

St. PETER'S UNIVERSITY

St. Peter's Institute of Higher Education and Research
(Declared under section 3 of UGC Act 1956)
Avadi, Chennai – 600 054.



M.Tech. (INFORMATION TECHNOLOGY)

(I TO IV SEMESTERS)

REGULATIONS AND SYLLABI

(REGULATIONS – 2008)

St. Peter's University

Chennai – 600 054.

M.TECH. (INFORMATION TECHNOLOGY) PROGRAMME

Regulations and Syllabi

(Effective from 2008)

- 1. Eligibility:** Candidates who passed B.E. / B.Tech. (CSE / IT) of the University or any other equivalent examination thereto are eligible for admission to Two Year M.Tech.(Information Technology) Programme.
- 2. Duration:** Two Years Comprising 4 Semesters. Each semester has a minimum 90 working days with a minimum of 5 hours a day.
- 3. Medium:** English is the medium of instruction and examination.
- 4. Weightage for Internal and End Assessment:** The weightage for Continuous Assessment (CA) and End Assessment (EA) be 25:75 unless the ratio is specifically mentioned in the scheme of Examinations.
- 5. Credit System:** Credit system be followed with 18 credits for each semester and each credit is equivalent to 25-30 hours of effective study provided in the Time Table.
- 6. Scheme of Examinations**

I Semester

| Code No. | Course Title | Credit | Marks | | |
|------------------|------------------------------------|-----------|------------|------------|------------|
| | | | CA | EA | Total |
| Theory | | | | | |
| 108ITPT01 | Applied Mathematics | 3 | 25 | 75 | 100 |
| 108ITPT02 | Data Structures & Algorithm | 4 | 25 | 75 | 100 |
| 108ITPT03 | Computer Organization | 4 | 25 | 75 | 100 |
| 108ITPT04 | Data Communication & Networks | 3 | 25 | 75 | 100 |
| 108ITPT05 | Software Engineering Methodologies | 3 | 25 | 75 | 100 |
| Practical | | | | | |
| 108ITPP01 | Programming Lab | 1 | 25 | 75 | 100 |
| Total | | 18 | 150 | 450 | 600 |

II Semester

| Code No. | Course Title | Credit | Marks | | |
|------------------|----------------------------------|-----------|------------|------------|------------|
| | | | CA | EA | Total |
| Theory | | | | | |
| 208ITPT01 | Information Systems Design | 3 | 25 | 75 | 100 |
| 208ITPT02 | Advanced Database Technology | 2 | 25 | 75 | 100 |
| 208ITPT03 | Operating Systems Design | 3 | 25 | 75 | 100 |
| 208ITPT04 | Software Requirements Management | 3 | 25 | 75 | 100 |
| | Elective - I | 3 | 25 | 75 | 100 |
| | Elective - II | 3 | 25 | 75 | 100 |
| Practical | | | | | |
| 208ITPP01 | Web Technology Lab | 1 | 25 | 75 | 100 |
| Total | | 18 | 175 | 525 | 700 |

SEMESTER III

| Code No. | Course Title | C | Marks | | |
|------------------|--|-----------|------------|------------|------------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 308ITPT01 | Distributed System | 3 | 25 | 75 | 100 |
| 308ITPT02 | Software Testing and Quality Assurance | 3 | 25 | 75 | 100 |
| | Elective III | 3 | 25 | 75 | 100 |
| PRACTICAL | | | | | |
| 308ITPP01 | Project Phase I* | 9 | 25 | 65 | 100 |
| | Viva voce | | | 10 | |
| Total | | 18 | 100 | 300 | 400 |

* Candidates who have completed Project work (Phase I) successfully are eligible for Project Work (Phase - II) Examination.

SEMESTER IV

| Code No. | Course Title | C | Marks | | |
|-----------|-------------------|----|-------|----|-------|
| | | | CA | EA | Total |
| 408ITPP01 | Project Phase II* | 18 | 25 | 65 | 100 |
| | Viva voce | | | 10 | |
| | Total | 18 | 25 | 75 | 100 |

List of Electives:-

SEMESTER II

| Code No. | Course Title | C | Marks | | |
|---------------|------------------------------|---|-------|----|-------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 208ITPE1 | Digital Signal Processing | 3 | 25 | 75 | 100 |
| 208ITPE2 | XML and Web Services | 3 | 25 | 75 | 100 |
| 208ITPE3 | Enterprise Resource Planning | 3 | 25 | 75 | 100 |
| 208ITPE4 | Grid Computing | 3 | 25 | 75 | 100 |
| 208ITPE5 | Pervasive Computing | 3 | 25 | 75 | 100 |
| 208ITPE6 | Information Security | 3 | 25 | 75 | 100 |
| 208ITPE7 | Component Based Technology | 3 | 25 | 75 | 100 |
| 208ITPE8 | Bio-Informatics | 3 | 25 | 75 | 100 |
| 208ITPE9 | Soft Computing | 3 | 25 | 75 | 100 |
| 208ITPE10 | Language Technologies | 3 | 25 | 75 | 100 |
| 208ITPE11 | Artificial Intelligence | 3 | 25 | 75 | 100 |
| 208ITPE14 | Mobile Computing | 3 | 25 | 75 | 100 |

