PERIYAR UNIVERSITY

SALEM 638 011

M. Sc DEGREE

COMPUTER SCIENCE

REGULATIONS AND SYLLABUS

(Effective from the Academic year 2008-2009 and thereafter)

Regulations

Effective from the Academic year 2008 - 2009

1. OBJECTIVE OF THE COURSE

To Develop the Post Graduates in **Computer Science** with strong knowledge of theoretical computer science subjects who can be employed in research and development units of industries and academic institutions.

2. CONDITION FOR ADMISSION

A candidate who has passed B.Sc computer science/B.C.A/B.Sc Computer technology/B.Sc Information Science degree of this University or any of the degree of any other University accepted by the syndicate as equivalent thereto subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the **M. Sc Computer Science** degree examination of this University after a course of study of two academic years.

3. DURATION OF THE COURSE

The programme for the degree of **Master of Science in COMPUTER SCIENCE** shall consist of **two Academic years** divided into four semesters. Each semester consist of 90 working days.

4. STRUCTURE OF M. Sc (Computer Science) PROGRAMME UNDER CBCS PATTERN FOR AFFILIATED COLLEGES (FROM 2008 AND THEREAFTER)

CURRICULUM AND SCHEME OF EXAMINATIONS

Courses	Number of Credits	Hours Per Week	Exam Duration (hrs)	Marks		
				I. A	E.E	Total
Semester-I						
Core Course-I-Design and Analysis of Algorithms	4	5	3	25	75	100
Core Course-II-Computer Architecture and Parallel Processing	4	5	3	25	75	100
Core Course-III-Visual Programming – Dot Net	4	5	3	25	75	100
Core Course-IV-Object Oriented Analysis and Design	4	5	3	25	75	100
Elective Course I	4	4	3	25	75	100
Core Course-V-Lab – I VB.Net Lab	3	6	3	40	60	100
Semester-II						
Core Course-VI-Advanced Java Programming	4	5	3	25	75	100
Core Course-VI - Linux and Network Programming	4	5	3	25	75	100
Elective Course II	4	4	3	25	75	100

EDC –I	4	4	3	25	75	100
Core Course-VIII-Lab – II Linux and Networking Lab	3	5	3	40	60	100
Core Course-IX- Lab – III Advanced Java Programming Lab	3	5	3	40	60	100
Human Rights	-	2	-	-	100	100
Semester-III						
Core Course-X- Data Mining and Warehousing	4	5	3	25	75	100
Core Course-XI- Network Security and Cryptography	4	5	3	25	75	100
Core Course-XII- Soft Computing	4	5	3	25	75	100
Elective Course III	4	5	3	25	75	100
Elective Course IV	4	5	3	25	75	100
Core Course-XIII- Lab-IV Software Development Lab	3	5	3	40	60	100
Semester-IV						
Core Course-XIV- E-Technologies	4	5	3	25	75	100
Core Course-XV- Digital Image Processing	4	5	3	25	75	100
Core Course-08-XVI- Dissertation and Viva-Voce	14			50	150	200

Total no. of Credits	Core EDC Elective	70 04 16					
Grand Total		90					
Total Marks							2300

EDC-EXTRA DISIPLINARY COURSE

Students are expected to opt EDC (Non major elective) offered by other departments.

I. A – INTERNAL ASSESSMENT

E. E – EXTERNAL EXAMINATIONS

The content of the syllabus and regulations may be followed for first and second semesters as per the regulations passed in the academic year 2006-2007.

Elective Course Code :

List of Electives

Elective -I

Theory of Automata
Software Engineering
Advanced Networks
Software Project Management

Elective -II

Wireless Application Protocol
Client/Sever Technology
Embedded systems
Advanced Operating systems

Elective -III

Parallel Computing
Mobile Computing
Enterprise Resource Planning
Discrete Structures

Elective -IV

Artificial Intelligence
Principles of Programming Languages
Optimization Techniques
Advanced Database Management Systems

EXAMINATIONS
THEORY

EVALUATION OF **INTERNAL ASSESSMENT**

Test	:	10 Marks
Seminar	:	05 Marks
Assignment	:	05 Marks
Attendance	:	05 Marks
Total	:	25 Marks

The Passing minimum shall be 50% out of 25 marks (13 marks)

EVALUATION OF **EXTERNAL EXAMINATIONS**

QUESTION PAPER PATTERN

Time duration: 3 Hours Max. Marks : 75

PART- A: 5x5 = 25

Answer all the questions
Either or type for each unit

PART- B: 5x10 = 50

Answer all the questions
Either or type for each unit

The Passing minimum shall be 50% out of 75 marks (38 marks)

PARACTICAL / SOFTWARE DEVELOPMENT

EVALUATION OF **INTERNAL ASSESSMENT**

Test 1	:	15 Marks
Test 2	:	15 Marks
Record	:	10 Marks
Total	:	40 Marks

The Passing minimum shall be 50% out of 40 marks (20 Marks)

EVALUATION OF **EXTERNAL EXAMINATIONS**

Time duration: 3 Hours Max. Marks : 60

QUESTION PAPER PATTERN

1. One compulsory question from the given list of objectives : 30 Marks
2. One Either/OR type question from the given list of objectives : 30 Marks

Distribution of Marks

Problem Understanding: 05 Marks
Program writing : 10 Marks
Debugging : 10 Marks
For Correct Results : 05 Marks

Mini-Project Viva-voce (joint) : 60 Marks

DISSERTATION

Evaluation (External) : 50 Marks
Viva-voce (joint) : 100 Marks

5. REGULATIONS OF PROJECT WORK

a. Students should do their five months **[Dec To Apr]** Project work in Company / Institutions.
b. The Candidate should submit the filled in format as given in **Annexure-I** to the department for approval during the Ist Week of January in their Project semester.
c. Each internal guide shall have maximum of eight Students.
d. Periodically the project should be reviewed minimum three times by the advisory committee.

e. The Students should prepare three copies of the dissertation and submit the same to the college on **30th April** for the evaluation by examiners. After evaluation one copy is to be retained in the College Library and one copy is to be submitted to the University (Registrar) and the student can hold one copy.

f. A Sample format of the dissertation is enclosed in **Annexure-II**.

g. Format of the **Title page** and **certificate** are enclosed in **Annexure III.**

h. The Students should use OHP / Power Point Presentation during their Project Viva voce Examinations.

6. PASSING MINIMUM

The candidate shall be declared to have passed the examination if the candidate secures not less than 50% marks in the University examination in each paper / practical. However submission of a record notebook is a must.

For the project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

7. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in **First Class**. All other successful candidates shall be declared to have passed in **Second Class**. Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in **First Class with Distinction** provided they pass all the examinations prescribed for the course at the first appearance.

Candidates who pass all the examinations prescribed for the course in first instance and within a period of two academic years from the year of admission to the course only are eligible for **University Ranking.**

8. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2006-07, i.e., for students who are to be admitted to the first year of the course during the academic year 2006-07 and thereafter.

09. TRANSITORY PROVISION

Candidates who were admitted to the PG course of study before 2006-2007 shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April/May 2009. Thereafter, there will be permitted to appear for the examination only under the regulations then in force

ANNEXURE - I

PERIYAR UNIVERSITY

College Name :

Course :

Student Name :

Register Number :

Title of the Project :

Address of Organization / Institution :

Name of the External Guide :

Designation :

Place :

Date : Signature of External Guide (with seal)

Name of the Internal Guide :

Qualification :

Teaching Experience :

Place :

Date : Signature of Internal Guide

Principal

[Approved or not Approved]

[University Use]

ANNEXURE II

COLLEGE BONAFIDE CERTIFICATE

COMPANY ATTENDANCE CERTIFICATE

ACKNOWLEDGEMENT

CONTENTS

ANNEXURE III

A. Format of the title page

TITLE OF THE DISSERTATION

A Dissertation submitted in partial fulfillment of
the requirements for the degree of
Master of Science in Computer Science
to the

Periyar University, Salem - 11

By

STUDENT NAME

REG. NO.

