

M.SC (Computer Science) DEGREE COURSE

SCHEME OF EXAMINATION: CBCS PATTERN

(APPLICABLE TO STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2013 – 2014)

Part	Study Components	Ins. hrs/ week	Examinations				Credit
			Dur. Hrs	CIA	ESE	Total	
SEMESTER-I							
III	Paper I : Advanced Computer Architecture	4	3	25	75	100	4
III	Paper II : Analysis and Design Of Algorithm	5	3	25	75	100	4
III	Paper III : Object Oriented Analysis And Design & C++	5	3	25	75	100	4
III	Practical -I :Object Oriented Analysis And Design & C++	4	3	40	60	100	4
III	Paper IV: Advanced Networks	4	3	25	75	100	4
III	Paper V : Advanced Software Engineering	4	3	25	75	100	4
III	Paper VI : Software Project Management	4	3	25	75	100	4
SEMESTER-II							
III	Paper VII : Java and Mobile Applications	5	3	25	75	100	4
III	Practical -II Java and Mobile Applications LAB	5	3	40	60	100	4
III	Paper VIII : Network Security and Cryptography	5	3	25	75	100	4
III	Paper IX : Cloud Computing	5	3	25	75	100	4
III	Paper X : Advanced MultiMedia	5	3	25	75		4
III	ELECTIVE – I	5	3	25	75	100	4
III	Mini Project			20	80	100	4
SEMESTER-III							
III	Paper XI : Data mining and Data Warehousing	5	3	25	75	100	4
III	Paper XII : .Web Technology	5	3	25	75	100	4
III	Practical -III: .Web Technology Lab	5	3	40	60	100	4
III	Paper XIII : Open Source with PHP&MYSQL	5	3	25	75	100	4
III	Paper XIV:Soft Computing	5	3	25	75	100	4
III	ELECTIVE – II	5	3	25	75	100	4
SEMESTER-IV							
III	Project work and viva voice					250*	10
Total						2250	90

\*Project report – 200 marks; Viva voce – 50 Marks

## **List of Elective Subjects**

**Course : M.Sc Computer Science**

<b>SUBJECT</b>	
<b>ELECTIVE</b>	
Elective- I	I. Microprocessor & its Applications II. Advanced DBMS III. WAP &XML
Elective- II	I. Digital Image Processing II. ERP III. Cyber Security

## **PAPER I: ADVANCED COMPUTER ARCHITECTURE**

Goals: To enable the students to learn the parallel processing and SIMD arrays.

Objectives: On successful completion of the course the students should have:

- Understood the trends and principles of parallel processing in computers.
- Gained problem solving skills using parallel algorithms.

### **UNIT I**

Introduction to parallel processing – Trends towards parallel processing – Parallelism in uniprocessor Systems – Parallel Computer structures– Architectural Classification schemes – Flynn’ Classification – Feng’s Classification – Handler’s Classification – Parallel Processing Applications

### **UNIT II**

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Instructional Level Parallel Processing – Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining

### **UNIT III**

Principles Linear Pipelining – Classification of Pipeline Processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics– Pipelined Vector Processing methods

### **UNIT IV**

SIMD Array Processors–Organization–Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Illiac–Cube interconnection network–Shuffle-Exchange and Omega networks - Multiprocessor Architecture and programming Functional structures – interconnection Networks.

## UNIT V

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

### REFERENCE BOOKS

- 1.Kai Hwang, Faye A. Briggs, “Computer Architecture and Parallel Processing” Mc Graw – Hill Book Company, 1985.
- 2.V. Rajaraman, C. Siva Ram Murthy, “Parallel Computers Architectures and Programming”, PHI, 2003.
- 3.Kai Hwang, “Advanced Computer Architecture –Parallelism,Scalability,Programmability”, Mcgraw Hill, 1993.
- 4.Michael J. Quinn, “Parallel Computing Theory and Practice”, TMCH, Second Edition, 2002.
- 5.Barry Wilkinson, Micheal Allen, “Parallel Programming: Techniques and Applications”, Prentice Hall, 1999.

## **PAPER II : ANALYSIS DESIGN OF ALGORITHMS**

Goals :To enable the students to learn the Elementary Data Structures and algorithms.

Objectives :On successful completion of the course the students should have

- Understood the various design and analysis of the algorithms.

### **UNIT I**

Introduction:- algorithm definition and specification – performance analysis – Elementary Data structures:- stacks and queues – trees – dictionaries – priority queues – sets and disjoint set union – graphs – basic traversal and search techniques.

### **UNIT II**

Divide – and – conquer: - General method – binary search – merge sort – quick sort – The Greedy method:- General method – knapsack problem – minimum cost spanning tree – single source shortest path.

### **UNIT III**

Dynamic Programming - general method – multistage graphs – all pair shortest path – Optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop Scheduling.

### **UNIT IV**

Backtracking:- general method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem – Branch and bound:- The method – 0/1 Knapsack problem – traveling salesperson.

