

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 – 2012)

(Effective from the Academic Year 2012-'13)

M.TECH. (INFORMATION TECHNOLOGY) PROGRAMME

Regulations and Syllabi

(Effective from the Academic Year 2012-'13)

- 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 | | | | | |
| 112ITPT01 | Applied Mathematics | 3 | 25 | 75 | 100 |
| 112ITPT02 | Data Structures and Algorithms | 3 | 25 | 75 | 100 |
| 112ITPT03 | Computer Architecture | 4 | 25 | 75 | 100 |
| 112ITPT04 | Computer Networks and Management | 3 | 25 | 75 | 100 |
| 112ITPT05 | Software Engineering | 3 | 25 | 75 | 100 |
| Practical | | | | | |
| 112ITPP01 | Data Structures Laboratory | 1 | 25 | 75 | 100 |
| 112ITPP02 | Networking Laboratory | 1 | 25 | 75 | 100 |
| | Total | 18 | 175 | 525 | 700 |

II Semester

| Code No. | Course Title | Credit | Marks | | |
|------------------|---|-----------|------------|------------|------------|
| | | | CA | EA | Total |
| Theory | | | | | |
| 212ITPT01 | Information Systems Design | 2 | 25 | 75 | 100 |
| 212ITPT02 | Software Requirements Engineering | 2 | 25 | 75 | 100 |
| 212ITPT03 | Information Security | 3 | 25 | 75 | 100 |
| 212ITPT04 | Advance Database System | 3 | 25 | 75 | 100 |
| 212ITPT05 | Distributed Systems | 3 | 25 | 75 | 100 |
| 212ITPTE3 | Elective I: Enterprise Resource Planning | 3 | 25 | 75 | 100 |
| Practical | | | | | |
| 212ITPP01 | Internet Programming Lab | 1 | 25 | 75 | 100 |
| 212ITPP02 | Case Tools Laboratory | 1 | 25 | 75 | 100 |
| | Total | 18 | 200 | 600 | 800 |

III SEMESTER

| Code No. | Course Title | Credit | Marks | | |
|----------------|---|-----------|------------|------------|------------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 312ITPTE10 | Elective II : Mobile Computing | 3 | 25 | 75 | 100 |
| 312ITPTE13 | Elective III : Spatial Database | 3 | 25 | 75 | 100 |
| 312ITPTE14 | Elective IV : Data Warehousing and Data Mining | 3 | 25 | 75 | 100 |
| PROJECT | | | | | |
| 312ITPP01 | 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.

IV SEMESTER

| Code No. | Course Title | Credit | Marks | | |
|-----------|-------------------|-----------|-----------|-----------|------------|
| | | | CA | EA | Total |
| 412ITPP01 | Project Phase II* | 18 | 25 | 65 | 100 |
| | Viva voce | | | 10 | |
| | Total | 18 | 25 | 75 | 100 |

LIST OF ELECTIVES FOR SEMESTER II

| Code No. | Course Title | C | Marks | | |
|------------------|--|---|-------|----|-------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 212ITPTE1 | Network Infrastructure and Cyber Computing | 3 | 25 | 75 | 100 |
| 212ITPTE2 | XML and Web Services | 3 | 25 | 75 | 100 |
| 212ITPTE3 | Enterprise Resource Planning | 3 | 25 | 75 | 100 |
| 212ITPTE4 | Grid Computing | 3 | 25 | 75 | 100 |
| 212ITPTE5 | Pervasive Computing | 3 | 25 | 75 | 100 |