College emblem

COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with Pin Code

MONTH – YEAR

B. Format of the Certificate

COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with PIN CODE

College emblem

MONTH – YEAR

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME

REG. NO.

A Dissertation submitted in partial
fulfillment of the requirements for the degree of

Master of Science in Computer Science

to the **Periyar University, Salem - 11.**

INTERNAL GUIDE HEAD OF THE DEPARTMENT

Submitted for the Viva-Voce Examination held on _____

Internal Examiner

External Examiner

DESIGN AND ANALYSIS OF ALGORITHMS

4 Credits

UNIT -I

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT-II

Mathematical Analysis of Non – recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT-III

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute – force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree – Traversal and Related Properties – Decrease and Conquer – Insertion Sort- Depth first Search and Breadth First Search.

UNIT-IV

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap Sort – Dynamic Programming – Warshall's and Floyd's Algorithms – Optimal Binary Search Trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm - Dijkstra's Algorithm – Huffman trees.

UNIT-V

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TEXT BOOK:

1. Anany Levitin, Introduction to the Design and Analysis of Algorithm, Pearson Education Asia, 2003.

REFERENCES

1. T.H.Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms, PHI Pvt. Ltd., 2001.
2. Sara Baase and Allen Van Gelder, Computer Algorithms – Introduction to Design and Analysis, Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, The Design and Analysis of Computer Algorithms, Pearson Education Asia, 2003.

COMPUTER ARCHITECTURE AND PARALLEL PROCESSING

4 Credits

UNIT - I

Introduction – Evolution of Computer systems – Trends of Parallel Processing – Parallelism in Uniprocessor Systems – Architecture, Mechanisms, Multiprogramming and Timesharing – Parallel Computer Structures – Pipeline, Array, Multiprocessor, Performance of Parallel computer, Data Flow – Architectural Classification – Applications.

UNIT - II

An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipeline Processors – Instructions Prefetch and Branch Handling, Data Buffering and Busing Structures – Job Sequencing and Collision Prevention – Vector Processing

Requirements – Characteristics of Vector Processing, Pipelined Vector Processing Methods.

UNIT - III

SIMD Array Processors – SIMD Interconnection Networks – Associative Array Processing.

UNIT - IV

Multiprocessor Architecture and Programming: Functional Structures-Interconnection Networks- Parallel Memory Organization.

UNIT - V

Multiprocessor Operating Systems-Interprocessor Communication Mechanisms-Multiprocessor Scheduling Strategies-Parallel Algorithms for Multiprocessors.

TEXT BOOK:

1. Kai Hwang, Faye A.Briggs, Computer Architecture And Parallel Processing, McGraw-Hill.

REFERENCE BOOK:

1. John P.Hayes, Computer System Architecture and Parallel Processing, McGraw-Hill.

VISUAL PROGRAMMING – Dot NET

4 Credits

UNIT - I

Introduction to .NET, Overview of .NET applications, .NET Framework – CTS – CLS – CLR – Managed execution, Runtime environment. Understanding assemblers, .NET security.

UNIT - II

VB.NET : Introduction – The Foundation – Visual Basic.Net Mini Style Guide – Classes, Types, and Objects : Difference – Classes – Working with Numbers – Point Types – Characters – Booleans –

Literal Notation – Type Conversion – Working with Variables and Constants –Specialized operators - Methods : What Is a Method : Types of Methods – Synchronous vs. Asynchronous Method Calls . Method Data – Method Access Characteristics – Properties – Introduction to Exception Handling .

UNIT - III

Types, Structures, and Enumerations – Classes : Getting the Semantics Correct – The Classes are the System – Class Characteristics – Inheritance –The Inherited Members of Object – Aggregation and Composition: Reuse by Containment – Ending Inheritance with Sealed Classes – Improved Performance with Shared Classes and Modules

UNIT - IV

Interfaces- Abstraction and Interfaces in Object-Oriented Software Design – Interfaces and Inheritance – Benefits – Implicit Interfaces – Explicit Interfaces – Introduction to Interface Design and Implementation – Designing and Defining Interfaces – Implementing Interfaces - Exceptions : Exceptions-Handling Models – Recovering from Exceptions – Exception Statements

UNIT - V

Collections, Arrays and Other Data Structures: NET's Array and Collections Namespace – Stacks – Queues – Arrays - Array Class - Declaring and Initializing Arrays – Multidimensional Arrays – Jagged Arrays – Programming Against Arrays – Array Exceptions – Passing and Receiving Arrays to or from Methods- Searching and Sorting Arrays- Bubble Sort – Partition and Merge – Quick Sort – Sorting strings and other objects – Populating Arrays – Arrays for Objects – Hash Tables.

TEXT BOOK :

1. Jeffrey R. Shapiro, The Complete Reference Visual Basic .NET, TMH, 2002.

OBJECT ORIENTED ANALYSIS AND DESIGN

4 Credits

UNIT - I

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying Object Model, Classes and Objects: The nature of an Object – Relationships among objects.

UNIT - II

Classes and Objects: The nature of the Class- Relationships among Classes- The Interplay of Classes and Objects – On building quality classes and objects. Classification: The importance of proper classification – Identifying proper Classes and Objects – Key Abstraction Mechanism.

UNIT - III

UML – Meta Model – Purpose of Analysis and Design – Overview of the Process – Inception – Elaboration – Construction – Refactoring – Transition – Iterative Development – Use Cases.

UNIT - IV

Class Diagrams: Essentials – Interaction Diagram – Class Diagram: Advanced Concepts.

UNIT - V

Packages and Collaborations – State Diagram – Activity Diagram – Physical Diagram – UML and Programming.

TEXT BOOK:

1. Grady Booch, Object Oriented Analysis and Design, Pearson Edn.
   (Units I & II)
2. Martin Fowler, Kendall Scott, UML Distilled, A brief Guide to the Standard object modeling Languages, 2nd ed, Pearson Education.
   (Units III to V)

REFERENCE BOOKS:

1. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns: Elements of Reusable Object Oriented Software, Pearson Education
2. James Rumbaugh et al, Object Oriented Modeling and Design, Pearson Education
3. Ivar Jacobson, Object Oriented Software Engineering: A Use Case Driven Approach, Pearson Education
4. Eriksson, UML Tool Kit, Pearson Education

VB.NET LAB

3 Credits

1. Create minimum two simple applications using controls. Eg: Calculator, Drawing Pictures using GDI, Animation and Trainer Kit.
2. Write a program to simulate MS – OFFICE word and Excel packages with minimum five features.
3. Develop minimum two database applications using ADO.Net.

Example:

(i) Online Banking
(ii) Online Shopping
(iii) Online Recruitment System.
(iv) Online Railway Reservation System.

The application should be developed with the option of navigation in between forms. For eg. The online Banking should be developed with the web pages to look into the account details, deposit and withdraw.

ADVANCED JAVA PROGRAMMING

4 Credits

UNIT – I

Java Utilities: Collections – I/O streams – Networking – Event Handling.

UNIT – II

AWT: Windows, Controls, Layout Managers and Menus – Swing. Multimedia: Images, Animation and Audio – JDBC.

UNIT – III

Java Servlets: Design – Life Cycle – Constituents of javax.servlet package – cookies – session tracking – Java Server Pages: Overview – Implicit Objects – Scripting – Standard actions – Directives.

UNIT – IV

Remote Method Invocation: Remote Interface – The Naming Class – RMI Security Manager Class – RMI Exceptions – Creating RMI Client and Server classes – RMI – I IOP.

UNIT – V

Java Beans: Events – Customization – Introspection – Persistence – EJB: Introduction – EJB Container – Classes – Interfaces – Deployment description – Session Bean – Entity Java Bean – Jar file.