### **UNIT V**

Parallel models:- Basic concepts, performance Measures. Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division, Parallel Evaluation of General Arithmetic Expressions, First-Order Linear recurrence.

**REFERENCE BOOKS**

- 1.Ellis Horowitz, “Computer Algorithms”, Galgotia Publications.
- 2.S. Lakshmivarahan, Sundarshan K.Dhall, "Analysis and Design of Parallel Algorithms".
- 3.Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman, "Data Structures and Algorithms".
- 4.Goodrich, “Data Structures & Algorithms in Java”, Wiley 3<sup>rd</sup> edition.

### **PAPER III : OBJECT ORIENTED ANALYSIS AND DESIGN & C++**

Goals :To enable the students to learn C++ and object models.

Objectives :On Successful completion of the course the students should have.

- Understood the concepts in object models and the basically the C++ language.

#### **UNIT I**

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

#### **UNIT II**

Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects –Key Abstractions and Mechanism

#### **UNIT III**

Introduction to C++ - Input and output statements in C++ - Declarations -control structures – Functions in C++.

#### **UNIT IV**

Classes and Objects –Constructors and Destructors –operators overloading –Type Conversion- Inheritance – Pointers and Arrays.

#### **UNIT V**

Memory Management Operators- Polymorphism – Virtualfunctions – Files – Exception Handling – String Handling -Templates.

#### **REFERENCE BOOKS**

- 1.“Object Oriented Analysis and Design with Applications”, Grady Booch, Second Edition, Pearson Education.
- 2.“Object -Oriented Programming with ANSI & Turbo C++”, Ashok N.Kamthane, First Indian Print -2003, Pearson Education.
- 3.Balagurusamy “Object Oriented Programming with C++”, TMH, Second Edition, 2003.

**PRACTICAL -I :OBJECT ORIENTED ANALYSIS AND DESIGN & C++ LAB**

1. Write a C++ Program to implement overloading new & delete operator.
2. Write a C++ program using the heap sort.
3. Write a C++ program using arithmetic operators using operator overloading.
4. Write a C++ program to find the largest of three numbers using inline function.
5. Create a class called 'EMPLOYEE' that has -EMPCODE and EMPNAME as data members -member function getdata( ) to input data-member function display( ) to output dataWrite a main function to create EMP, an array of EMPLOYEE objects. Accept and display the details of at least 6 employees
6. Draw a Activity diagram for ATM.
7. Draw a Sequence diagram for library management system.
8. Draw a Collaboration diagram for Hospital.
9. Draw a use case diagram for student information system.
10. Draw a UML diagram related to object model, dynamic model, and functional model for ATM.



## **PAPER IV : ADVANCED NETWORKS**

Goals : To enable the students to learn the digital networks, Internet protocol and UDP diagrams.

Objectives: On Successful completion of the course the students should have gained in-depth knowledge of Internet protocols and their functionalities.

### **UNIT I**

Introduction to digital networks - WAN - WAN standards - Introduction TCP/IP and Internet - network technologies - TCP/IP features, protocol standards Internetworking concepts and Architectural model - Network interface layer.

### **UNIT II**

IP layer: Internet Address - Mapping Internet Address to Physical Address - Determining an Internet address at startup - Transparent gateways and subnet addressing - multicast addressing - client-server model of interaction - bootstrap protocol - domain name system - address discovery and binding.

### **UNIT III**

Internet Protocol: Connectionless Datagram delivery- data Structures and input processing. Routing IP datagrams - error and control messages - protocol layering - user datagram protocol - reliable stream transport service - fragmentation and reassembly. Routing: Cores - peers and algorithms - autonomous systems –interior gateways protocols - routing table and routing algorithms

### **UNIT IV**

UDP: User datagrams. TCP: Data structures and Inputprocessing - finite state machine implementation - output processing – timer management - flow control and adaptive retransmission - urgent data processing and the push function - socket level interfaces

### **UNIT V**

Application layer: Remote login - File transfer Access - electronic mails - Internet management. X.25 networks and support protocols.

## **REFERENCE BOOKS**

- 1.Douglas E. Comer, “Internetworking with TCP/IP Volume I”, Prentice Hall, 1991.
- 2.Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP Volume II”, Prentice Hall, 1991
- 3.Uyless Black, “TCP/IP & Related Protocols” McGraw-Hill, 1995.

**PAPER V : ADVANCED SOFTWARE ENGINEERING**

Goals :To enable the students to learn the concepts of Software Engineering, Web engineering and Component based development.

Objectives :On Successful completion of the course the students should have:

- Understood the concepts of Software Engineering.
- Understood the concepts of Web Engineering & Component based development .

**UNIT I**

Introduction to Software Engineering : The evolving role of software – The changing nature of software – Software myths – A process frame work – Process technology – Process model – Agile process model.

**UNIT II**

pplying Web Engineering: Attributes of web based systems and applications – Webapp engineering layers – Process – Practices – Web based systems – Planning web engineering projects – Team issues – Requirement analysis for webapp – Models – Architecture design Object oriented hyper media design method – Testings.