III SEMESTER

| Code No. | Course Title | Credit | Marks | | |
|-------------------|---|--------|-------|----|-------|
| | | | CA | EA | Total |
| THEORY | | | | | |
| 312ITPTE6 | Digital Signal Processing | 3 | 25 | 75 | 100 |
| 312ITPTE7 | Component Based Technology | 3 | 25 | 75 | 100 |
| 312ITPTE8 | Management For Information Technology | 3 | 25 | 75 | 100 |
| 312ITPTE9 | Soft Computing | 3 | 25 | 75 | 100 |
| 312ITPTE10 | Mobile Computing | 3 | 25 | 75 | 100 |
| 312ITPTE11 | Artificial Intelligence | 3 | 25 | 75 | 100 |
| 312ITPTE12 | Embedded Systems | 3 | 25 | 75 | 100 |
| 312ITPTE13 | Spatial Database | 3 | 25 | 75 | 100 |
| 312ITPTE14 | Data Warehousing and Data Mining | 3 | 25 | 75 | 100 |
| 312ITPTE15 | Software Project Management | 3 | 25 | 75 | 100 |
| 312ITPTE16 | Introduction to Machine Learning | 3 | 25 | 75 | 100 |
| 312ITPTE17 | Web Advertising And Marketing | 3 | 25 | 75 | 100 |
| 312ITPTE18 | High Speed Networks | 3 | 25 | 75 | 100 |
| 312ITPTE19 | Bio Informatics | 3 | 25 | 75 | 100 |
| 312ITPTE20 | Language Technologies | 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 is 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 questions 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. Effective Period of Operation for the Arrear Candidates : Two Year grace period is provided for the candidates to complete the arrear examination, if any.

Registrar

11. Syllabus

UNIT I CALCULUS OF VARIATION

Introduction – Euler’s equation – several dependent variables language’s equation of dynamics – Integrals involving derivatives higher than the first – problem with constrains – Direct methods and eigen value problems.

UNIT II MATRIX THEORY

Eigen values using QR transformations- generalized eigenvectors – canonical forms – singular value decomposition and applications – pseudo inverse – least square approximations.

UNIT III LINEAR PROGRAMMING PROBLEM

Graphical method – simplex method – Big M technique – Integer programming.

UNIT IV LOGIC

Statement – Connectives – Truth tables – Normal forms – predicate Calculus – Inference – Theory of statement - Calculus and Predicate calculus – Automata theorem proving.

UNIT V COMBINATORICS AND RECURSIVE FUNCTIONS

Review of permutation and combination-Mathematical Induction-Pigeon hole-Principle of inclusion and exclusion –Generating function – recurrence relation , Recursive functions – primitive recursive functions.

References

1. Gupta.A.S ,Calculus of variations with Applications,Prentice –Hall of India New Delhi,1997.
2. Bronson.R,“Matrix Operation” Schaums Outline Series ,Mc Graw Hill , New York ,1989.
3. K.H.Rosen ,Discrete Mathematics and its Applications,Mc Graw Hill Book Company , 1999.

112ITPT02 DATA STRUCTURES AND ALGORITHMS

UNIT I COMPLEXITY ANALYSIS & ELEMENTARY DATA STRUCTURES

Asymptotic notations – Properties of big oh notation – asymptotic notation with several parameters – conditional asymptotic notation – amortized analysis – NP-completeness – NP-hard – recurrence equations – solving recurrence equations – arrays – linked lists – trees.

UNIT II HEAP STRUCTURES

Min-max heaps – Deaps – Leftist heaps – Binomial heaps – Fibonacci heaps – Skew heaps – Lazy-binomial heaps.

UNIT III SEARCH STRUCTURES

Binary search trees – AVL trees – 2-3 trees – 2-3-4 trees – Red-black trees – B-trees – splay trees – Tries.

UNIT IV GREEDY & DIVIDE AND CONQUER

Quicksort – Strassen's matrix multiplication – Convex hull – Tree-vertex splitting – Job sequencing with deadlines – Optimal storage on tapes

UNIT V DYNAMIC PROGRAMMING AND BACKTRACKING

Multistage graphs – 0/1 knapsack using dynamic programming – Flow shop scheduling – 8-queens problem – graph coloring – knapsack using backtracking

REFERENCES :

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, Galgotia, 1999.
2. E. Horowitz, S.Sahni and S. Rajasekaran, Computer Algorithms / C++, Galgotia, 1999.
3. Adam Drozdex, Data Structures and algorithms in C++, Second Edition, Thomson learning – vikas publishing house, 2001.
4. G. Brassard and P. Bratley, Algorithmics: Theory and Practice, Printice –Hall, 1988.
5. Thomas H.Corman, Charles E.Leiserson, Ronald L. Rivest, "Introduction to Algorithms", Second Edition, PHI 2003.