REFERENCE BOOKS

1. Herbert Schildt, The Complete Reference – JAVA 2 , Fourth Edition, 2001
2. Muthu, Programming with Java, Vijay Nicole Imprints Private Ltd., 2004
3. Deitel H.M. & Deital P.J, Java How To Program, Prentice-Hall of India, Fifth Edition, 2003.
4. Cay.S. Horstmann, Gary Cornel, Core Java 2 – Vol. II- Advanced Features, Pearson Education, 2004.
5. Tom Valsky, Enterprise JavaBeans – Developing component based Distributed Applications, Pearson 1999.

LINUX AND NETWORK PROGRAMMING

4 Credits

UNIT -I

Introduction to Linux Operating System, Linux basic, commands, file system, file and directory, Commands permissions, users, groups,

devices, Partitioning theory and partition, management with Linux, Installation of Linux, Post Install Configuration of Linux, Configuring run levels and consoles, Fstab and Crontab, Concept of modules, Linux services and daemons, Searching with locate, updatedb, Connecting to Internet

UNIT-II

Networking Introduction-OSI layers, Protocols, Routers, Gateways and IP Addressing, LAN Technologies, Creating a Local Area, Network using Red Hat Linux, Assigning static IP addresses, Network services, Creating Linux Network-Dynamic IP addresses, DHCP server and Client Configuration, Host names, name lookup on LAN, NFS-Native file sharing service, Configuring NFS

UNIT-III

Introduction to File Servers, native and cross-platform, Samba server, Creating Samba share and Samba users, Configuring Samba windows client, Introduction to FTP, Configuring FTP Server and Client Introduction to Remote Logging, Telnet and SSH, Running Telnet and SSH sessions, Introduction to Print Services, LPD, CUPS. Introduction to Information or Directory services, Configuring NIS

UNIT-IV

Introduction to Naming Services, Configuring DNS, Introduction to WEB Services, Configuring Apache

Introduction to Mail Services, Configuring Send mail, Introduction to proxy services, configuring SQUID

UNIT-V

Introduction to Firewall Services, Configuring IPTABLES. Linux Backup and Recovery Services. Introduction to kernel, Types of kernel, kernel compilation, Compilation options.

TEXT BOOKS:

1. Richard Peterson, The Complete reference LINUX, Tata McGraw Hill, 2nd edn. (Units I,II & III).
2. Steven Graham, Steve Shah, Linux Administration – A Beginner's Guide, Wiley Dreamtech. (Units IV & V).

REFERENCE BOOKS:

1. Beck, Bome, Dziadza, Kunitz, Linux Kernel Internals, Pearson Edn., 2001.
2. Sybex, LINUX Complete, BPB Publications
3. D.Bandel, R.Napier, Using Linux, Pearson Education Asia
4. Bill Ball, David Pitts, Red Hat Linux 7, Techmedia
5. David Bandel, Robert Napier, Special Edition Using Linux, Pearson Edn.

LINUX AND NETWORKING LAB

3 Credits

1. Logging In
   - Logging in and out, passwords, Telnet
2. Workstations
   - The X-Window System, CDE, Gnome, KDE
   - Running applications
   - The xterm window, shells, command line format
   - Help Screens and Manual pages
   - The X-Window system
   - Remote display of windows
3. Files
   - Filenames and Pathnames, wildcards, the Tree,
   - The current directory, relative pathnames
   - Directories; Manipulating, listing
   - Access permissions (chmod)
   - File manipulation (cp, mv, rm etc.)
   - X-Window File Managers
   - Viewing files (more, pg, less, cat, etc.)
4. Editors
   - Simple use of vi
   - Simple use of Emacs
   - Window editors
5. Unix Utilities
   - Finding Files (find, locate)
   - Mail programs
   - Pattern extractors (grep, cut, diff)
   - Backup / Archiving with tar

The FTP file transfer program

6. I/O Redirection
   Pipes & Filters
7. Processes
   Creating background processes, Job Control
   Process Status (ps, top)
   Killing Processes, Signals

ADVANCED JAVA PROGRAMMING LAB

3 Credits

1. Implementation of Multi threading and Exception handling concepts
2. Implementation of I/O Streams
3. Programs in AWT, Swing and Event handling
4. Network Programming
5. Programs using JDBC.
6. Implementing Servlets / JSP
7. RMI

DATA MINING AND WAREHOUSING

4 Credits

UNIT - I

Introduction – Data mining – Data mining functionalities – kinds of patterns can be mined – classification – major issues. Data warehouse – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehouse to data mining.

UNIT - II

Data pre-processing – Data cleaning – Data Integration and Transformation – Data Reduction – Discretization and concept hierarchy generation – Data mining primitives – Data mining Task

UNIT - III

Association Rule Mining – Mining single dimensional Boolean association rules from transactional databases –. Classification and

prediction – Issues regarding classification and prediction – Bayesian classification- Classification by Back propagation – classification based on concepts from association rule mining

UNIT - IV

Cluster Analysis – A categorization of Major clustering methods - Partitioning methods- Hierarchical methods – Grid based methods - Model based clustering methods – Density – based methods

UNIT - V

Applications and Trends in Data Mining – Data mining system products and Research prototypes – Additional themes on Data mining – Social Impacts of Data Mining – Trends in Data mining-Mining Spatial Databases – Mining Time-series and sequence data – Mining the World wide web.

TEXT BOOK

1. Jiwei Han, Michelien Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers an Imprint of Elsevier, 2001.
   (Chapters 1,2,3,4.1,6.1,6.2,7,8,9.2,9.4,9.6,10)

REFERENCE BOOKS

1. Arun K.Pujari, Data Mining Techniques, Universities Press (India) Limited, 2001.
2. George M. Marakas, Modern Data warehousing, Mining and Visualization: core concepts, Printice Hall, First Edition, 2002.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson, 2008.
4. Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2008.

NETWORK SECURITY AND CRYPTOGRAPHY

4 Credits

UNIT-I

Types of Physical Medium-Topologies-Wireless Networking: Wireless Protocols. Data Link Layer: Layered Data Link Protocols-SLIP and PPP-MAC and ARP. Network Layer: Routing Risks-Addressing-Fragmentation-Security.

UNIT-II

Internet Protocol: IP Addressing-ICMP-Security options. Transport Layer: Common Protocols-Transport Layer Functions-Gateways. TCP: Connection Oriented Protocols-TCP Connections-UDP. Session Layer: Session State Machine-Session and Stacks. SSL: SSL Functionality-Certificates. SSH: SSH and Security-SSH Protocols. STMP: Email Goals-Common servers. HTTP: HTTP Goals-URL.

UNIT-III

Security: Importance-Threat Models-Concepts-Common Mitigation Methods. Network theory: Standards Bodies-Network Stacks-Multiple Stacks-Layers and Protocols-Common Tools. Cryptography: Securing Information-Necessary Elements-Authentication and Keys-Cryptography and Randomness-Hashes-Ciphers-Encryption-Steganography.

UNIT-IV

Data Encryption Techniques-Data Encryption Standards-Symmetric ciphers. Public key Cryptosystems-Key Management.

UNIT-V

Authentication-Digital Signatures-E-Mail Security-Web Security-Intrusion-Firewall.

TEXT BOOKS:

1. Neal Krawetz, Introduction Network Security, India Edition, Thomson Delmar Learning. 2007
   (Unit-I:5.1,5.4,7.2,8.3,9,10,11.2,11.3,11.5,11.9,Unit-II: 12.1,12.2,12.4,14.1,14.2,14.3,15.1,15.2,15.7,16.2,16.3,19.2,19.3, 20.1,20.2,22.2,2223.1,23.2,Unit-

III:1.1,1.2,1.3,1.4,3.1,3.2,3.3,3.4,3.5,4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8)

2. V.K.Pachghare, Cryptography and Information Security, PHI Learning Private Limited 2009, (Unit-IV: 2,3,5,7,8, Unit-V: 9,10,11,13,14,16)

REFERENCE BOOK:

1. William Stallings, Cryptography and Network Security, Prentice –Hall of India, 2008

SOFT COMPUTING

4 Credits

UNIT-I Fundamentals of Neural Networks

Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-characteristics of Neural Networks-Learning Methods-Taxonomy-History of Neural Network-Early Neural Network Architectures.