**UNIT III**

Project Management : The management spectrum – Estimation – Resources – Decomposition techniques – Empirical estimation models – Project scheduling – Defining the tasks – Risk management – Quality management – Concepts – Assurance – Reviews – Change management – Software configuration management – The SCM process.

**UNIT IV**

Advanced topic in Software Engineering : Formal methods – Basic concepts – Mathematical preliminaries – Mathematical notations– Formal specification languages – Object constraint languages – The Z specifications – The ten commandments of formal methods – The clean room approach – Functional specification – Clean room design – Clean room testing.

**UNIT V**

Component based development: Engineering of component based systems – The CBSE process – Domain engineering – Component based development – Classifying and retrieving components – Economics of CBSE – Re-engineering: Business process re-engineering – Software re-engineering – Reverse engineering – Restructuring – Forward engineering – The economics of re-engineering.

**REFERENCE BOOK**

1.Roger S. Pressman, “Software Engineering – A practitioner’s Approach”, 6<sup>th</sup> edition, McGraw Hill International Edition, 2005.

## **PAPER VI -SOFTWARE PROJECT MANAGEMENT**

Goals: To enable the students to learn the basic functions, principles and concepts of Software project management.

Objectives: On successful completion of the course the students should have:

- Understood the Software configuration management
- Understood the Activity Planning , Risk Management using case studies

### **UNIT I**

Introduction to Software Projects – An Overview of Project Planning – Project Evaluation – Selection of an appropriate Project approach –Software effort Estimation.

### **UNIT II**

Activity Planning –Project Schedules –Sequencing and Scheduling Projects –Network Planning Model – forward and backward pass-Identifying the Critical path-Activity float-Shortening Project Duration –Identifying Critical Activities-precedence networks.

### **UNIT III**

Risk Management –Resource Allocation –Monitoring and Control –Managing People and Organizing Teams – Planning for Small Projects.

### **UNIT IV**

Software Configuration Management –Basic Functions –Responsibilities –Standards –Configuration Management –Prototyping –Models of Prototyping.

### **UNIT V**

Case Study –PRINCE Project Management.

### **REFERENCE BOOKS**

- 1.Mike Cotterell, Bob Hughes, “Software Project Management”, Inclination/Thomas Computer Press, 1995.
- 2.Darrel Ince, H.Sharp and M.Woodman, “Introduction to Software Project Management and Quality Assurance”, Tata McGraw Hill, 1995.

## **PAPER VII - JAVA & MOBILE APPLICATIONS**

Goals : The purpose of this course is to prepare students with skills and knowledge of Wireless Internet programming in WAP page development and Java-Based Wireless applications.

Objectives : To implement working knowledge of Wireless / WAP programming using XHTML and a Java-based programming language. Students will be able to plan, design, and update WAP sites, and create simple Wireless applications.

### **UNIT I**

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism.- Objects and classes in Java – defining classes – methods - access specifies – static members – constructors – finalize method.

### **UNIT II**

Arrays – Strings - Packages – Java-Doc comments – Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes.

### **UNIT III**

The Object class – Reflection – interfaces – object cloning – inner classes – proxies - I/O Streams - Graphics programming – Frame – Components – working with 2D shapes.

### **UNIT IV**

J2ME Overview : Java 2 Micro Edition and the World of Java- Inside J2ME- J2ME and Wireless Devices- Small Computing Technology :Wireless Technology- Radio Data Networks- Microwave Technology- Mobile Radio Networks- Messaging- Personal Digital Assistants.

### **UNIT V**

J2ME Architecture and Development Environment : J2ME Architecture- Small Computing Device Requirements- Run Time Environment- MIDlet Programming – Java Language for J2ME - J2ME Software Development Kits - Hello World J2ME Style - Multiple MIDlets in a MIDlet Suite. J2ME Wireless Toolkit J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices.

### **TEXT BOOK**

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2008.
- 2.J2ME: The Complete Reference, James Keogh, Tata McGrawHill.

## **REFERENCES**

1. K. Arnold and J. Gosling, “The JAVA programming language”, Third edition, Pearson Education, 2000.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, 1st edition, J.Knudsen, Pearson
5. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.

## **PRACTICAL II : JAVA & MOBILE APPLICATIONS LAB**

1. Programs to implement Overloading, Overriding and Packages.
2. Programs to implement various forms of Inheritance and User Exceptions.
3. Program to implement String Manipulation.
4. Programs to implement Applet and Event Handling using Abstract Window Toolkit (AWT) Package.
5. Program to implement multiple chatting using threads in JAVA (using runnable interface).
6. Programs to implement the use of files and streams.
7. Program for implementing threads synchronization.
8. To develop a Transmission Control Protocol (TCP) client / server application to demonstrate socket programming.
9. To develop a User Datagram Protocol (UDP) client / server application to demonstrate socket programming.
10. Develop an application using AWT components and Java Data Base Connectivity (JDBC).
11. creating a Hello World program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc)
12. Create a program which creates to following kind of menu.
  - i. cut
  - ii. copy
  - iii. past
  - iv. delete
  - v. select all
  - vi. unselect all
13. Create a menu which has the following options:
  - i. cut - can be on/off
  - ii. copy - can be on/off
  - iii. paste - can be on/off
  - iv. delete - can be on/off
  - v. select all - put all 4 options on
  - vi. unselect all - put all 4 options off
14. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third slide program returns to the first slide.
15. Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.
16. Write a sample program to show how to make a SOCKET Connection from J2ME phone.