SEMESTER III

| Code No. | Course Title | C | Marks | | |
|---------------|--------------------------------|---|-------|----|-------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 308ITPE12 | Embedded Systems | 3 | 25 | 75 | 100 |
| 308ITPE13 | Data Warehousing & Data Mining | 3 | 25 | 75 | 100 |
| 308ITPE15 | Software Project Management | 3 | 25 | 75 | 100 |
| 308ITPE16 | Digital Imaging | 3 | 25 | 75 | 100 |
| 308ITPE17 | High Speed Networks | 3 | 25 | 75 | 100 |

7. Passing Requirements: The minimum pass mark (raw score) be 50% in End Assessment (EA) and 50% in Continuous Assessment (CA) and End Assessment (EA) put together. No minimum mark (raw score) in Continuous Assessment (CA) be prescribed unless it its specifically mentioned in the scheme of Examination.

8. Grading System: Grading System on a 10 Point Scale be followed with 1 mark = 0.1 Grade point to successful candidates as given below.

CONVERSION TABLE

(1 mark = 0.1 Grade Point on a 10 Point Scale)

| Range of Marks | Grade Point | Letter Grade | Classification |
|----------------|-------------|--------------|---------------------|
| 90 to 100 | 9.0 to 10.0 | O | First Class |
| 80 to 89 | 8.0 to 8.9 | A | First Class |
| 70 to 79 | 7.0 to 7.9 | B | First Class |
| 60 to 69 | 6.0 to 6.9 | C | First Class |
| 50 to 59 | 5.0 to 5.9 | D | Second Class |
| 0 to 49 | 0 to 4.9 | F | Reappearance |

Procedure for Calculation

| | |
|---|--|
| Cumulative Grade Point Average (CGPA) | = $\frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}}$ |
| | = $\frac{\sum (CA+EA) C}{\sum C}$ |
| Where Weighted Grade Points in each Course | = Grade Points (CA+EA) multiplied by Credits |
| | = (CA+EA)C |
| Weighted Cumulative Percentage of Marks(WCPM) | = CGPAx10 |

C- Credit,

CA-Continuous Assessment,

EA- End Assessment

9. Pattern of the Question Paper: The question paper for End Assessment will be set for three hours and for the maximum of 100 marks with following divisions and details.

Part A: 10 questions (with equal distribution to all units in the syllabus).

Each question carries 2 marks.

Part B: 5 question with either or type (with equal distribution to all units in the syllabus). Each question carries 16 marks.

The total marks scored by the candidates will be reduced to the maximum prescribed in the Regulations.

10. Syllabus

108ITPT01 APPLIED MATHEMATICS

1. Calculus Of Variation

Introduction – Euler’s equation-several dependent variables Lagrange’s equation of dynamics-Integrals involving derivatives higher than the first-Problem with constraints-Direct methods and eigen value problems.

2. Matrix Theory

Eigen values using QR transformations – generalized eigen vectors – canonical forms – Singular value decomposition and applications – pseudo inverse – least square approximations.

3. Linear Programming Problem

Graphical method – Simplex method – Big M technique – Integer Programming.

4. Logic

Statement – Connectives – Truth tables – Normal forms – Predicate Calculus – Inference – Theory of Statement .Calculus and Predicate calculus – Automata Theorem proving.

5. Combinatorics and Recursive Functions

Review of permutation and Combination – Mathematical Induction – Pigeon hole – Principle of Inclusion and Exclusion – Generating function – Recurrence relation.

References:

1. Taha, H.A., “Operations Research: An Introduction”, Seventh Edition, Pearson Education Edition, Asia, New Delhi, 2002.
2. K.H.Rosen , “Discrete Mathematics and its Applications” , Mc-Graw Hill Book Company,1999.
- 3.Broson.R. , Matrix Operations, Schaum’s outline series , McGraw Hill,New York,1989.
- 4.Gupta.A.S. , Calculus of variations with Applications , Prentice –Hall of India New Delhi , 1997.

108ITPT02 DATA STRUCTURES AND ALGORITHMS

1. Introduction

Basic concepts of object oriented programming - Abstract Data types - List - Implementation - Arrays - Cursors, Pointers.

2. Basic Data Structures

Stack, Queue - Implementation - Applications. Trees - Traversals - General - Binary - Expression Search Tree - AVL Trees - Splay Trees - B trees.