UNIT-II Backpropagation Networks

Architecture of Backpropagation Network-Backpropagation Learing-Illustratrations-applications-Effect of Tuning Parameters of the Backpropagation Neural Network-Selection of various parameters in Backpropagation Neural Network-Variations of Standard Backpropagation algorithms.

UNIT-III Adaptive Resonance Theory (ART)

Introduction- ART1- ART2-Applications

UNIT-IV Fuzzy Sets and Systems

Fuzzy Sets-Fuzzy Relations-Fuzzy Logic-Fuzzy Rule based system-Defuzzification Methods-Applications.

UNIT-V Fuzzy Backpropagation Networks

LR-Type Fuzzy Numbers-Fuzzy Neuron-Fuzzy Backpropagation Architecture- Learning in Fuzzy Backpropagation-inference in Fuzzy Backpropagation-Applications.

TEXT BOOK:

1. Rajasekaran. S and Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2008
   (Chapters: 2.1, 2.3-2.9, 3.1-3.7, 5.1-5.4, 6.3, 6.5, 7.3-7.6, 12.1-12.6)

REFERENCE BOOKS

1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, Wiley India, 2008

E –TECHNOLOGIES

4 Credits

UNIT – I

Introduction to Electronic Commerce: Electronic Commerce– Business Models, Revenue Models, and Business Processes – Economic Forces and Electronic Commerce – Identifying Electronic Commerce Opportunities – International Nature of Electronic Commerce. **Technology Infrastructure**: The Internet and the Word Wide Web– Internet and World Wide Web – Packet – Switched Networks – Internet Protocols – Markup Languages and the Web – Intranets and Extranets – Internet Connection Options - Internet2 and The Semantic Web. **The Environment of Electronic Commerce:** Legal, Ethical and Tax issues.

UNIT – II

Selling on the Web: Revenue Models and Building a Web Presence – Marketing on the Web - Business– to – **Business Strategies:** From Electronic Data Interchange to Electronic Commerce –Online Auctions, Virtual Communities and **Web Protocols:–** Auction Overview – Online Auctions and Related Business – Virtual Communities and Web Portals.

UNIT – III

Web Server Hardware and Software: – Software for Web Servers – Electronic Mail (E-Mail) – Web Site and Internet Utility Programs – Web Server Hardware. **Electronic Commerce Software**: Basic

Functions of Electronic Commerce Software – Advanced Functions of Electronic Commerce Software – Electronic Commerce Software for Small and Midsize Companies – Electronic Commerce Software for Midsize to Large Businesses – Electronic Commerce for Large Businesses. **Electronic Commerce Security:** -Payment Systems for Electronic Commerce-Planning for Electronic commerce.

UNIT - IV

E- Marketing: Traditional Marketing – Identifying Web Presence Goals – The Browsing Behavior Model – Online Marketing – E-Advertising - Internet Marketing Trends – Target Markets – E-Branding – Marketing Strategies. - E-security – **E-Payment Systems:** E-Customer Relationship Management: E Supply Chain Management.

UNIT – V

E-Strategy: Information and Strategy – The Virtual Value Chain – Seven Dimensions of E-Commerce Strategy – Value Chain and E-Strategy – Planning the E-Commerce Project – E – Commerce Strategy and Knowledge Management – E-Business Strategy and Data Warehousing and Data mining.**Mobile Commerce:–** Wireless Applications – Technologies for Mobile Commerce– WAP Programming Model – Wireless Technologies – Different Generations in Wireless Communication – Security issues Pertaining to Cellular Technology –M-Commerce in India. Customer – **Effective Web Design:**-Legal and Ethical Issues.

TEXT BOOKS:-

1. Gary P. Schneider, E-Commerce Strategy, Technology and Implementation, CENGAGE Learning INDIA Private Limited,. Reprint 2008 (Unit-I: Chapter 1,2,3 Unit-II: Chapter 4,5,6,7, & III Chapter – 8,9,10,11,12).
2. P.T. JOSEPH, E-Commerce an Indian Perspective Third Edition Prentice Hall of India, (Unit-IV: Chapter 4,5,6,7,8 & V – Chapter 9,10,11,12).

REFERENCE BOOKS:

1. Mike Papazologn, E-Business, Organizational and Technical Foundations, Wiley India Pvt Ltd, 2008
2. Elias M. Awad, Electronic Commerce, Prentice-Hall of India, 2008

3. Kenneth C.Laudon, Carlo Guercio Traver E- Commerce-business, technology, society, Pearson Education 2009.

DIGITAL IMAGE PROCESSING

4 Credits

UNIT - I

Introduction: What is Digital Image Processing? – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image processing System – Digital Image Fundamentals: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels.

UNIT - II

The Image, its Mathematical Background: Overview – Linear Integral Transforms. Data Structures for Image Analysis: Level of Image Data Representation – Traditional Image Data Structures – Hierarchical Data structures. Image Pre-processing: Pixel Brightness Transformations - Geometric transformations – Local pre-processing: Image smoothing, Edge Detectors – Image Restoration.

UNIT - III

Segmentation : Thresholding – Edge Based Segmentation : Edge Image Thresholding, Border tracing - Region Based Segmentation – Matching – Shape Representation and **Description:** Region Identification – Contour Based Shape Representation and Description-Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description, Simple Scalar Region Descriptors.

UNIT - IV

Object recognition: Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems- Mathematical Morphology – Basic Morphological concepts – Binary Dilation and Erosion.

UNIT - V

Image Data Compression: Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchal and Progressive Compression Methods – Comparison of Compression Methods – Coding –JPEG Image Compression.

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E.Woods, Digital Image Processing, Prentice Hall, Third Edition, 2008. (Unit-1: Chapter 1-1.1, 1.3, 1.4, 1.5, Chapter 2 -2.1, 2.2, 2.3, 2.4, 2.5).
2. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, Cengage Learning, 2009 (Unit -II: Chapter 3 – 3.1, 3.2 ,Chapter-4, Chapter-5,5.1, 5.2,5.3, 5.3.1, 5.3.2, 5.4 Unit-III: Chapter 6 -6.1, 6.2, 6.2.1, 6.2.3., 6.3, 6.4, Chapter 8 – 8.1, 8.2,8.2.1,8.2.2, 8.3, 8.3.1 Unit-IV- 4 – Chapter 9,9.1,9.2, 9.3,9.7, Chapter 13-13.1, 13.3 Unit-5: Chapter 14- 14.1, 14.2, 14.3, 14.4, 14.5,14.6, 14.8, 14.9,14.9.1)

REFERENCE BOOKS

1. Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.
2. Chanda & Majumdar, Digital Image Processing and Analysis, Prentice Hall ,3rd Edition

ELECTIVE I
THEORY OF AUTOMATA

4 Credits

Note: No Theorems required. Emphasis on Concepts and Applications.

UNIT - I

Automata Theory: Introduction – Structural representation – Automata and Complexity –Alphabets – Strings – Languages – Problems. Finite Automata: Introduction– Deterministic Finite Automata – Non-Deterministic Finite Automata - Application: Text Search – Finite Automata with Epsilon-Transitions.

UNIT - II

Regular Expressions – Finite Automata and Regular Expressions – Applications of Regular Expressions - Algebraic Laws for Regular Expressions – Proving Languages not to be Regular – Decision Properties of Regular Languages – Equivalence and Minimization of Automata – Moore and Mealy Machines.