## **PAPER VIII- NETWORK SECURITY AND CRYPTOGRAPHY**

Goals :To understand the most common cryptographic algorithms and protocols and how to use them to secure distributed applications and computer networks.

Objectives : To familiarize the student with the fundamentals of computer and network security, including protection, access control, distributed access security, firewalls, and secure coding practices.

### **UNIT I:**

INTRODUCTION: OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality

### **UNIT II:**

PUBLIC KEY CRYPTOGRAPHY: Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

### **UNIT III:**

AUTHENTICATION AND HASH FUNCTION :Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard.

### **UNIT IV:**

NETWORK SECURITY: Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security

### **UNIT V:**

SYSTEM LEVEL SECURITY: Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

### **TEXTBOOK**

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Third Edition, 2003.

**REFERENCES**

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2003.



**PAPER IX- CLOUD COMPUTING**

Goals : To set up cloud services for creating maps, cloud services for managing spatial data, and cloud services for processing spatial data.

Objectives: To evaluate cloud computing resources, and use ESRI and open source web GIS technologies.

**UNIT I**

INTRODUCTION TO CLOUD COMPUTING : Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.

**UNIT II**

DEVELOPING CLOUD SERVICES : Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service –Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

**UNIT III**

CLOUD COMPUTING FOR EVERYONE : Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

**UNIT IV**

USING CLOUD SERVICES : Collaborating on Calendars, Schedules and Task Management- Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files.

**UNIT V**

OTHER WAYS TO COLLABORATE ONLINE :Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis .

**REFERENCE BOOK**

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

**Paper X : Advanced MultiMedia**

**Goal:**

To learn about Animation & Graphical concepts.

**Objective:**

On successful completion of this subject the students should have:

\* Writing programming ability for creating animations using Photoshop & Flash.

**Unit I:**

What is Multimedia? - Introduction to making MM - MM skills - MM authoring tools: Card and page based, icon and object based, Time based.

Text: using text in MM, Hypermedia and Hypertext – Sound: Digital Audio, MIDI, MIDI Vs Digital Audio - Images: Making still Images, Image file formats.

**Unit II:**

Starting Photoshop cs3 - Menu commands: File menu – Edit menu – Image menu.

Layer menu– Select menu– Filter menu – View menu – Window menu – Help menu.

**Unit III:**

Tools of Photoshop (Tool Box tools).

Using paints and colors: Color tools – Color picker – Color palette – Swatches palette – Blending modes.

**Unit IV:**

File types in Flash: File documents-Contextual menus-Tools Panel-Time line window.

Drawings in Flash (All drawing tools).

**Unit V:**

Timeline Animation: Basic methods –Frame-by-Frame animation-modifying multiframe sequences-using tweens for animation.

Applying layer types: Guide layer-motion guides-mask layers.

**Text Books:**

1. Multimedia: Making it work, Tay Vaughan, Seventh Edition, Tata MC Graw Hill.

2. Adobe Photoshop CS3 LP editorial board, law point publications, kolkata, 2008.
3. Macromedia Flash 8 Bible, Robert Reinhardt and Snow Dowd, Wiley India Edition, 2006.

**Reference Books:**

1. Adobe Photoshop CS3, Shelly, Cashman, Starks, CENGAGE Learning, India Edition, 2009.
2. Photoshop CS4 in simple steps, DreamTech Press, Kogent Learning Solutions Inc, 2010.
3. FLASH MX in easy steps - NICK VANDOME, Dreamtech, New Delhi

## MINI PROJECT

### PROJECT WORK GUIDELINES

1. Guide has been allotted to each student by the department. Student can select any topic in discussion with the supervisor. Students should maintain a work diary where in weekly work carried out has to be written. Guide should review the work every week and put his/her signature. The work diary along with project report should be submitted at the time of viva voce.
2. CIA Marks Distribution: A minimum of two reviews have to be done, one at the time finalizing the questionnaire/ identifying the primary data and the second review at the time of commencement of report writing. They should be asked to present the work done to the respective guide in the two reviews. The guide will give the marks for CIA as per the norms stated below:

First Review	05 Marks
Second Review	05 Marks
Work Diary	10 Marks
	_____
	20 Marks
	_____

3. End Semester Examination: The evaluation for the end semester examination should be as per the norms given below:

External Examiner	30 Marks
Internal Examiner	30 Marks
Viva-voce Examination	20 Marks
(Jointly given by the external and internal examiner)	_____
	80 Marks
	_____

## **PAPER X- DATA MINING AND WAREHOUSEING**

**Goals:** The goal of this course is to develop analytical and critical thinking skills for the development of integrative plans for enterprise-wide systems that optimize enterprise performance

### **Objectives:**

How to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.