3. Advanced Data Structures

Set - Basic operations - Advanced Set representations - Priority Queue - Applications - Graphs - Traversals -Representation.

4. Memory Management

Issues - Storage allocation - Dynamic - Compaction, Garbage collection - Buddy systems.

5. Algorithm Analysis And Design

Algorithm Analysis - Sorting - Searching . Design Techniques - Divide & Conquer - Greedy - Dynamic Programming - Backtracking - Branch and Bound Knapsack - Travelling Salesman Problem - Graph coloring- 8 Queens problem.

Text Books:

1. Aho, Hopcroft, Ullman, Data Structure & Algorithms, Addison Wesley pub Company 1985.

References:

1. M.A. Weiss, Data Structures & Algorithm analysis in C++, Benjamin Cummings, 1994.
2. Sara Baase, Computer algorithms - Introduction to design and analysis, AW, 1988.
3. Sahni, Data Structures, Algorithms and applications in Java, McGraw Hill, 2000.

1. Basic Structure of Computers

Functional units – Basic operational concepts – Bus structures – Performance evaluation – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instruction Set Architecture – RISC – CISC – ALU Design – Fixed point and floating point operations – Example architectures.

2. Processing Unit and pipelining

Datapath and Control – Microprogramming – Enhancing Performance with Pipelining – Pipelined Data Path and Control – Hazards – Exceptions – Super Scalar and Dynamic Pipelining.

3. Memory Organization

Main Memory Organization - Basics of Caches – Cache Performance – Virtual Memory – Segmentation – Paging – Framework for Memory Hierarchies.

4. Interfacing Processors and Peripherals

Interrupts – DMA – I/O Performance Measures – Characteristics of I/O Devices – Buses – Designing and Interfacing I/O Systems.

5. Multiprocessors

Multiprocessor Configurations–Connectivity – Clusters – Case Studies of Different Architectures.

Text Books:

1. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The hardware/software interface", Second Edition, Morgan Kaufmann Inc., 1998.

References:

1. D. A. Patterson and J. L. Hennessy, "Computer Architecture A Quantitative Approach", Morgan Kaufmann Pub. Inc.2003.

2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", Fifth Edition, McGraw Hill, 2002.

3. Vincent T Heuring, H. F. Jordan, "Computer Systems Design and Architecture", Addison Wesley, 1999.

1. General Overview

Components of network – Topologies – WAN/LAN – OSI-ISO layered Architecture – Modulation and demodulation – Bit error rates – Line Coding – Error correcting codes.

2. Data Link Layer

Design issues – CRC techniques and sliding window techniques – Performance analysis of sliding window techniques – Framing Formats – Case study – HDLC protocols – Medium access control – CSMA/CD – Token ring and token bus – FDDI – Wireless LAN – Performance analysis of MAC protocols – Bridges.

3. Network Layer

Design issues – IP addressing and IP datagram – Routers and gateways – Routing – fixed – Adaptive – multipath – flow-based – IPv6 – Quality of Service.

4. Transport Layer

TCP and UDP – Error handling and flow control – Congestion control – Socket abstraction – Berkley socket – Winsock.

5. Applications Services

Simple Mail Transfer Protocols (SMTP) – File transfer protocols (FTP) – telnet – the World Wide Web (WWW) – Hypertext Transfer Protocol (HTTP) – Domain name Service (DNS) – Security – Multimedia applications.

References:

1. William Stallings, "Data and Computer Communications", Seventh Edition, Prentice Hall, 2003.
2. Larry Peterson, Bruce S. Davie, "Computer Networks: A Systems approach", Morgan Kaufmann publishers, Second Edition, 1999.
3. Keiser, "Local Area Networks", McGraw Hill, 1989.
4. A. S. Tanenbaum, "Computer Networks", Prentice Hall PTR, Fourth Edition, 2002.
5. James F. Kurose, et al, "Computer Networking: A Top-Down Approach Featuring the Internet", Addison Wesley, Second Edition, 2002.

108ITPT05 SOFTWARE ENGINEERING METHODOLOGIES

1. Software Life Cycle

Scope of Software Engineering – Historical, Economic and Maintenance Aspects – Software Process – Software Life Cycle Models – Tools.

2. Testing

Quality – Non-Execution based Testing – Execution based Testing – Testing versus Correctness Proofs – Testing Distributed and Real Time Software

3. Object Orientation

Modules – Objects – Reusability – Portability and Interoperability – Planning and Estimation

4. Analysis and Design

Requirements Phase – Specification Phase – Object Oriented Analysis Phase – Design Phase.