UNIT - III

Context-Free Grammars: Definition – Derivations using a Grammar – Leftmost and Rightmost Derivations – The Language of a Grammar – Sentential Forms - Parse Trees - Pushdown Automata: Definition – Languages of a PDA – Equivalence of PDA's and CFG's - Deterministic Pushdown Automata.

UNIT - IV

Turing Machine: Introduction – Notation - Description – Transition Diagram – Languages – Turing Machines and Halting – Programming Techniques for Turing Machines – Multitape Turing Machine – Restricted Turing Machines – Turing Machines and Computers.

UNIT - V

Intractable Problems: The Classes P and NP- The NP Complete Problem – Complements of Languages in NP – Problems solvable in polynomial space.

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Introduction to Automata Theory, Languages and Computation, Pearson Education, 2001.

REFERENCE BOOKS:

1. S.P.Eugene Xavier, Theory of Automata, Formal Languages and Computation, New Age International, 2004.
2. A.M.Natarajan, A.Tamilarasi, P.Balasubramani, Theory of Computation, New Age International, 2003.
3. E.V.Krishnamurthy, Introductory Theory of Computer Science, East-West Press Pvt. Ltd, 1983.
4. Bernard M. Moret, The Theory of Computation, Pearson Education, 1998.

SOFTWARE ENGINEERING

4 Credits

UNIT – I

Socio-technical systems: Emergent system properties- Systems Engineering – Organisations, People and Computer Systems – Legacy Systems. Software Processes: Software process models – Process iteration – Process activities – The Rational Unified Process – Computer-Aided Software Engineering. Project Management: Management activities – Project planning – Project scheduling – Risk management.

UNIT – II

Software Requirements: Functional and non-functional requirements – User requirements – System requirements – Interface specification – The software requirements document. Requirements Engineering Process: Feasibility studies – Requirements elicitation and analysis – Requirements validation – Requirements management. System Models: Context Models – Behavioural Models – Data Models – Object Models – Structured Methods.

UNIT – III

Design: Architectural Design decisions - System organization – Modular decomposition styles – Control styles- Reference Architectures. Distributed Systems Architectures: Multiprocessor architectures – Client-Server Architectures – Distributed object architectures – Inter-Organisational distributed computing. Application Architectures: Data processing systems – Transaction processing systems – Event processing systems – Language processing systems. User Interface Design: Design issues- The UI design process – User Analysis – User Interface prototyping – Interface evaluation.

UNIT – IV

Rapid Software Development: Agile methods- Extreme programming – Rapid application development - Software prototyping. Component-based Software Engineering: Components and Component Models – The CBSE process – Component composition. Software Evolution: Program evolution dynamics – Software maintenance – Evolution processes – Legacy system evolution.

UNIT – V

Verification and Validation: Planning verification and validation – Software inspections –Automated static analysis – Verification and formal methods. Software Testing: System Testing – Component Testing – Test case design – Test automation. Software Cost Estimation: Software productivity – Estimation techniques – Algorithmic cost modeling – Project duration and staffing. Configuration Management: System building – CASE tools for configuration management.

TEXT BOOK:

1. Ian Sommerville, " Software Engineering", Seventh Edition, Pearson Education, 2005

REFERENCE BOOKS:

1. Richard Fairley, Software Engineering Concepts, TMGH, 1997
2. Roger S. Pressman, Software Engineering a Practioner's Approach, Fifth Edition, Mc Graw-Hill Higher Education.
3. Rajib Mall, Fundamentals of Software Engineering, PHI, Second Edition
4. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, Second Edition, PHI/ Pearson Education Asia.

ADVANCED NETWORKS

4 Credits

UNIT - I

ISDN Overview:The Integrated Digital Network – A Conceptual Overview of ISDN – ISDN Standards – ISDN Interfaces and Functions: Transmission Structure – User-Network Interface Configuration – ISDN Protocol Architecture – ISDN Connections – Addressing – Interworking.

UNIT - II

ISDN Physical Layer: Basic User-Network Interface – Primary Rate User-Network Interface – U Interface – ISDN Data Link Layer: LAPD – Terminal Adaption – Bearer Channel Data Link Control Using I.465/V.120,207.

UNIT - III

ISDN Network Layer: Overview – Basic Call Control – Control of Supplementary Services – ISDN Services: Service Capabilities – Bearer Services and Teleservices – Basic and Supplementary Services – B-ISDN network concept: General Architecture of the B-ISDN – Networking Techniques – Signaling Principles – Broadband network Performance – Traffic management aspects – Operation and maintenance aspects – Customer network aspects.

UNIT - IV

B-ISDN user-network interfaces and protocols: B-ISDN protocol reference model – General aspects of the user-network interface – Physical layer of the user-network interface at 155/622 Mbit/s Additional user-network interfaces – Equipment-internal interfaces – ATM layer – ATM adaptation layer.

UNIT - V

Operation and maintenance of the B-ISDN UNI: Network configuration for OAM of the customer access – OAM functions and information flows – Implementation issues – Integrated local management interface – Traffic management: Traffic control procedures and their impact on resource management – Mechanisms to achieve a specified QoS – Statistical multiplexing in ATM networks – Congestion control Signaling , routing and addressing - ATM switching: Switching elements – Switching networks – Switches and cross-connects.

TEXT BOOKS :

1. William Stallings , ISDN and BroadBand ISDN with Frame Relay and ATM, Pearson Education , Fourth Edition , 2003.
2. Rainer Handel , Manfred N Huber , Stefan Schroder , ATM Networks Concepts Protocols Applications, Pearson Education Asia , Third Edition , 2002.

REFERENCE BOOKS :

1. John M.Griffiths , ISDN Explained, 2e , March 1995 , Willey & Sons.
2. Koji Kobayashi , Computers and Communications, The MID Press (a Version of c and C) 1986.

3. Walter , J., Gooralski , J., Introduction to ATM networking , MCGraw-Hill Inc.,

SOFTWARE PROJECT MANAGEMENT

4 Credits

UNIT-I

SPM: Introduction – Project planning – Project evaluation – Selection of an appropriate project approach.

UNIT-II

Software effort estimation – Activity planning – Risk Management – Resource allocation.

UNIT-III

Monitoring and control – Managing people and organizing teams – Small projects.

UNIT-IV

Software Quality: Introduction – Establishment – Software Quality Assurance Planning – Overview – Purpose and Scope – SQA management – Documentation – Standards, Practices, Conventions and Metrics.

UNIT-V

Reviews and Audits – Tests – Tools – Techniques and Methodologies – Training – Risk Management.

TEXT BOOKS:

1. BOB Huges Mike Cotterell, Software Project Management, 2nd edn, McGraw Hill. (Units I to IV).
2. Mordechai Ben, Menachem Garry S. Marliss, Software Quality, Vikas, 1997. (Unit V)

REFERENCE BOOKS:

1. Futrell, Quality software Project management, Pearson Education India.
2. Royce, Software Project management, Pearson Education India.

3. "Basics of Software Project Management", NIIT, Prentice-Hall of India
4. Drew Bire and Mike Harwood, "Software Project Management from concept to Deployment", Wiley Dreamtech
5. Darrel Ince, "An Introduction to Software Quality Assurance and its implementation".

ELECTIVE II

WIRELESS APPLICATION PROTOCOL

4 Credits

UNIT-I

Introduction – Market Convergence – Enabling Convergence – Key Services for the Mobile Internet – Business Opportunities. Making the Internet "Mobile": Challenges and Pitfalls – The Origins of WAP – WAP Architecture – Components of the WAP Standard – Network Infrastructure services Supporting WAP Clients – WAP Architecture Design Principles – Relationship to other Standards.