### **UNIT I**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

### **UNIT II**

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

### **UNIT III**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification.

### **UNIT IV**

Cluster Analysis Introduction :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**

Advanced Data mining techniques: Spatial Data Mining, Multimedia Data Mining, Text Mining, Web mining, Graph Mining, Neural networks, and Genetic algorithm, Mining Sequence Patterns in Biological Data, Social Network Analysis and Multi- relational Data Mining.

Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

### **TEXT BOOKS**

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.
3. Data Mining Techniques – Arun K Pujari, 2nd edition, Universities Press.

### **REFERENCE BOOKS**

1. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
3. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition.
4. Margaret H. Dunham, “Data mining introductory and advanced topics”, Pearson education, 2003.
5. Alex Berson, Stephen J. Smith, “Data warehousing, data mining, & OLAP, TMCH, 2001.

## **PAPER XI - WEB TECHNOLOGY**

**Goals:** An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed.

**Objectives:** It will cover the practical aspects of multi-tier application development using the .NET framework.

### **UNIT 1**

#### **1.1 Introduction to .NET framework:**

Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.

#### **1.2 Language Concepts and the CLR:**

Visual Studio .NET - Using the .NET Framework.

#### **1.3 The Framework Class Library:**

.NET objects - ASP .NET - .NET web services – Windows Forms

### **UNIT 2:**

#### **2.1 Elements:**

Variables and constants – data types – declaration. Operators – types – precedence. Expressions. Program flow – Decision statements – if .. then, if..then..else, select..case– Loop statements – while..end while, do..loop, for..next, for..each..next.

#### **2.2 Types:**

Value data types – Structures, Enumerations. Reference data types- Single-dimensional – Multi-dimensional arrays – jagged arrays – dynamic arrays

#### **2.3 Windows programming:**

Creating windows Forms – windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box. Events – Click, close, Deactivate, Load, Mousemove, Mousedown, MouseUp.

#### **2.4 Menus and Dialog Boxes:**

Creating menus – menu items – context menu - Using dialog boxes – showDialog() method.UNIT - III  
APPLICATION DEVELOPMENT USING ADO .NET

### **UNIT 3:**



### **3.1 Features of ADO.NET:**

Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset.

### **3.2 Accessing Data with ADO.NET:**

Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.

## **UNIT 4:**

### **4.1 ASP.NET Features:**

Change the Home Directory in IIS - Add a Virtual Directory in IIS- Set a Default Document for IIS - Change Log File Properties for IIS - Stop, Start, or Pause a Web Site.

### **4.2 Creating Web Controls:**

Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding web controls to a Page.

### **4.3 Creating Web Forms:**

Server Controls - Types of Server Controls - Adding ASP.NET Code to a Page.

## **UNIT 5:**

### **5.1 Overview of XML:**

XML Serialization in the .NET Framework -SOAP Fundamentals-Using SOAP with the .NET Framework.

### **5.2 Introduction to web services:**

Web Services protocol and standards – WSDL Documents - Overview of UDDI - Calling a Web Service from a Browser - Calling a Web Service by Using a Proxy - Creating a simple web service - Creating and Calling a Web Service by Using Visual Studio .NET.

## **REFERENCE BOOKS:**

1. Introduction to Visual basic.NET - NIIT Prentice Hall of India,2005
2. Introducing Microsoft .NET- David S. Platt Microsoft Press”, Saarc Edition, 2001
3. Introduction to Microsoft ASP.NET Work Book - Microsoft- Microsoft Press
4. Developing XML Web Services Using Microsoft® ASP.NET -Microsoft- Microsoft Press
5. Designing Microsoft ASP.NET Applications-Douglas J. Reilly-Microsoft Press
6. ASP.NET-Danny Ryan and Tommy Ryan-Hungry Minds Maran Graphics

**PRACTICAL –III : WEB TECHNOLOGY LAB**

**1. Simple Programs with ASP.NET AND C#**

- a) Write a console application that obtains four int values from the user and displays the product.
- b) If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
- c) Write an application that includes the logic from Exercise 1, obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
- d) Write a console application that places double quotation marks around each word in a string.
- e) Write an application that uses two command-line arguments to place values into a string and an integer variable, respectively. Then display these values.
- f) Write an application that receives the following information from a set of students:

Student Id:

Student Name:

Course Name:

Date of Birth:

The application should also display the information of all the students once the data is entered. Implement this using an Array of Structures.

**g) Write programs using conditional statements and loops:**

- i. Generate Fibonacci series.
- ii. Generate various patterns (triangles, diamond and other patterns) with numbers.
- iii. Test for prime numbers.
- iv. Generate prime numbers.
- v. Reverse a number and find sum of digits of a number.
- vi. Test for vowels.
- vii. Use of for each loop with arrays.