UNIT I FUNDAMENTALS OF COMPUTER DESIGN AND PIPELINING

Fundamentals of Computer Design – Measuring and reporting performance – Quantitative principles of computer design. Instruction set principles – Classifying ISA – Design issues. Pipelining – Basic concepts – Hazards – Implementation – Multicycle operations.

UNIT II INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES

Concepts – Dynamic Scheduling – Dynamic hardware prediction – Multiple issue – Hardware based speculation – Limitations of ILP – Case studies.

UNIT III INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES

Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms – Case studies.

UNIT IV MULTIPROCESSORS AND MULTICORE ARCHITECTURES

Symmetric and distributed shared memory architectures – Performance issues – Synchronisation issues – Models of memory consistency – Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies.

UNIT V MEMORY AND I/O

Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

REFERENCES:

1. John L. Hennessey and David A. Patterson, "Computer Architecture – A quantitative approach", Morgan Kaufmann / Elsevier, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture : A hardware/ software approach" , Morgan Kaufmann / Elsevier, 1997.
3. William Stallings, "Computer Organization and Architecture – Designing for Performance", Pearson Education, Seventh Edition, 2006.
4. Behrooz Parhami, "Computer Architecture", Oxford University Press, 2006.

112ITPT04 COMPUTER NETWORKS AND MANAGEMENT

UNIT I 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.

UNIT II 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.

UNIT III 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.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES

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

UNIT V 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", Pearson Education, Second Edition, 2002.

REFERENCES:

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

UNIT I

Definition – systems approach – modeling the process and lifecycle – meaning of process – software process models – tools and techniques – practical process modeling – information systems – planning and managing the project – tracking project – project personnel – effort estimation – risk management – project plan – process models and project management

UNIT II

Capturing the requirements – requirements process – requirements elicitation – types – characteristics – modeling notations – specification languages – prototyping – documentation – validation and verification – measures – specification techniques – designing the system – decomposition and modularity – architectural styles and strategies – issues – characteristics – improvement techniques – design evaluation, validation – documentation

UNIT III

Considering objects – object orientation – OO development – use cases – representing OO – OO system design – program design – OO measurement – writing programs – standards – procedures – guidelines – documentation – programming process

UNIT IV

Testing the program – faults – failures – issues – unit testing – Integration testing – testing OO systems – test planning – automated testing tools - testing the system – principles – function testing – performance testing – reliability, availability and maintainability – acceptance testing – installation testing – automated system testing – test documentation – testing safety critical systems – delivering the system – training – documentation

UNIT V

System maintenance – the changing system – nature of maintenance – problems – measuring maintenance characteristics – techniques and tools – software rejuvenation – evaluation approaches – selection – assessment vs. prediction - evaluating products, processes and resources – improving predictions, products, processes and resources – guidelines – decision making in software engineering – licensing – certification and ethics

TEXT BOOKS:

1. Shari Lawrence Pfleeger, Joanne M. Atlee, Software Engineering: Theory and Practice, Prentice Hall, 2006

REFERENCES:

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, Prentice Hall, 2002

112ITPP01 DATA STRUCTURES LABORATORY

1. Min Heap
2. Deaps
3. Leftist Heap
4. AVL Tree
5. B-Tree
6. Tries
7. Quick Sort
8. Convex hull
9. 0/1 Knapsack using Dynamic Programming
10. Graph coloring using backtracking

112ITPP02 NETWORKING LABORATORY

1. Socket Programming
 - a. TCP Sockets
 - b. UDP Sockets
 - c. Applications using Sockets
2. Simulation of Sliding Window Protocol
3. Simulation of Routing Protocols
4. Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat
5. Simulation of Network Management Protocols
6. Study of Network Simulator Packages – such as opnet, ns2, etc.

II Semester

212ITPT01 INFORMATION SYSTEMS DESIGN

UNIT I 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.

UNIT II 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

UNIT III 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.

UNIT IV 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.

UNIT V 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.

212ITPT02 SOFTWARE REQUIREMENTS ENGINEERING

UNIT I 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.

UNIT II 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.

UNIT III 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.

UNIT IV 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.

UNIT V 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.