UNIT-II

The Wireless Markup Language: Overview – The WML Document Model – WML Authoring – URLs Identify Content – Markup Basics – WML Basics – Basic Content – Events, Tasks and Bindings – Variables – Controls – Miscellaneous Markup – Sending Information – Application Security – Document Type Declaration – Errors and Browser Limitations.

UNIT – III

Web Site Design: Computer Terminals versus Mobile Terminals – Designing a usable WAP Site – Structured Usability Methods – User Interface Design Guidelines – Design Guidelines for Selected WML Elements.

UNIT-IV

Tailoring Content to the Client-Push Messaging: Overview of WAP Push – Push Access Protocol – WAP Push Addressing – Push Message – MIME media types for Push Messages – Push Proxy Gateway – Push Over – the – Air Protocol – Push Initiator Authentication and Trusted Content.

UNIT-V

Wireless Telephony Applications: Overview of the WTA Architecture – The WTA Client Framework – The WTA Server and Security – Design Considerations – Application Creation Tool Box – Future WTA Enhancements – Mapping the Deployment Chain to the Business value chain – Security Domains – Linking WAP and the Internet – WAP Service Design – The Mobile Internet Future.

TEXT BOOK

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana and Others, The Wireless Application Protocol, Pearson Education, 2001.

REFERENCE BOOK

1. Charless Arehare, Nirmal Chidambaram, and others, Professional WAP, Wrox
   press Ltd., Shroff publ. And Dist – Pvt. Ltd., 2001.

CLIENT / SERVER TECHNOLOGY

4 Credits

UNIT-I

Basic concepts of Client/Server – Characteristics – File Servers – Database servers – Transaction servers- Groupware servers – Objective servers – Web servers – Fat servers or fat clients – 2 tier versus 3 tier – Client/Server building blocks – Operating system services. Base services – Extended services – Server scalability – Client Anatomy.

UNIT-II

NOS Middleware – Peer-to-peer communications – RPC – MOM Middleware – MOM versus RPC - The fundamentals of SQL and relational databases – Server architecture – Stored procedures, triggers and rules.

UNIT-III

Online transaction processing – Decision support systems – OLTP versus DSS: programming effort, database needs – Data warehouses – Elements - Hierarchies – Replication versus Direct access – Replication mechanism – EIS/DSS Tools – Client/server transaction processing – transaction models – TP Monitors – Transaction management standards.

UNIT-IV

Groupware – Components – Distributed objects and components – CORBA: components – Object Management Architecture – Services – Business objects.

UNIT-V

Client/server Distributed system management – components – Management application – The Internet Management Protocols – OSI Management Framework – The Desktop Management Interface – X/Open Management Standards – Client/server application development tools – Client/Server Application Design.

TEXT BOOK:

1. Robert Orfali, Dan Harkey and Jeri Edwards, The Essential Client Server Survival Guide, 2nd edn. Galgotia

REFERENCE BOOKS:

1. Dawna Travis Dewire, Client/Server computing, Tata McGraw Hill.
2. Jafferey D. Schank, Novell's guide to Client/Server Application and Architecture, BPB Publications.

EMBEDDED SYSTEMS

4 Credits

UNIT - I

Introduction to Embedded System: An Embedded System – Processor in the System – Other Hardware Units – Software Embedded into a System – Exemplary Embedded Systems.

UNIT - II

Processor and Memory Organization: Structural Units in a Processor – Processor Selection for an Embedded System – Memory Selection for an Embedded system – Direct Memory Access – Devices and Buses for Device Networks: I/O Devices – Timer and Counting Devices – Serial Communication and Parallel Communication – Device Drivers and Interrupts Servicing Mechanism: Device Drivers – Device Drivers for Internal Programmable Timing Devices – Interrupt Servicing (Handling) Mechanism – Context, Latency and Deadline.

UNIT - III

Programming Concepts and Embedded Programming in C and C++: Software Programming in Assembly Language (ALP) and in High Level Language 'C' – Embedded Programming in C++ - Embedded Programming in Java – Optimisation of Memory needs – Inter-Process Communication and Synchronisation of Processes, Tasks and Threads: Multiple Processes in an Application – Problem of Sharing Data by Multiple Tasks and Routines – Inter Process Communication.

UNIT - IV

Real Time Operating Systems: Real-Time and Embedded System Operating Systems – Interrupt Routines in RTOS Environment: Handling of Interrupt Source Call by the RTOSs - RTOS Task Scheduling Models, Interrupt Latency and Response Time of the Tasks as Performance Metrics – Performance Metric in Scheduling model for Periodic, Sporadic and Aperiodic Tasks – List of Basic Actions in a Preemptive Scheduler and Expected Times taken at a Proccessor – Fifteen-Point Strategy for Synchronisation between the Processors, ISRs, OS Functions and Tasks and for Resource Management – Embedded Linux Internals: Linux Kernel for the Device Drivers and Embedded System – OS Security Issues.

UNIT – V

Case Study of an Embedded System for a Smart Card – Hardware-Software Co-Design in an Embedded System: Embedded System Project Management – Embedded System Design and Co-Design Issues in System Development Process – Design Cycle in the Development Phase for an Embedded System – Users of Target System or its Emulator and In-Circuit Emulator(ICE) – Use of Software Tools for Development of an Embedded System – Use of Scopes and Logic

Analysers for System Hardware Tests – Issues in Embedded System Design.

TEXT BOOK:

1. Raj Kamal, Embedded Systems – Architecture, Programming and Design, Tata McGraw-Hill,2003.

REFERENCE BOOKS:

1. David E. Simson, An Embedded Software Primer, Addisons-Wesley-2001.
2. Steve Heath, Embedded Systems Design, Elsevier, 2003.
3. Frank Vahid and Tony Givargis, Embedded System Design, John Wiley And Sons, Inc, 2002.

ADVANCED OPERATING SYSTEM

4 Credits

UNIT -I

Introduction: Definition of a Distributed System: Goals - Hardware Concepts Software Concepts - Remote Procedure Call: Basic RPC Operation – Parameter Passing – Extended RPC Models – Remote Object Invocation: Distributed Objects – Binding a Client to an Object – Static versus Dynamic Remote Method Invocations – Parameter Passing.

UNIT- II

Processes: Threads – Clients – Code Migration: Approaches to Code Migration – Migration and Local Resources – Migration in Heterogeneous Systems – Software Agents – Naming: Naming Entities - Names, Identifiers and Addresses – Name Resolution – The Implementation of a Name Space – Locating Mobile Entities: Naming versus Locating Entities – Simple Solutions – Removing Unreferenced Entities.

UNIT- III

Synchronization: Clock Synchronization – Physical Clock Synchronization Algorithms – Use of Synchronized Clocks – Logical Clocks – Global State – Electron Algorithms – Mutual Exclusion – Distributed Transactions - Consistency and Replication – Data-Centric Consistency Models: Linearizability and Sequential Consistency – Weak Consistency – Distribution Protocols: Replica Placement – Epidermic Protocols.

UNIT -IV

Fault Tolerance: Introduction to Fault Tolerance – Process Resilience: Design Issues – Failure Masking and Replication – Reliable Client-Server Communication – Reliable Group Communication: Basic Reliable – Multicasting Schemes – Distributed Commit: Two-Phase Commit – Recovery: Introduction – Stable Storage – Distributed Object Based Systems: Distributed COM - Distributed File Systems: Sun Network File System.

UNIT - V

Introduction to Real-time systems: Real-time system –Definition – Classification of Real-Time systems: Clock-based Tasks (cyclic, periodic) –Event based Tasks (aperiodic) –Interactive Systems-Operating Systems : Introduction , Real-time Multitasking Operating Systems –Scheduling Strategies – Priority Structures – Task Management – Scheduler and Real-time Clock Interrupt Handler – Memory Management –Code Sharing – Resource Control : an Example of an Input/Output Subsystem(IOSS) – Task Co-operation and Communication – Mutual Exclusion – Data Transfer(the Producer – Consumer Problem) – Liveness –Minimum Operating System Kernel – Example of Creating a RTOS Based on a Modula-2 Kernel.