5. Implementation and Integration

Implementation Phase – Integration Phase – Maintenance Phase

Text Books:

1. Stephen R Schach, "Classical and Object-Oriented Software Engineering – With UML and C++", McGraw Hill, New Delhi, 2002.
2. Ivar Jacobson, "Object Oriented Software Engineering", Pearson Education, 1992.

References:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw- Hill International Edition, Fifth Edition , 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, Sixth edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

108ITPP01 PROGRAMMING LABORATORY

1. Implementation of all the data structures specified in Data Structures theory subject.
2. Implement applications like conversion of arithmetic expressions from infix to postfix and evaluation of Postfix expressions.
3. Implementation of Linked Dictionary.
4. Implementation of searching using Binary Search trees.
5. Studying sorting algorithms.

SEMESTER II

208ITPT01 INFORMATION SYSTEMS DESIGN

1. Information System and Organization

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

2. Representation and Analysis of System Structure

Models for Representing Systems: Mathematical, Graphical and Hierarchical Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture - Application of System Representation to Case Studies

3. Systems, Information and Decision Theory

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

4. Information System Application

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

5. Development and Maintenance Of Information Systems

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off-the Shelf Software Packages – Outsourcing – Comparison of Different Methodologies.

Text Books:

1. K. C. Laudon, J. P. Laudon, M. E. Brabston, "Management Information Systems: Managing the Digital Firm", Pearson Education 2002.

2. K. C. Laudon, J. P. Laudon, "Management Information Systems, Organization and Technology in the Networked Enterprise," Sixth Edition, Prentice Hall, 2000.

References:

1. E.F. Turban, R.K., R.E. Potter. "Introduction to Information Technology", Wiley, 2004.

2. M. E. Brabston, "Management Information Systems: Managing the Digital Firm", Pearson Education, 2002.

3. Jeffrey A. Hoffer, Joey F. George, Joseph S. Valachich, "Modern Systems Analysis and Design", Third Edition, Prentice Hall, 2002.

1. Distributed Databases

Distributed Databases Vs Conventional Databases – Architecture – Fragmentation – Query Processing – Transaction Processing – Concurrency Control – Recovery.

2. Object Oriented Databases

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks - Recovery.

3. Emerging Systems

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

4. Database Design Issues

ER Model - Normalization - Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues – Design of Temporal Databases – Spatial Databases.

5. Current Issues

Rules - Knowledge Bases - Active And Deductive Databases - Parallel Databases – Multimedia Databases – Image Databases – Text Database

References:

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, "Intelligent Database Systems", Addison-Wesley, 2001.
2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, R.T.Snodgrass, V.S.Subrahmanian, "Advanced Database Systems", Morgan Kaufman, 1997.
3. N.Tamer Ozsü, Patrick Valduriez, "Principles Of Distributed Database Systems", Prentice Hal International Inc., 1999.
4. C.S.R Prabhu, "Object-Oriented Database Systems", Prentice Hall Of India, 1998.
5. Abdullah Uz Tansel Et Al, "Temporal Databases: Theory, Design And Principles", Benjamin Cummings Publishers, 1993.
6. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", Mcgraw Hill, Third Edition 2004.
7. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fourth Edition, Mcgraw Hill, 2002.
8. R. Elmasri, S.B. Navathe, "Fundamentals Of Database Systems", Pearson Education, 2004.

1. Introduction

Introduction - Operating Systems and Services - Processes - CPU Scheduling - Approaches.

2. Process Management

Process Synchronization - Semaphores - Deadlocks - Handling Deadlocks - Multithreading.

3. Memory management

Memory Management - Paging - Segmentation - Virtual Memory - Demand Paging - Replacement Algorithms.

4. File Handling

Disk Scheduling Approaches - File Systems - Design Issues - User Interfaces to File Systems - I/O Device Management.

5. Case Studies

Case Study - Design and Implementation of the UNIX OS, Process Model and Structure - Memory Management - File System - UNIX I/O Management and Device Drivers - Windows - System Components - Process Management - Memory Management - File Systems - Networking.

References:

1. Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts" , Sixth Edition, Addison Wesley Publishing Co., 2003.
2. M. J. Bach, " Design of the UNIX Operating system" , Prentice Hall, 1986.

1. Requirements Engineering Overview

Software Requirement Overview – Software Development Roles –Software Development Process Kernels – Commercial Life Cycle Model – Vision Development – Stakeholders Needs and Analysis – Stakeholder needs – Stakeholder activities.

2. Requirements Elicitation

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.

3. Requirements analysis

Identification of Functional and Non Functional Requirements – Identification of Performance Requirements – Identification of safety Requirements – Analysis – Feasibility & Internal Compatibility of System Requirements – Definition of Human Requirements Baseline.

4. Requirements Development

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 –Throwaway Prototyping.