2. Object oriented programs with C#
  - a) Program using classes.
  - b) Program with different features of C#
    - i. Function Overloading
    - ii. Inheritance (all types)
    - iii. Constructor overloading
    - iv. Interfaces
    - v. Using Delegates and events
    - vi. Exception handling
3. Programs using different controls VB NET
4. Programs using CSS.
5. Programs using ASP.NET Server controls.
6. Database programs with ASP.NET and ADO.NET
7. Programs using Language Integrated query.
8. Programs securing web pages.
9. Implement the exercise on AJAX.
10. Implement the exercise on JQuery.

## **PAPER XII: OPEN SOURCE WITH PHP & MYSQL**

Goals :acquired relevant skills necessary to design professional web pages. Laboratory will be the venue for actual application.

Objectives : Appraise the impact of PHP and mySQL on Information Technology Management and on Global Economies as it applies to data collection, eCommerce, and security on the Web

### **UNIT -1:**

PHP and MySQL Part II: SQL tutorial - PHP/MySQL function – Displaying Queries in Tables- Building forms from Queries.

### **UNIT -2:**

PHP and AJAX: AJAX Introduction, History of AJAX, How does AJAX work, IE memory leaks, XML HTTP Request - GET or POST?, XML Http Request in IE Firefox, callback URL and URL rewriters, Problems and Challenges, Benefits of AJAX, How and when to use AJAX, Selecting the right tools and framework for Ajax.

### **UNIT -3:**

PHP and Smarty: What is Smarty?, Basic Syntax, Variables, Variable Modifiers, Combining Modifiers, Built-in Functions, Custom Functions, Config Files, Debugging Console, Constants, Smarty Class Variables, Smarty Class Methods, Caching, Advanced Features, Extending Smarty With Plugins, Troubleshooting: Smarty/PHP errors, Tips & Tricks, Resources, BUGS.

### **UNIT- 4:**

State Management: Creating Cookies -Set Cookies -Destroying Cookies -Creating Session  
Set Session Destroying Session Working with File:Opening File - Reading File- Writing File. Closing File - Appending File - Uploading File.

### **UNIT-5**

MySQL Function in PHP Database Connections-Managing Database Connections-Performing Queries-Closing Connection.

### **TEXT BOOK**

1. PHP 5 and MySQL Bible Wiley Dream teck India Pvt.ltd 2006 Edition.
2. Professional LAMP Linux, Apache, MySQL and PHPs Web Development –Wiley dream teach 2006 Edition.

## **Paper XI V:Soft Computing**

Goals:To introduce the techniques of soft computing and adaptive neuro-fuzzy inferencing systems which differ from conventional AI and computing in terms of its tolerance to imprecision and uncertainty.

### **OBJECTIVES**

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems

### **UNIT I FUZZY SET THEORY**

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

### **UNIT II OPTIMIZATION**

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

### **UNIT III NEURAL NETWORKS**

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Multilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

### **UNIT IV NEURO FUZZY MODELING**

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

### **UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE**

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

#### **TEXT BOOK**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.

#### **REFERENCES**

1. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
2. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
4. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.

## **ELECTIVE I :1. MICROPROCESSOR & ITS APPLICATIONS**

Goal : To introduce the operation, programming, and application of microprocessor.

Objective : This course contains of fundamental concepts of computer organization, basic I/O interfaces and Interrupt operations.

### **UNIT I**

8085 CPU: 8085 Architecture – Instruction set – Addressing modes – Timing diagrams – Assembly language programming – Counters – Time Delays – Interrupts – Memory interfacing – Interfacing, I/O devices.

### **UNIT II**

PERIPHERALS INTERFACING: Interfacing Serial I/O (8251)- parallel I/O (8255) –Keyboard and Display controller (8279) – ADC/DAC interfacing – Inter Integrated Circuits interfacing (I2C Standard)- Bus: RS232C- RS485-GPIB

### **UNIT III**

8086 CPU :Intel 8086 Internal Architecture – 8086 Addressing modes- Instruction set- 8086 Assembly language Programming–Interrupts.

### **UNIT IV**

8051 MICROCONTROLLER: 8051 Micro controller hardware- I/O pins, ports and circuits- External memory – Counters and Timers-Serial Data I/O- Interrupts-Interfacing to external memory and 8255.

### **UNIT V**

8051 PROGRAMMING AND APPLICATIONS: 8051 instruction set – Addressing modes – Assembly language programming – I/O port programming -Timer and counter programming – Serial Communication – Interrupt programming –8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

### **TEXT BOOKS**

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 4th Edition,

Penram International Publishing, New Delhi, 2000. (Unit I, II)

2. John Uffenbeck, The 80x86 Family, Design, Programming and Interfacing, Third Edition. Pearson Education, 2002.

3. Mohammed Ali Mazidi and Janice Gillispie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003. (Unit IV, V)

## **REFERENCES**

1. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000

2. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.

3. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.



## **ELECTIVE I : 2. ADVANCED DBMS**

### **Goals**

To enable the students to be familiar with database management.