212ITPT03 INFORMATION SECURITY

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection

UNIT V

Network Security, System Security, User Security and Program Security

TEXT BOOK:

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

REFERENCES:

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

212ITPT04 ADVANCED DATABASE SYSTEMS

UNIT I DISTRIBUTED DATABASES

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

UNIT II OBJECT ORIENTED DATABASES

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

UNIT III EMERGING SYSTEMS

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

UNIT IV DATABASE DESIGN ISSUES

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

UNIT V 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.

212ITPT05 DISTRIBUTED SYSTEMS

UNIT I INTRODUCTION AND COMMUNICATION

Introduction – Distributed Operating Systems – Network Operating System – Middleware – Client-Server Model – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Threads in Distributed Systems – Code Migration.

UNIT II DISTRIBUTED OPERATING SYSTEMS

Clock Synchronization – Logical Clocks – Global States – Election Algorithms – Mutual Exclusion – Distributed Transactions – Consensus and Related Problems – Distributed Deadlocks.

UNIT III DISTRIBUTED SHARED MEMORY AND FAULT TOLERANCE

Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models – Distribution Protocol – Consistency Protocol – Sequential Consistency and Ivy, Release Consistency and Munin – Introduction to Fault Tolerance – Distributed Commit.

UNIT IV DISTRIBUTED FILE SYSTEMS

Introduction to Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System – Recent Advances.

UNIT V CASE STUDIES

CORBA – Mach – JINI.

TEXT BOOKS:

1. A.S. Tanenbaum, M. VanSteen, "Distributed Systems", Pearson Education 2004.
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Third Edition, Pearson Education, 2002.

REFERENCES:

1. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGraw Hill Series in Computer Science, 1994.
2. P.K.Sinha, "Distributed Operating Systems".

212ITPP01 INTERNET PROGRAMMING LAB

1. Designing Web Pages using Client Side Scripting and DHTML.
2. Client Server Scripting Programs.
3. Simulation of Email and File Transfer Protocols.
4. Development of Web Services.
5. XML and Databases.
6. Server Side Application Using JSP.
7. Web Customisation.
8. Development of E-Business Application.

212ITPP02 CASE TOOLS LABORATORY

1. Practicing the different types of case tools such as (Rational Rose & other Open Source) used for all the phases of Software development life cycle.
2. Data modeling
3. Semantic data modeling
4. Source code generators
5. Re-engineering
6. Experimenting CASE Environments
 - a. Toolkits
 - b. Language-centered
 - c. Integrated
 - d. Fourth generation
 - e. Process-centered
7. Implementation of the following using CASE Workbenches:
 - a. Business planning and modeling
 - b. Analysis and design
 - c. User-interface development
 - d. Programming
 - e. Verification and validation
 - f. Maintenance and reverse engineering
 - g. Configuration management
 - h. Project management

ELECTIVES

212ITPTE1 NETWORK INFRASTRUCTURE AND CYBER COMPUTING

UNIT I INTRODUCTION AND ROUTER ARCHITECTURE

Introduction: Networks, architecture, applications, ISO model. Routers: Function of Router – Types – Elements – Packet flow – Packet Processing – Algorithms and Data Structures (packet buffer allocation) – Packet processing functions (Bridge Algorithm, Table Lookup and Hashing) – Protocol Software (threads, Interrupts) – Hardware Architectures For Protocol Processing – Classification and Forwarding – Switching Fabrics.

UNIT II NETWORK PROCESSORS

Scalability with Parallelism and Pipelining – Complexity of Network Processor Design (Packet processing, ingress & egress processing, Macroscopic Data Pipelining and Heterogeneity) – Network Processor Architectures: architectural variety, Primary Architectural characteristics, Packet Flow, Clock Rates, software architecture, Assigning Functionality to the Processor Hierarchy. Examples of Commercial Network Processors: Multi-Chip Pipeline, Augmented RISC Processor, Embedded Processor Plus Coprocessors.

UNIT III CYBER COMPUTING

Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services - Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies.

UNIT IV RECOVERY AND EVIDENCES

Data Recovery – Evidence Collection and Data Seizure – Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication – Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events.

UNIT V ETHICAL HACKING

Hacking windows – Network hacking – Web hacking – Password hacking. A study on various attacks: Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks – Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system.