5. Requirements Validation

Validation Objectives – Analysis of Requirements Validation – Activities – Properties – Requirement Reviews – Requirements Testing – Case Tools For Requirements Engineering.

Text Books:

1. Ian Sommerville, Pete Sawyer, "Requirements Engineering: A Good Practice Guide", John Wiley and sons, 2000.
2. Dean Leffingwell, Don Widrig, "Managing Software Requirements, Second Addition: A Use Case Approach", Addison Wesley, 2003.
3. Karl Eugene Wiegers, "Software Requirements", Microsoft Press, 1999.
4. Ian Graham, "Requirements Engineering and Rapid Development", Addison Wesley, 1998.

1. Scripting Languages 2 Experiments

Dynamic HTML with JavaScript – Multimedia Objects – Cascading Style Sheets.

2. CGI Applications 4 Experiments

Perl Programming – Cookies – Database Applications – XML and Web Applications – PHP – MySQL Database – Apache Web Server.

3. Java Network Programming 4 Experiments

I/O Streaming Models in Java – Socket Programming – Client/Server Model Protocol Simulation – Ping Simulation – Web Page Retrieval – RMI Single Call and Singleton Models – Content Handlers – RMI-IIOP and CORBA Distributed Applications.

4. Java and XML 4 Experiments

Client/Server Applications – Document Object Models – SAX Models – XML and Databases – XML Parsers – Document Type Definitions – XSL – SOAP Protocol.

5. Multi Tier Applications 4 Experiments

Web Servers – Deployment of Servlets – Java Server Pages – Real Time Applications – Session Tracking Models – e-Business Applications – Handling Multimedia Data – Database Applications – Deployment of Enterprise Java Beans.

1. Communication in Distributed Environment

Introduction – Client–Server Paradigm – Threads in Distributed Systems – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting – Group Communication – Reliable and Unreliable Multicasting.

2. Distributed Operating Systems

Issues in Distributed Operating System – Lamport’s Logical Clock – Vector Clock – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocol.

3. Distributed Shared Memory

Introduction – Data–Centric Consistency Models – Client–Centric Consistency Models –
Distribution Protocols – Consistency Protocols – Ivy – Munin – Atomic Transaction.

4. Fault Tolerance and Distributed File Systems

Introduction to Fault Tolerance – Distributed Commit Protocol – Distributed File System
Architecture – Issues in Distributed File Systems – Sun NFS.

5. Case Studies

Distributed Object-Based System – CORBA – COM – Distributed Coordination-Based System – JINI.

Text Books:

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Third Edition, Pearson Education Asia, 2002.
2. Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGraw Hill Series in Computer Science, 1994.

References:

1. A.S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2004.
2. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004.

308ITPT02 SOFTWARE TESTING AND QUALITY ASSURANCE

1. Fundamentals of Software Quality Assurance

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

2. Quality Standards

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

3. Quality Metric System

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

4. Software testing – Introduction

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.

5. Testing issues

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: Their Role in White-box Based Test Design, Additional White Box Test Design Approaches, Evaluating Test Adequacy Criteria.

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, 1995.
3. William E.Perry, "Effective Methods for Software Testing", Second Edition, Wiley, 2000.

LIST OF ELECTIVES

208ITPE1 DIGITAL SIGNAL PROCESSING

1. Signals Systems

Basic Elements of Digital Signal Processing – Concept of Frequency In Continuous Time And Discrete Time Signals – Sampling Theorem – Discrete Time Signals. Discrete Time Systems – Analysis of Linear Time Invariant Systems – Z Transform – Convolution and Correlation.

2. FFT

Introduction To DFT – Efficient Computation of DFT Properties of DFT – FFT Algorithms – Radix-2 And Radix-4 FFT Algorithms – Decimation in Time – Decimation in Frequency Algorithms – Use of FFT Algorithms in Linear Filtering And Correlation.

3. IIR Filter Design

Structure of IIR – System Design of Discrete Time IIR Filter From Continuous Time Filter – IIR Filter Design By Impulse Invariance – Bilinear Transformation – Approximation Derivatives – Design of IIR Filter In The Frequency Domain.

4. FIR Filter Design

Symmetric and Antisymmetric FIR Filters – Linear Phase Filter – Windowing Technique – Rectangular – Kaiser Windows – Frequency Sampling Techniques – Structure For FIR Systems.

5. Finite Word Length Effects

Quantization Noise – Derivation For Quantization Noise Power – Fixed Point And Binary Floating Point Number Representation – Comparison – Over Flow Error – Truncation Error – Co-Efficient Quantization Error – Limit Cycle Oscillation – Signal Scaling – Analytical Model Of Sample And Hold Operations – Application Of DSP – Model Of Speech Wave Form – Vocoder.