TEXT BOOKS:

1. Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems – Principles and Paradigms, PHI, 2004. (UNIT I – IV)
2. Stuart Bennett, Real Time Computer Control – An introduction, Pearson Education, 2003 (UNIT – V)

REFERENCE BOOKS:

1. Pradeep K. Sinha, Distributed Operating Systems, PHI, 2001.
2. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems-Concepts and Design, 3rd Edition, Pearson Education, 2002.
3. Mukesh Singhal and Niranjan G. Shivarathri, Advanced Concepts in Operating Systems, TMH, 2001.
4. C.M.Krishna and K.G.Shin, Real Time Systems, MGH, 1997.

ELECTIVE III
PARALLEL COMPUTING

4 Credits

UNIT - I

Paralle Processing –Shared Memory Multi processing – Distributed Memory – Using Parallelism – Tolls and Languages – Programmability Issues – Operating system support – Types of Operating systems – Parallel Programming Models –Software tools

UNIT – II

Distributed Computing – Message Passing Model – General model – Programming Model – PVM – Remote Procedure call – Parameter passing –Locating the server – Semantics in the presence of failures – Security – Problem areas – Java remote method Invocation – DCE – Developing applications in DCE

UNIT – III

Algorithms for Parallel machines - speedup, complexity and cost - Histogram Computation – Parallel reduction – Quadruple program- Matrix Multiplication –Parallel sorting algorithms.

UNIT - IV

Parallel Programming Languages – Sample problem – Fortran 90 – nCUBE C –
Occam – C- Linda

UNIT - V

Grid computing – The Data centre, the Grid and Distributed/High Performance computing- Cluster and Grid Computing – Meta computing – Scientific , Business and E-Governance Grids – Web services and Grid computing

TEXT BOOKS

1. M.Sasi kumar, Dinesh Shikhare and P.Ravi Prakash – Introduction to Parallel Processing- PHI –New Delhi -2006 – Unit I,II,III & IV - Chapters 1,7,89,10

2. C.S.R Prabhu , Grid and Cluster computing –PHI New Delhi - 2008. Unit V-chapter 1

REFERENCE BOOKS

1. Perrott.R.H, Parallel Programming, Addison Wesley Publishing Company, 1987.

MOBILE COMPUTING

4 Credits

UNIT - I

Introduction: Advantages of Digital Information - Introduction to Telephone Systems – Mobile communication: Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication.

UNIT - II

Introduction to Cellular Mobile Communication – Mobile Communication Standards – Mobility Management – Frequency Management – Cordless Mobile Communication Systems.

UNIT - III

Mobile Computing: History of data networks – Classification of Mobile data networks - CDPD System – Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication.

UNIT - IV

Important Parameters of Mobile Communication System – Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol.

UNIT - V

WCDMA Technology and Fibre Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.

TEXT BOOK:

1. T.G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Learning Private Limited.2009 (Unit-I: 1, 1.1, 2, 3, 3.1, 3.2, 3.3 Unit-II: 4, 5, 6, 7, 8 Unit-III: 9, 9.1, 9.2, 9.3, 10, 10.1, 10.2, 10.3, 11, 12 Unit-IV: 13, 14, 14.1, 15, 16, 16.1, 16.2, 16.3, 16.4, 17 Unit-V: 18, 19, 20, 21)

REFERENCE BOOK:

1. Jochen Schiller, Mobile Communications, Second Edition, Pearson Education. 2007

ENTERPRISE RESOURCE PLANNING

4 Credits

UNIT – I

Introduction to ERP: Evolution of ERP – What is ERP? – Characteristics of ERP – Features of ERP– Need for ERP- Benefits of ERP – Enterprise – an Overview – ERP and related Technologies : Business Process Reengineering – Management Information System – Decision Support System – Executive Information System – Data Warehousing – Data Mining – On-line Analytical Processing(OLAP) – Supply Chain Management.

UNIT – II

ERP- A Manufacturing perspective: Introduction - CAD/CAM - Materials requirement planning - Bill of Material - Closed loop MRP- Manufacturing resource planning – Distribution requirements planning- Production data management - Data management - Process management - Benefits of PDM. ERP Modules: Finance management – manufacturing management - Plant maintenance – Quality management – Materials management – Human resources – Sales and distribution.

UNIT – III

ERP Market: SAP AG – Baan company – Oracle corporation – People soft – JD Edwards world solution's company – QUAD – System software associates Inc. (SSA). ERP Implementation life cycle: Pre-evaluation screening – Package evaluation – Project planning phase – Gap analysis – Re-Engineering – Configuration – Implementation team training – Testing - End – user training – Post Implementation.

UNIT – IV

Selection of ERP: Difficulty in selecting ERP – Approach to ERP selection – "Request For Proposal" approach – Proof of Concept (POC) approach - application of POC approach – Comparison of RFP and POC approach – Analytic Hierarchy Process approach - application of AHP in evaluation of ERP - Vendor , Consultants and Users – Future directions in ERP.

UNIT – V

ERP Resources on the Internet – ERP Case studies

TEXT BOOK

1. Alexis Leon, Enterprise Resource Planning, 1999, Tata McGraw Hill.
   (Chapters: 1,2,3,4,5,6,7,8,9,10,11)
2. Ravi Shankar S.Jaiswal, Enterprise Resource Planning 1999, Galgotia Publications Pvt. Ltd. (Chapters: 1,9)

REFERENCE BOOK

1. Alexis Leon, ERP Demystified, 2000, Tata McGraw Hill.
2. Ashim Raj Singla, Enterprise Resource Planning, 2008, Cengage Learning India Pvt. Ltd. New Delhi.

DISCRETE STRUCTURES

4 Credits

UNIT - I

Sets and subsets - Operations on Sets - sequences- Logic: propositions and Logical Operations - Conditional Statements - Methods of Proof - mathematical induction - mathematical Statements - logic and problem Solving

UNIT - II

Relations and diagraphs: Product sets and Partitions- Relations and Digraphs - Paths in Relations - Properties- Equivalence relations- Data Structures for relations and digraphs- Operations on relations

UNIT -III

Functions : Introductions - Functions for computer science - Growth of functions - Permutation Functions- Languages and Finite state machines: Languages Representation of special Grammars and languages - Finite state machines - Monoids, machines and languages- Machines and regular languages - Simplification of machines

UNIT -IV

Graph Theory: Introduction - Handshaking problem - Paths and Cycles - Isomorphism - representations of Graphs- Connected Graphs- Konigsberg Bridge Problem

UNIT - V

Trees- Spanning trees- Rooted Trees- Directed Graphs- Applications: Scheduling- Finding a Cycle in a Directed graph- Priority in Scheduling - Eulerian Circuits

TEXT BOOKS

1. Kolman, Busby, Ross, Discrete mathematical Structures, PHI Private limited, Sixth Edition, 2009 (For Units I, II & III Chapters 1.1, 1.2, 1.3, 2, 4, 5, 10)

2. Gray Haggard, John Schlipf, Sue Whitesids, Discrete Mathematics for Computer Science, Cengage Learning Publisher Seventh Indian Reprint, 2008
   (For Units IV and V, Chapter - 6)

REFERENCE BOOK

1. Purna Chandra Biswal, Discrete Mathematics and Graph Theory, PHI Private Limited, 2008
2. Kevin Ferland, Discrete Mathematical Structures, Cengage Learning, First Edition, 2009

ELECTIVE IV

ARTIFICIAL INTELLIGENCE

4 Credits

UNIT - I

The AI problems – AI techniques – problems, problems space & search – Defining the problem as a state Search – Production systems – problem characteristics – heuristic search techniques – Generate & test – Hill climbing – Best first search. Problem reduction – constraint satisfaction – means – ends analysis.