### **Objectives**

On Successful completion of the course the students should have:

- Understood distributed database management, query processing, distributed object database management systems

### **UNIT I**

**Introduction** :Architecture. Advantages, Disadvantages, Data models,relational algebra, SQL, Normal forms.

### **UNIT II**

**Query Processing** : General strategies for query processing, transformations, expected size, statistics in estimation, query improvement, query evaluation, view processing, query processor.

**Recovery** : Reliability, transactions, recovery in centralized DBMS, reflecting updates, Buffer management, logging schemes, disaster recovery.

### **UNIT III**

**Concurrency** : Introduction, serializability, concurrency control, locking schemes, timestamp based ordering, optimistic scheduling, multiversion techniques, deadlocks.

### **UNIT IV**

**Object Oriented Data base Development** : Introduction, Object definition language, creating object instances, Object query language. **Distributed Databases** : Basic concepts, options for distributing a database, distributed DBMS.

### **UNIT V**

**Data Warehousing** : Introduction, basic concepts, data warehouse architecture, data characteristics, reconciled data layer, data transformation, derived data layer, user interface.

**Object Relational Databases :** Basic concepts, enhanced SQL, advantages of object relational approach.

**REFERENCES :**

1. An Introduction to database systems by Bipin C. Desai, Galgotia Publications.
2. Modern Database Management by Feffray A. Lioffer, Mary B. Prescottl, Fred R Mcfadden, 6th edition, Pearson Education.
3. Principles of distributed database systems, by M.Tamer &Valduriez, 2nd edition, LPE Pearson education.
4. Database system concepts by Korth.

**ELECTIVE I :3. WAP & XML**

**Goals:** The goal of this course is to provide an introduction both methodological and practical to the most basic internet languages, architectures and applications, but also to illustrate some of the most challenging and innovative techniques on the fore.

**Objective :** Internet and World Wide Web have modified in a radical way how individuals and organizations interacts, for business, learning or leisure purposes. With Internet millions of people around the world have access to an xtraordinary amount of information, they can search it, exchange email, make phone calls, buy and sell goods and services, build and operate virtual enterprises.

**UNIT I**

The Rise of Mobile Data: Market Convergence Enabling Convergence – Key Services for the Mobile Internet. Overview of the Wireless Application Protocol: The Origins of WAP – Overview of the 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, Tashs and Bindings.

**UNIT III**

Variables – Other Content you can Include – Controls – Miscellaneous Markup – Sending Information – Application Security – Other Data: The Meta Element – Document Type Declarations – Errors and Browser Limitations – Content Generation – WML Version Negotiation.

#### **UNIT IV**

User Interface Design: Making Wireless Applications, Easy to Use: Web Site Design: Computer Terminals Vs Mobile Terminals – Designing a Usable WAP Site – Structured Usability Methods – User Interface Design Guidelines – Design Guidelines for Selected WML Elements.

#### **UNIT V**

Wireless Telephony Applications: Overview of the WTA Architecture – WTA Client Framework – WTA Server & Security – Design Considerations – Application Creation Toolbox – Future WTA Enhancements. The Mobile Internet Future: Better Content, Easier Access – Beyond Browsing – Beyond Cellular – Mobile Data Unleashed.

#### **TEXT BOOKS**

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Daniel Mauney, Jari Alvinen, David Bevis, Jim Chan, Stefan Hild

### **ELECTIVE II : 1. DIGITAL IMAGE PROCESSING**

Goals:

To enable the students to learn the fundamentals of Digital Image Processing, image Compression and Segmentation

Objectives:

On Successful completion of the course the students should have:

Understood the fundamentals of Digital Image Processing, Image Compression and Segmentation

#### **UNIT I**

**DIGITAL IMAGE FUNDAMENTALS** : Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

#### **UNIT II**

**IMAGE ENHANCEMENT** : Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contraharmonic mean filters, Homomorphic filtering, Color image enhancement.

### **UNIT III**

**IMAGE RESTORATION:** Image Restoration - degradation model, Unconstrained restoration - Lagrange multiplier and Constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations.

### **UNIT IV**

**IMAGE SEGMENTATION:** Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed Segmentation algorithm.

### **UNIT V**

**IMAGE COMPRESSION:** Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

### **TEXTBOOK**

1. Rafael C. Gonzalez, Richard E. Woods, , Digital Image Processing', Pearson, Second Edition, 2004.
2. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson 2002.

### **REFERENCES**

1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, ' Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.
3. D,E. Dudgeon and RM. Mersereau, , Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, , Digital Image Processing' , John Wiley, New York, 2002

## **ELECTIVE II : 2. ENTERPRISE RESOURCE PLANNING**

Goal:

To learn about ERP Implementation Technology.