Text Book:

1. John G Proakis, Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", Third Edition, Pearson Education, 2000.

References:

1. Sanjit K.Mitra, "Digital Signal Processing – A Computer Base Approach, Tata Mcgraw Hill, 2001.
2. Alan V. Oppenheim, Ronald W. Schafer, John R. Back, "Discrete Time Signal Processing", First Edition, Pearson Education, 2000.

3. Johny R. Johnson, "Introduction to Digital Signal Processing", Prentice Hall, 1984.
4. N. Sarkar, "Elements Of Digital Signal Processing", Second Edition, Khanna Publishers, 2000.
5. Proakis, "A Self-Study Guide for Digital Signal Processing", First Edition, Pearson Education, 2003.
6. Itearchor, "Digital Signal Processing", Second Edition, Pearson Education, 2002.

208ITPE2 XML AND WEB SERVICES

1. XML Technology family

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – DTD – XML Schemas – X-Files – XML processing – DOM – SAX – presentation technologies – XSL – XFORMS – XHTML – voiceXML – Transformation – XSLT – XLINK – XPATH – XQuery

2. Architecting Web Services

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

3. Web services building block

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

4. Implementing XML in e-Business

B2B – B2C Applications – Different types of B2B interaction – Components of ebusiness
XML systems – ebXML – RosettaNet - Applied XML in vertical industry – web services for mobile devices.

5. XML and Content Management

Semantic Web – Role of Meta data in web content - Resource Description Framework – RDF schema – Architecture of semantic web – content management workflow – XLANG – WSFL

Text Books:

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, 2003.

208ITPE3 ENTERPRISE RESOURCE PLANNING

1. Introduction To ERP

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On-line Analytical Processing – Supply Chain Management.

2. ERP Implementation

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

3. Business Modules

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution.

4. ERP Market

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

5. ERP – Present And Future

Turbo Charge the ERP System – EIA – ERP and E-Commerce – ERP and Internet – Future Directions in ERP.

Text Books:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning", Thomson Learning, 2001.

References:

1. Vinod Kumar Garg, N.K. Venkata Krishnan, "Enterprise Resource Planning – concepts and Planning", Prentice Hall, 1998.
2. Jose Antonio Fernandez, " The SAP R/3 Handbook", Tata McGraw Hill, 1998.
3. Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education, 2003.

208ITPE4

GRID COMPUTING

1. Introduction To Grid Computing

Introduction – The Grid – Past, Present and Future – Applications of grid computing Organizations and their roles.

2. Grid Computing Architure

Grid Computing anatomy – Next generation of Grid computing initiatives– Merging the Grid services architecture with Web services architecture.

3. Grid Computing Technologies

OGSA – Sample use cases that drive the OGSA platform components – OGSi and WSRF– OGSA Basic Services – Security standards for grid computing.

4. Grid Computing Tool Kit

Globus Toolkit –Versions – Architecture –GT Programming model –A sample grid service implementation.

5. High Level Grid Services

High level grid services – OGSi .NET middleware Solution Mobile OGSi.NET for Grid computing on Mobile devices.

Text Books:

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

REFERENCES:

1. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, "Grid Computing: Making the Global Infrastructure a reality ", John Wiley and sons,2003.
2. Ahmar Abbas, "Grid Computing: A Practical Guide to Technology and Applications", Charles River media, 2003.

208ITPE5

PERVASIVE COMPUTING

Unit I

Pervasive Computing Application - Pervasive Computing devices and Interfaces – Device technology trends, Connecting issues and protocols.

Unit II

Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction.

Unit III

Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security.

Unit IV

PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture.

Unit V

User Interface Issues in Pervasive Computing, Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture.

Text Books

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff. Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addison Wesley, Reading, 2002.
2. Uwe Hansman, Lothar Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Second Edition, Springer- Verlag, New Delhi, 2003. Reference Books.

Reference Books

1. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)
2. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.

208ITPE6

INFORMATION SECURITY

1. Introduction

History – Critical Characteristics of Information – NSTISSC Security Model – Components of an Information System – Securing the Components – Balancing Security and Access – The SDLC – The Security SDLC – Need for Security – Business Needs – Threats – Attacks – Legal – Ethical and Professional Issues.

2. Security Analysis

Risk Management Identifying and Assessing Risk – Assessing and Controlling Risk.

3. Logical Design

Blueprint for Security – Information Security Policy – Standards and Practices – ISO 17799/BS 7799 – NIST Models – VISA International Security Model – Design of Security Architecture – Planning for Continuity.

4. Physical Design

Security Technology – IDS – Scanning and Analysis Tools.

5. Network and Computer Security

Cryptography – Access Control Devices – Physical Security – Security and Personnel.

Text Books :

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, 2003.
2. Ron Weber, "Information Systems Control and Audit", Pearson Education, 2004.

