCREEN DESIGN PROCESS 9

User interface design process – Obstacles – Usability – Human characteristics in design – Human interaction speed – Business functions – Requirement analysis – Direct – Indirect methods – Basic business functions – Design standards – System timings – Human consideration in screen design .

UNIT III MENU DESIGN 9

Structures of menus – Functions of menus – Contents of menu – Formatting – Phrasing the menu – Selecting menu choice – Navigating menus – Graphical menus.

UNIT IV WINDOW COMPONENTS 9

Windows: Characteristics – Components – Presentation styles – Types – Managements – Organizations – Operations – Web systems – Device – Based controls:

Characteristics – Screen – Based controls: Operate control – Text boxes – Selection control – Combination control – Custom control – Presentation control.

UNIT V TEXT AND DESIGN PAGE 9

Text for web pages – Effective feedback – Guidance & assistance – Internationalization – Accessibility – Icons – Image.

TOTAL = 45

TEXT BOOK

1. Wilbent. O. Galitz, “The Essential Guide to User Interface Design”, John Wiley& Sons, 2001.

REFERENCES

1. Alan Cooper, “The Essential of User Interface Design”, Wiley – Dream Tech Ltd., 2002.

CSY123 SOFTWARE MAINTENANCE 3 0 0 3

UNIT I 9

Introduction – The need for software maintenance – Categorizing software change – Software maintenance frame work – Fundamentals of software change – Limitations and economic implications.

UNIT II 9

Maintenance Process – Models – Quick Fix Model – Boehm’s model – Osborne’s Model – Iterative enhancement model – Reuse oriented model – Process maturity.

UNIT III 9

Program understanding – Program comprehension – Comprehension process models – Reverse Engineering – Levels of reverse engineering – Other supporting techniques – Forward engineering – Restructuring – Reengineering.

UNIT IV 9

Maintenance Measures – Guidelines for building maintenance measures – Building and sustaining maintainability.

UNIT V 9

Maintenance tools – Maintenance manual – Documentation – Case Studies.

TOTAL=45

TEXTBOOK

1. Panygrub, Armstrong A Takang ,” Software Maintenance: Concepts and Practice”,2nd edition, World Scientific Publishing Co.Ptc.Ltd.,2003.

REFERENCES

1. Alain April ,Alain Abran,” Software Maintenance Management: Evaluation and Continuous Improvement”, Wiley – IEEE Computer Society Press, 2008.

CSY124 MULTIMODAL COMPUTING

3 0 0 3

Aim:

- Introduction to Multimodal systems
- Motivations for Multimodality
- Applications of Multimodality
- Building Multimodal Interfaces

UNIT I INTRODUCTION TO MULTIMODAL SYSTEMS

9

Introduction to Multimodal systems, Multimodal Interfaces: Unimodal, Multimedia interfaces, GUI. Interaction Modalities: Acoustic, Tactile, Visual. Basics of data acquisition: Audio, Video. □ □ Single microphone source separation, Admissibility of audio evidence, □ Acquisition of digital evidence.

UNIT II AUDIO ATTENTION MODELLING AND DATA FUSION

9

Audio attention modelling and data fusion: □ Types of attention, □ Measuring attention, □ Fusion of audiovisual attention. Multimodal integration and understanding: Early approaches, Unification multimodal integration and Parsing.

UNIT III AUDIO RECOGNITION AND CLASSIFICATION

9

Audio recognition and classification: □ Feature extraction, □ Hidden Markov Modelling, □ Training and pattern matching, Training and pattern matching. Audio enhancement techniques for forensics: □ Objectives of forensic analysis. Case study: Gaze recognition

UNIT IV ISSUES IN THE DESIGN AND IMPLEMENTATION OF MULTIMODALITY 9

Issues in the design and implementation of Multimodality: Multimodal user interface client, Modality recognition, Modality integration and understanding, Multimodal generation: Multimodal output planning, Multimodal synchronization, Multimodal Dialog management.

UNIT V SECURITY AND SURVEILLANCE APPLICATIONS

9

Security and surveillance applications: □ Requirements analysis, □ Challenges, □ Audio analysis as part of larger systems. Audio-based human computer interaction: □

Audio scene analysis, □ Source localisation, □ □ Source separation, □ □ Performance analysis and comparison. Case Study involving Gesture recognition.

□ **TOTAL: 45**

TEXTBOOKS

1. P. Maragos, A. Potamianos, P. Gros, Multimodal Processing and Interaction: Audio, Video, Text, Springer, 2010.
2. D. Wang, G. Brown, Computational Auditory Scene Analysis: Principles, Algorithms, and Applications, Wiley - IEEE Press, 2006.
3. W. Wang, Machine Audition: Principles, Algorithms and Systems, IGI Global, 2010.

REFERENCES

1. D. Monekosso, P. Remagnino, Y. Kuno, Intelligent Environments: Methods, Algorithms and Applications Springer, 2008.
2. E. Damiano, J. Jeong, L. C. Jain, New Directions in Intelligent Interactive Multimedia, Springer, 2009.
3. R. Maher, Audio Forensic Examination, IEEE Signal Processing Magazine, Vol. 26, No. 2, pp. 84-94, 2009.
4. F. Camastra, Machine Learning for Audio, Image and Video Analysis: Theory and Applications Springer, 2007.

CSY019 RESEARCH METHODOLOGY FOR COMPUTER SCIENTIST 3 0 0 3

UNIT I RESEARCH PROBLEM

9

The Research problem – Sources of research problem – Information, how to deal with it – Criteria / Characteristics of a good research problem – Errors in selecting a good research problem – Types of research – Nature and use of arguments.

UNIT II PROBABILITY, STATISTICAL INFERENCE AND ANALYSIS

9

Probability – Random variables – Binomial, Poisson, Geometric, Uniform, Normal, Exponential distributions – Moments – Moments generating functions and their properties – Function of random variables. Design of experiments: Analysis of variance – One way and two way classifications– Completely randomized design – Randomized block design – Latin square design – 2^2 factorial design.

UNIT III OPERATIONS RESEARCH AND OPTIMIZATION TECHNIQUES

9

Basic of operation research : Characteristic of OR-OR and Decision making –Linear programming – Stimulation and Graphical solution canonical and standard terms of Linear programming problem – Algebraic solution – Simplex method – Chranes method of penalties – Concept of duality – properties of duality –Transportation model: Definition – Formulation and solution of transportation models. Sequencing problems –

Processing each of n jobs through m machine. – Linear Programming – Introduction to supervised and unsupervised learning – Graph theory– Basic definitions – Connected graph – Tree.

UNIT IV QUEUING THEORY

9

Single and Multiple server Markovian queuing models – Customer impatience – Queuing applications.

UNIT V CASE STUDIES

9

Presentation by students on their area of interest.

TOTAL = 45

TEXT BOOKS

1. Nicholas Walliman, “Your Research Project”, 2nd edition, Vistaar Publications, New Delhi , 2005.
2. Gupta, S.C. and Kapoor, V.K., “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons, New Delhi, 2001.
3. Taha, H.A., “Operations Research: An Introduction”, 7th edition, Pearson Education Edition, Asia, New Delhi, 2002.

REFERENCES

1. Walpole, R.E., Myer R.H., Myer, S.L. and Ye, K., “Probability and Statistics for engineers and Scientists”, 7th edition, Pearson Education, Delhi, 2002.
2. Goel, B.S. and Mittal S.K, “Operations Research”, Pragati Prakashan, Meerut, 2000.
3. Freund, J.E., and Miller, I.R., “Probability and Statistics for Engineers”, Prentices Hall of India, 5th edition, New Delhi, 1994.