Objective:

On successful completion of this subject the students should have :

Their problem solving skills in Building the Business Model   Learning about key concepts of Industrial and Financial Systems   Knowledge on MultiClient Server Solution

### **UNIT – 1**

Introduction To ERP - Evolution of ERP - Scenario and Justification of ERP in India- Evaluation of ERP, Various Modules Of ERP - Advantage of ERP - Reasons for the growth of ERP -An overview of Enterprise - Integrated Management Information - Business Modeling - ERP for make to order companies - Business Process Mapping for ERP Module Design

**UNIT – 2**

ERP and Related Technologies - Business Process Reengineering (BPR) - Management Information System (MIS) - Executive Information System (EIS)-Decision support System (DSS)- Supply Chain Management (SCM)

**UNIT – 3**

ERP implementation - ERP implementation lifecycle - Issues in implementing - ERP Modules – Methodologies - Project Teams –Process Definitions – Vendors and Consultants – Data Migration – Project management– Post Implementation Activities.

**UNIT - 4**

Enterprise Application Integration – ERP and E-Business – ERP Market – Marketplace - Dynamics - SAP AG - ERP Packages – Business Module in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution

**UNIT- 5**

Future Directions in ERP - New markets - new channels - faster implementation methodologies - business modules and BAPIs - convergence on windows NT - Application platform - new business segments - more features - web enabling - market snapshot.

**REFERENCE BOOKS:**

1. Alexis Leon, “ERP DEMYSTIFIED”, Tata McGraw Hill, Second Edition, 2008
2. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007.
3. Pankaj Sharma, Enterprise Resource Planning ,PHI 2006

**ELECTIVE II : 3. CYBER SECURITY**

Goals :

To enable the student to learn about the cryptography security standards etc.

Objectives :

On successful completion of the course the students should have

Understood the security issues of network.

## **UNIT I**

**Networking Concepts Overview** : Basics of Communication Systems-Transmission Media - ISO/OSI and TCP/IP Protocol Stacks -Local Area Networks- Wide Area Networks - Internetworking - Packet Formats - Wireless Networks - The Internet. **Information Security Concepts** : Information Security Overview- Information Security Services-Types of Attacks -Goals for Security- E-commerce Security -Computer Forensics-Steganography -Security Engineering

## **UNIT II**

**Security Threats and vulnerabilities** : Overview of Security threats -Hacking Techniques -Password Cracking- Insecure Network connections- Malicious Code - Programming Bugs - Cyber crime and Cyber terrorism-Information Warfare and Surveillance **Cryptography** :Introduction to Cryptography - Symmetric key Cryptography - Asymmetric key Cryptography - Message Authentication and Hash functions -Digital Signatures - Public Key infrastructure - Diffe-Hellman key exchange proptocol - Applications of Cryptography.

## **UNIT III**

**Security Management Practices** : Overview of Security Management -Information Classification Process- Security Policy - Risk Management -Security Procedures and Guidelines -Business Continuity and Disaster Recovery

**Security Laws and Standards** :Security Assurance - Security Laws - International Standards -Security Audit - OCTAVE approach -SSE-CMM

## **UNIT IV**

**Access Control and Intrusion Detection**: - Overview of Identification and Authorization -I & A Techniques -Overview of IDS -Intrusion Detection Systems and Intrusion Prevention Systems **Server Management and Firewalls**:User Management -DNS Routing and Load Balancing -Overview of Firewalls -Types of Firewalls -DMZ and firewall features **Security for VPN and Next Generation Networks**:VPN Security -Security in Multimedia Networks -Fax Security -Link Encryption Devices

## **UNIT V**

**Security Architectures and Models:** Designing Secure Operating Systems -Controls to enforce security services -Information flow model and Biba model

**System Security:**Desktop Security -email security: PGP and SMIME -Web Security: web authentication, SSL and SET

**OS Security:**OS Security Vulnerabilities, updates and patches -OS integrity checks - Anti-virus software - Design of secure OS and OS hardening -Configuring the OS for security.

### **References:**

- 1.Cyberwar: The Next Threat to National Security & What to Do About It (Hardcover)  
by Richard A. Clarke.
2. Computer Security, 2nd ed. Dieter Gollmann Publisher: John Wiley & Sons, 2006  
Cyber Security – Andrew S. Tanenbaum, 4th edition, PHI.



### **GUIDELINES FOR PROJECT WORK**

1. The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
2. Each student should carry out individually one Project Work and it may be a work using the software packages that they have learned or the implementation of Concepts from the papers studied or implementation of any innovative idea.
3. The Project work should be compulsorily done in the Industry only under the supervision of the Department staff concerned.
4. The work has to be done in five reviews during IV Semester.
5. External Exam will be conducted as follows. End Semester Viva
  - ❖ An End- semester Internal Viva-voce will be conducted at the end of IV semester for 250 marks.
  - ❖ Both the Internal (Respective Guides) and External Examiners (100) + (100) Should Conduct the Viva-Voce Examination at the last day of the practical session.
  - ❖ Along with the mark sheet an Annexure report containing the candidate's Register no and Title of the Project work should be sent to the Controller of Examinations by the Examiners and a copy of the same has to be retained in the Department.
  - ❖ No candidate will be allowed to change the title of the Project work after the completion of End-semester Viva.
  - ❖ For those absent on genuine grounds a common subliment End-Semester Viva-voce may be conducted at the COE for All degree by obtaining prior permission from the COE on the recommendations from the HODs of respective Department before the commencement of the next semester.