References:

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol. 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw Hill, 2003.
3. Matt Bishop, "Computer Security Art and Science", Pearson Education, 2002.

1. Introduction

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.

2. Java Component Technologies

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.

3. CORBA Technologies

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.

4. COM and .Net Technologies

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.

5. Component Frameworks And Development

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.

Text Books:

1. "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003.

References:

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

1. Introductory concepts

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.

2. Search Engines and Data Visualization

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.

3. Statistics and Data Mining

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.

4. Pattern Matching

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.

5. Modeling and Simulation

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.

Text books:

1. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.

References:

1. T.K.Attwood and D.J. Perry Smith, "Introduction to Bio Informatics, Longman Essen, 1999.

208ITPE9

SOFT COMPUTING

1. Introduction To Soft Computing And Neural Networks

Evolution of Computing - Soft Computing Constituents–From Conventional AI to computational Intelligence - Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radia Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures.

2. Fuzzy Sets And Fuzzy Logic

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations - Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Logic – Fuzzy Expert Systems – Fuzzy Decision Making.

3. Neuro-Fuzzy Modeling

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control.

4. Machine Learning

Machine Learning Techniques – Machine Learning Using Neural Nets – Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

5. Support Vector Machines

Support Vector Machines for Learning – Linear Learning Machines – Support Vector Classification – Support Vector Regression - Applications.

Text Books:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

References:

1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
2. Amit Konar, "Artificial Intelligence and Soft Computing", First Edition, CRC Press, 2000.
3. Simon Haykin, "Neural Networks: A Comprehensive Foundation", Second Edition Prentice Hall, 1999.
4. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.

208ITPE10

LANGUAGE TECHNOLOGIES

1. Introduction

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.

2. Information Retrieval

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.

3. Text Mining

Categorization – Extraction Based Categorization – Clustering – Hierarchical Clustering – Document Classification and Routing – Finding and Organizing Answers From Text Search – Use Of Categories and Clusters For Organizing Retrieval Results – Text Categorization and Efficient Summarization Using Lexical Chains – Pattern Extraction.

4. Generic Issues

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.

5. Applications

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

Text Books:

1. Daniel Jurafsky, 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: Clustering, Classification and Retrieval", Springer Verlag, 2003.
4. Christopher D. Manning and Hinrich Schütze, "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. Tomasz Strzalkowski, "Natural Language Information Retrieval", Kluwer Academic publishers, 1999.
4. Christopher D. Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing", MIT Press, 1999.

208ITPE11

ARTIFICIAL INTELLIGENCE

1. Introduction

Intelligent Agents – Agents and environments – Good behavior – The nature of environments – structure of agents – Problem Solving – problem solving agents – example problems – searching for solutions – uniformed search strategies – avoiding repeated states – searching with partial information.

2. Searching Techniques

Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments – Constraint satisfaction problems (CSP) – Backtracking search and Local search – Structure of problems – Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

3. Knowledge Representation

First order logic - syntax and semantics – Using first order logic – Knowledge engineering – Inference – propositional versus first order logic – unification and lifting – forward chaining – backward chaining – Resolution – Knowledge representation – Ontological Engineering – Categories and objects – Actions – Simulation and events – Mental events and mental objects.

4. Learning

Learning from observations – forms of learning – Inductive learning – Learning decision trees – Ensemble learning – Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods – Learning with complete data – Learning with hidden variable – EM algorithm – Instance based learning – Neural networks – Reinforcement learning – Passive reinforcement learning – Active reinforcement learning – Generalization in reinforcement learning.

5. Applications

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction –

Probabilistic language processing – Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

Text Books:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education / Prentice Hall of India, 2004.

References:

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt .Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Second Edition, Tata McGraw Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.

208ITPE14

MOBILE COMPUTING

1. Introduction

Wireless Transmission – Signal Propagation – Spread Spectrum – Satellite Networks – Capacity Allocation – FAMA – DAMA – MAC.

2. Mobile Networks

Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security – GPRS.

3. Wireless Networks

Wireless LAN – IEEE 802.11 Standard – Architecture – Services – AdHoc Network – HiperLan – Blue Tooth.

4. Routing

Mobile IP – DHCP – AdHoc Networks – Proactive and Reactive Routing Protocols – Multicast Routing.

5. Transport And Application Layers

TCP over Adhoc Networks – WAP – Architecture – WWW Programming Model – WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WML Scripts.

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1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003.
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002.
3. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
5. C.K.Toh, "AdHoc Mobile Wireless Networks", Prentice Hall, Inc, 2002.
6. Charles E.Perkins, "AdHoc Networking", Addison-Wesley, 2001.

1. Introduction

Challenges of Embedded Systems – Fundamental Components – Examples of Embedded Systems – Hardware Fundamentals – Gates – Timing Diagrams – Memory – Direct Memory Access – Buses – Interrupts – Schematics – Build Process of Embedded Systems.