Text Books:

1. Douglas E. Comer "Network System Design using Network Processors" Prentice Hall, 2006.
2. Deepankar Medhi, Karthikeyan Ramasamy, "Network Routing: Algorithms, Protocols, and Architecture", Elsevier, 2007.
3. John R. Vacca, "Computer Forensics", Firewall Media, 2004.
4. Ankit Fadia "Ethical Hacking" second edition Macmillan India Ltd, 2006.

Reference Books:

1. Chad Steel, "Windows Forensics", Wiley India, 2006.
2. Majid Yar, "Cybercrime and Society", Sage Publications, 2006.

212ITPTE2 XML AND WEB SERVICES

UNIT I

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

UNIT II OBJECT ORIENTED DATABASES

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

UNIT III EMERGING SYSTEMS

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

UNIT IV DATABASE DESIGN ISSUES

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

UNIT V CURRENT ISSUES

Semantic Web – Role of Meta data in web content - Resource Description Framework – RDF schema – Architecture of semantic web – content management workflow – XLANG – WSFL – BPEL4WS

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", First Edition, Apress, 2004.
4. Russ Basiura and Mike Batongbacal, "Professional ASP .NET Web Services", Apress, 2003.

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.

UNIT I INTRODUCTION TO GRID COMPUTING

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

UNIT II GRID COMPUTING ARCHITURE

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

UNIT III GRID COMPUTING TECHNOLOGIES

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

UNIT IV GRID COMPUTING TOOL KIT

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

UNIT V 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.

212ITPTE5 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

REFERENCES

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.

312ITPTE6 DIGITAL SIGNAL PROCESSING

UNIT I SIGNALS AND SYSTEMS

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

UNIT II FREQUENCY TRANSFORMATIONS

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms – Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

UNIT III IIR FILTER DESIGN

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV FIR FILTER DESIGN

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V APPLICATIONS

Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

TEXT BOOKS:

1. John G. Proakis & Dimitris G. Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C. Ifeachor, & Barrie W. Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach" ,Tata McGraw Hill, Fourth Edition, 2007 .
2. Alan V. Oppenheim, Ronald W. Schaefer & John R. Buck, "Discrete Time Signal Processing", Pearson Education, Second Edition, 2001.
3. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill.

312ITPTE7 COMPONENT BASED TECHNOLOGY

UNIT I INTRODUCTION

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

UNIT II 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.

UNIT III 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.

UNIT IV 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.

UNIT V 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

UNIT I Nature Of It Management

IT organisation and information - IT Management - A model for the study of IT Management. Strategic importance of IT: Developing an IT strategy - IT planning.

UNIT II IT Trends

Software and hardware trends-Advances in telecomm-Application portfolio resources: Introduction-Application and data resource-process for portfolio management. Managing application development: Traditional life cycle approach-Application project management -Resource allocation and control-Alternatives to traditional development-Successful end user computing.

UNIT III Tactical And Operational Considerations

Developing and managing customer expectations. Problem-Change and recovery management-Managing production operations-Network management.

UNIT IV Controlling The Information Resources

Accounting for IT resources-IT controls and asset protection.

UNIT V Preparing For Advances In It

People-Organ-Management systems. People Management-Management processes-Role of CIO.

Text Books :

1. Carrol W.Frenzel, "Management of Information Technology", Boyd and Frosee Publishing Company, 1992

Reference Books

1. Dickson, Gary N, James Wetherbe, "Management Information System", McGraw Hill, 1985

UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV FUZZY LOGIC

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

UNIT V 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 – Case studies.

TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

REFERENCES:

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
4. S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007.
5. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS

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

GSM – System Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security - GPRS

UNIT III WIRELESS NETWORKS

Wireless LAN – IEEE 802.11 Standards – Architecture – services – HIPERLAN – AdHoc Network – Blue Tooth.

UNIT IV NETWORK LAYER

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

UNIT V TRANSPORT AND APPLICATION LAYERS

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.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Prentice Hall of India / Pearson Education, 2003.
2. William Stallings, "Wireless Communications and Networks", Second Edition, Prentice Hall of India / Pearson Education, 2004.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", Prentice Hall Inc., 2002.

UNIT I 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.