UNIT - II

Game playing : Mini – max procedure – Adding Alpha – Beta cutoffs – Additional refinements – Searching AND/OR Graphs – Iterative deepening. Using Predicate Logic – Representing simple facts & logic – Representing instance & IS a Relationships – Computable functions & Predicates – Use of the predicate calculus in AI – Resolution – natural deduction.

UNIT - III

Representing knowledge using Rules – Procedural verses declarative knowledge logic programming – forward versus backward reasoning – Resolving within AND/OR Graphs matching – control knowledge – symbolic Reasoning under uncertainity – non – monotonic reasoning – Implementation Issues – Augmenting a problem solver - Implementation of depth first & breadth first search. Statistical reasoning – Bayee's theorem – Certainity factors & Rule based Systems – Bayesian Networks – Dempston – Shafer theory – Fuzzy logic.

UNIT - IV

Expert Systems – Architectural Components – Explanation facilities – knowledge acquisition.

UNIT - V

Expert System Development process – Non – formal representation of knowledge – semantic Networks – Frames – Scripts – Production Systems – Expert Systems tools.

TEXT BOOKS:

1. Elain Rich & Kevin Kaight – Artificial Intelligence - Tata McGraw Hill – Second Edition, 1991 (For units – I , II , & III :Chapter 1,2,3,5,6,7,9).
2. David W. Roltson – Principles of Artificial Intelligence & Expert Systems Development – McGraw Hill (For units – IV & V : Chapters 1,4,7,8,9).

PRINCIPLES OF PROGRAMMING LANGUAGES

4 Credits

UNIT - I

Language Design Issues: History-Role of Programming languages - environments - Impact of machine Architectures - Lnaguage Translation Issues: Programming language Syntax- Stages in Translation - formal Translation models - recursive descent Parsing

UNIT - II

Modeling Language Prpperties: Formal Properties of Languages- Language Semantics-Elementary data Types: Properties of Types and Object- Scalar Data Types - Composite Data Types

UNIT - III

Encapsulation: Structure data types - Abstract data types - Encapsulation by sub programs Type Definitions Inheritance: - Polymorphisms

UNIT -IV

Functional Programming: Programs as Functions- Functional Programming in an Imperative Language - LISP - Functional Programming with static typing - delayed evaluation- Mathematical functional programming- recursive functions and lambda calculus - Logic programming : Logic and Logic Programs - Horn Clauses - Prolog - Problems with logic programming

UNIT V

Formal Semantics: Sample small language - operational Semantics - Denotation Semantics - Axiomatic Semantics - Program correctness - Parallel Programming: Parallel Processing and programming languages - threads - Semaphore - monitors-message passing - parallelism Non Imperative Languages

TEXT BOOKS :

1. Terrence W Pratt, Marvin V Zelkowitz, Programming Languages - Design and
   Implementation, PHI Publications, 4th edition, 2008
   UNIT - I: Chapters 1, 2, 3, UNIT - II: Chapters 4, 5, UNIT - III: Chapters 6, 7

2. Kenneth C. Louden , programming Languages-Principles and Practics , Cengage Learning Publications , 2 Edition, 2008
   UNIT -IV : Chapters 11,12, UNIT V : Chapter 13, 14

REFERENCE BOOKS

1. Daniel P Friedman, Mitchell Wand, Christopher T Haynes, Essentials of programming languages, 2 Edition, PHI Publishers, 2005

OPTIMIZATION TECHNIQUES

4 Credits

UNIT – I Linear Programming

Introduction-Concept of Linear Programming Model-Development of Linear Programming Models-Graphical Method-Simplex Method-Big M Method-Dual Simplex Method-Two Phase Method. Duality: Formulation of Dual Problem-Application of Duality.

UNIT – II Transportation and Assignment Problem

Introduction-Mathematical Model of Transportation Problem-Types of Transportation Problem-Methods to solve Transportation problem. Assignment problem: Introduction-Zero-One Programming Model-types of Assignment problem-Hungerian Method.

UNIT – III Inventory Control

Introduction-Models of inventory-Implementation of purchase inventory model-EOQ Model for multi-item joint replenishment.

UNIT – IV Production Scheduling

Introduction-Single Machine Scheduling: Measures of Performance-Shortest Processing Time Rule to Minimize Mean Flow Time-Weighted Shortest Processing Time rule to minimize weighted mean flow time-Earliest Due Date rule to Minimize Maximum Lateness-Model to Minimize total Tardiness. Flow Shop Scheduling: Johnson's Algorithm for n jobs and Two Machines problem-Extension of Johnson's Algorithm for n jobs an Three Machines problem-Job Shop Scheduling.

UNIT - V Queueing Models

Introduction-Terminologies of Queueing System-Empirical Queueing Model: (M/M/1) : (GD/∞/∞) Model-(M/M/C) : (GD/∞/∞) Model-(M/M/1) : (GD/N/∞). Simulation: Need for Simulation-Types of Simulation-Major Steps of simulation-simulation using high-level languages.

TEXT BOOK:

1. Pannerselvam. R., Operations Research, Second Edition, PHI Learning Private Limited, 2008. (Chapters: 2.1 – 2.5, 2.7, 3.1 – 3.4, 4.1 - 4.4, 7.1, 7.2, 7.5, 7.8, 9.1, 9.2, 9.3.1-9.3.3, 9.4.1-9.4.4, 14.1, 14.2.1 – 14.2.5, 14.3.1, 14.3.2, 14.4.1)

REFERENCE BOOKS:

1. Nita H Shah, Ravi M. Gor, Hardik Soni, Operations Research, Prentice-Hall of India, 2008.
2. Srinivasan. G., Operations Research, PHI, 2008.
3. Wayne L. Winston, Operations Research, Cengage Learning, 2009.

ADVANCED DATABASE MANAGEMENT SYSTEMS

4 Credits

UNIT - I

Advanced Data Modeling - Advanced SQL - Database design.

UNIT - II

Advanced Database concepts: Transaction management and concurrency control - Database performance tuning and query optimization, distributed database management systems.

UNIT - III

Object Oriented Databases – Introduction – Evolution of object oriented concepts- Object Oriented Concepts – Characteristics of an Object Oriented Data models – OODM and previous models - OODBMS – How Object Orientation affects Database Design – Advantages and Disadvantages of OODBMS. Databases in Electronic Commerce.

UNIT -IV

Web databases: Internet technologies and databases - Uses of internet databases - Web to database Middleware - Server side Extensions - The web browser - Internet database systems : special considerations - Database Administration.

UNIT - V

Mobile Database – Geographic Information Systems – Genome Data Management – Multimedia Database – Spatial Databases**.**

TEXT BOOK:

1. Peter Rob and Carlos Coronel, Database Systems – Design, Implementation and Management, Cengage Learning, 7th Edition, 2007. (Unit- I, Ch.6, 8 ,9, Unit-II, 10,11,12)

2. Peter Rob and Carlos Coronel, Database Systems – Design, Implementation and Management, Thompson Learning, Course Technology, 5th Edition, 2003. (Unit – III – ch11,14, Unit –IV ch.15.1, 15.2, 15.3,15.4,15.6,16)
3. Ramez Elmasri, Shamkant B.Navathe, Fundamentals of Database

Systems 5/E,Pearson Education, (Unit-V, Ch- 24,30)

REFERENCE BOOKS:

1. Thomas M. Connolly, Carolyn E. Begg, Database Systems - A Practical Approach to Design , Implementation , and Management, Third Edition , Pearson Education, 2003.
2. Gary W. Hansen and James V. Hansen, Database Management and Design, Prentice Hall of India Pvt Ltd, 1999.
3. C.S.R.Prabhu, Object Oriented Database Systems, PHI, 2003.
4. M.Tamer Ozsu , Patrick Ualduriel, Principles of Distributed Database Systems, Second Edition, Pearson Education, 2003.