2. Memory Management And Interrupts

Memory Access Procedure – Types of Memory – Memory Management Methods – Pointer Related Issues – Polling Versus Interrupts – Types of Interrupts – Interrupt Latency – Reentrancy – Interrupt Priority – Programmable Interrupt Controllers – Interrupt Service Routines.

3. Real-Time Operating Systems – RTOS

Desktop Operating Systems Versus RTOS – Need for Board Support Packages – Task Management – Race Conditions – Priority Inversion – Scheduling – Inter Task Communication – Timers – Semaphores – Queues.

4. Embedded System Design And Implementation

Requirements of An Embedded System – Architecture Styles and Patterns – Design Practices – Implementation Aspects and Choices.

5. Embedded Software Development Tools

Host and Target Machines – Cross Compilers – Linker and Locators for Embedded Software – Address Resolution – Locating Program Components – Initialized Data and Constant Strings – PROM Programmers – ROM Emulators – Flash Memory.

TEXT BOOKS:

1. Sriram V. Iyer, Pankaj Gupta, "Embedded Real-Time Systems Programming", Tata McGraw Hill, 2004.
2. David E. Simon, "An Embedded Software Primer", Pearson Education, 1999.

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1. Embedded Systems – Raj Kamal.
2. Frank Vahid and Tony Givargis, "Embedded System Design – A unified Hardware/Software Introduction", John Wiley and Sons, 2002.

308ITPE13 DATA WAREHOUSING AND DATA MINING

1. Introduction

Definition of Data Mining - Data Mining Vs Query Tools – Machine Learning – Taxonomy of Data Mining Tasks – Steps in Data Mining Process – Overview of Data Mining techniques.

2. Data Warehousing

Definition – Multidimensional Data Model – Data Cube – Dimension Modelling – OLAP Operations – Warehouse Schema – Data Warehouse Architecture – Data Mart – Meta Data – Types of Meta Data – Data Warehouse Backend Process – Development Life Cycle.

3. Data Pre-Processing And Characterization

Data Cleaning – Data Integration and Transformation – Data Reduction – Discretization and Concept Hierarchy Generation – Primitives – Data Mining Query Language – Generalization – Summarization – Analytical Characterization and Comparison - Association Rule – Mining Multi Dimensional data from Transactional Database and Relational Database.

4. Classification

Classification – Decision Tree Induction – Bayesian Classification – Prediction – Back Propagation – Cluster Analysis – Hierarchical Method – Density Based Method – Grid Based Method – Outlier Analysis.

5. Applications

Tools – Applications – Case Study.

Text Books:

1. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley Publishers, 2001.
2. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufman Publishers, 2000.

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1. Usama M.Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth, Ramasamy Uthurusamy, "Advances in Knowledge Discover and Data Mining", The M.I.T.Press, 1996.
2. Ralph Kimball, Margy Ross, "The Data Warehouse Toolkit", John Wiley and Sons Inc., 2002.
3. Alex Berson, Stephen Smith, Kurt Thearling, "Building Data Mining Applications for CRM", Tata McGraw Hill, 2000.
4. Margaret Dunham, "Data Mining: Introductory and Advanced Topics", Prentice Hall, 2002.

308ITPE15 SOFTWARE PROJECT MANAGEMENT

1. Introduction to Software Project Management

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

2. Project Evaluation

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

3. Activity Planning

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.

4. Monitoring And Control

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.

5. Managing People And Organizing Teams

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.

References:

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

308ITPE16**DIGITAL IMAGING****1. Fundamentals Of Image Processing**

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

2. Image Enhancement

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

3. Image Segmentation And Feature Analysis

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

4. Multi Resolution Analysis And Compressions

Multi Resolution Analysis – Image Pyramids – Multi resolution expansion – Wavelet Transforms – Image Compression Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

5. Applications of Image Processing

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

References:

1. Rafael C.Gonzalez, Richard E.Woods, "Digital Image Processing" Second Edition, Pearson Education, 2003.

2. Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001
3. Anil K.Jain, "Fundamentals of Digital Image Processing", Person Educaiton, 2003.

308ITPE17

HIGH SPEED NETWORKS

1. HIGH SPEED NETWORKS

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.

2. CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

3. TCP AND ATM CONGESTION CONTROL

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.

4. INTEGRATED AND DIFFERENTIATED SERVICES

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

5. PROTOCOLS FOR QOS SUPPORT

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

Text Books:

1. William Stallings, "High Speed Networks and Internet", Second Edition, Pearson Education, 2002.

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1. Warland, Pravin Varaiya, "High Performance Communication Networks", Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.

2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN Architecture", Cisco Press, Volume 1 and 2, 2003.