UNIT II 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.

UNIT III KNOWLEDGE REPRESENTATION

First order logic - syntax and semantics – Using first order logic – Knowledge engineering – Inference – prepositional 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.

UNIT IV 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.

UNIT V 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.

REFERENCES

9. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education / Prentice Hall of India, 2004.
10. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
11. Elaine Rich and Kevin Knight, "Artificial Intelligence", Second Edition, Tata McGraw Hill, 2003.
12. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.

UNIT I EMBEDDED COMPUTING

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

UNIT II EMBEDDED C PROGRAMMING

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

UNIT III OPTIMIZING ASSEMBLY CODE

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

UNIT IV PROCESSES AND OPERATING SYSTEMS

Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT V EMBEDDED SYSTEM DEVELOPMENT

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

REFERENCES

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

Unit 1 : Introduction

Overview – Benefits -Application Domains of Geographical Information Systems (GIS), SDBMS Application –Stroll through spatial databases

Unit 2 : Data Models & query language

Models of spatial databases – three step data base design – ER model with spatial concepts – Data modeling with UML – Database Query language – Relational algebra – SQL primer – Extend SQL – Object relational SQL

Unit 3 : Storage Methods and Indexing

Disks –Files – Indexing – Trends – Spatial operations – Query Optimization – Index structures – Distributed Databases- parallel databases

Unit 4: Spatial networks

Network databases- Data Models-Query language for graphs- algorithms-Access methods

Unit 5 : Mining spatial databases

Pattern discovery – Motivation-Classification-Association Rule techniques-clustering –Outlier detection-Support for field entities- Content based retrieval-spatial warehouses

Text Books:

1. Spatial Databases: A Tour, S. Shekhar and S. Chawla, Prentice Hall, 2003.

References Books:

1. Moving Objects Databases, by Ralf Hartmut Guting, Markus SchneiderMorgan kaufman, 2005.
2. Spatial Databases with Applications to GIS, P. Rigaux, M. Scholl, A. Voisard, Morgan Kaufmann, 2002.
3. Spatio-Temporal Database,M. Koubarakis, T. Selles at al (ed.), Springer 2003.
4. References : Selected papers from the bibliography available at:
<http://www.spatial.cs.umn.edu/Courses/Fall07/8715/paperList.html>

312ITPTE14 DATA WAREHOUSING AND DATA MINING

UNIT I

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

UNIT II

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III

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

UNIT IV

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

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data:

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

REFERENCES

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

UNIT I BASIC CONCEPTS

Product, Process and Project – Definition – Product Life Cycle – Project Life Cycle Models.

UNIT II FORMAT PROCESS MODELS AND THEIR USE

Definition and Format model for a process – The ISO 9001 and CMM Models and their

relevance to Project Management – Other Emerging Models like People CMM.

UNIT III UMBRELLA ACTIVITIES IN PROJECTS

Metrics – Configuration Management – Software Quality Assurance – Risk Analysis.

UNIT IV IN STREAM ACTIVITIES IN PROJECTS

Project Initiation – Project Planning – Execution and Tracking – Project Wind up – Concept of Process/Project Database.

UNIT V ENGINEERING AND PEOPLE ISSUES IN PROJECT MANAGEMENT

Phases (Requirements, Design, Development, Testing , Maintenance, Deployment) – Engineering Activities and Management Issues in Each Phase – Special Considerations in Project Management for India and Geographical Distribution Issues.

REFERENCES:

1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Humphrey, Watts, "Managing the Software Process ", Addison Wesley, 1986.
3. Pressman, Roger, "Software Engineering", A Practitioner's approach. McGraw Hill, 1997.
4. Bob Hughes and Mike Cotterell, "Software Project Management".
5. Wheelwright and Clark, "Revolutionising product development", The Free Press, 1993.

UNIT I

Introduction-Machine Learning-Supervised Learning-Model Selection and Generalization-Bayesian Decision Theory-Losses and Risks-Association Rules-Parametric Methods-Likelihood Estimation-Bayes' Estimator-Multivariate Methods-Multivariate Data-Discrete Features

UNIT II

Dimensionality Reduction-Factor Analysis-Multidimensional Scaling-Locally Linear Embedding-Clustering-Mixture Densities-k-means Clustering-Expectation Maximization Algorithm-Supervised learning after clustering—Histogram Estimator-Kernel Estimator-k-nearest neighbor Estimator-Generalization to multivariate data-Condensed nearest neighbor-Nonparametric Regression-Running line smoother-Decision Trees-Univariate Trees-Pruning-Rule Extraction for trees

UNIT III

Linear Discrimination-Generalizing Linear Model-Pair wise Separation-Parametric Discrimination revisited-Gradient Descent-Multilayer Perceptrons-Introduction-Training the perception-Boolean Functions-Multilayer Perceptions-MLP as universal Approximator - Back Propagation Algorithm-Tuning the network size-Dimensionality reduction-Recurrent networks-Local Models

UNIT IV

Kernel Machines-Estimation of parameter Distribution - Regression-Gaussian Process-Hidden Markov Models-three basic problems of HMM-HMM-Graphical Models-Example-d-Separation-Belief Propagation-Undirected graphs-Combining multiple learning-rationale-generating diverse learners-model combination schemes-voting-error correcting-Boosting -Cascading-Reinforcement Learning-Model based learning-Temporal Difference learning-Partially observable states

UNIT V

Design and Analysis of Machine Learning Experiments—Response Surface design-Cross validation and resampling methods-Measuring classifier performance-Comparison of classification algorithms-Comparing multiple algorithms-Probability

Text Book:

1. Introduction to Machine Learning ,Second Edition -Ethem Alpaydin

Reference Books

1. Bayesian Reasoning and Machine Learning, David Barber
2. Gaussian Processes for Machine Learning ,Carl E. Rasmussen, Christopher K. I. Williams - The MIT Press , 2005
3. Introduction to machine learning, Yves Kodratoff.

UNIT I

Introduction: Internet Principles – Basic Web Concepts – Client/Server model – Retrieving data from Internet – HTML and Scripting Languages – Standard Generalized Mark-up Language –Next Generation Internet – Protocols and applications. Introduction to How Web Advertising Works, Banner Ads – Sidebar Ads – Varied Shapes and Sizes – PopUp and PopUnder – Floating Ads.

UNIT II

Enterprise Application development environment : Web servers – Server Administration – IDL – Database Connectivity – Web Application architecture – Distributed Web Applications – Remote method Invocation – Web Customization – Mark Up Languages.

UNIT III

E-Business Applications: E-Business Frame Work – E-Business Cycle – E-Commerce Strategies – E-Business Architectures – Stored Procedures – SQL Procedures – Electronic Payment Services - Shopping Functions.

UNIT IV

Business and the Marketing Concept : How to Make a Web Page - Elements of Good Web Site Design - Starting a Business Online - Server Services - Domain Names -Web Oriented Industries. Online Marketing – Email Marketing – Search Engine Marketing – Banner Ad Placement – Link Exchange.

UNIT V

Real Time Applications: Role of scripting languages – Shopping Cart – Home Banking Applications – Design and Implementation – Fire Wall – Business models – Tools usage.

Reference Books:

1. Ed Roman, "Mastering EJB and the Java 2 Platform Enterprise edition", John Wiley and Sons.
2. Stephen Aubury, Scott R.Weiner, "Developing Java Enterprise Applications" Wiley Computer publishing, 2001.
3. "Professional Java Server Programming", Wrox Press Ltd.
4. Daniel J. Berg, J. Steven Fritzing, "Advanced Java Techniques for Java Developers", John Wiley and Sons, Revised Edition.
5. Rickard Oberg, "Mastering RMI: Developing Enterprise Applications in Java and EJB", John Wiley and Sons, Book and CDROM edition 2001.
6. Harold, Eliote Rusty Harold, "XML Bible", 2nd Edition Hungry Minds, Inc.

UNIT I 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.

UNIT II 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.

UNIT III 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.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES

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

UNIT V 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", Pearson Education, Second Edition, 2002.

REFERENCES:

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

UNIT I 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.

UNIT II 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.

UNIT III 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.

UNIT IV 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.

UNIT V 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.

UNIT I 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.

UNIT II 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.

UNIT III 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 organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV 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.

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

Registrar