

# **M. Sc. Syllabus**

**(Academic year 2015 onwards)**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018**

**(An Autonomous) college affiliated to Bharathiar University)**

M. Sc., Computer Science Syllabi and Scheme of Examinations for the Students Admitted from 2015-2016 academic year onwards

**ABOUT THE COURSE**

The M. Sc. (**Computer Science**) course offered by this college is a two year full time course consisting of four semesters. It is oriented towards the concepts of the theory of Computer Science and its applications in recent developments both in commercial and scientific areas.

**ELIGIBILITY FOR ADMISSION**

Candidates for admission to the first year course leading to the degree of Master of Science (M.Sc.) will be required: A pass with 50% of Marks in B.Sc.(CS) or B.C.A. or B.Sc.(IS) or B.Sc.(IT) or B.Sc.(CT) degree in any University recognized by the Bharathiar University.

In case of SC/ST candidates, a mere pass in the qualifying examination will be sufficient.

**ELIGIBILITY FOR EXAMINATION**

A candidate will be permitted to appear for the semester examinations held at the end of each semester only on securing a minimum attendance of 75% and that the candidate's conduct has been satisfactory. If a candidate fails to secure 75% attendance and conduct has been satisfactory it shall be open to the principal or any authority delegated such powers to grant exemption to a candidate for valid reasons subject to usual conditions.

**EXAMINATIONS**

Semester examinations shall be conducted at the end of each semester for the subjects of study undergone by the students in that semester. UGC pattern of question paper is followed for all the theory subjects. Practical examinations will be conducted with one internal examiner and one external examiner and the question paper for practical examination will be set by both Internal and External examiners.

**PASSING REQUIREMENTS**

1. Single valuation (External) system will be followed to award marks.
2. A candidate shall be declared to have passed the examinations in a subject if he/she secures not less than 50% in the end of semester examination.
3. A candidate who successfully completes the course and passes the examinations prescribed in all the subjects of study and practical examinations shall be declared to have been qualified for the degree.

4. If a candidate does not complete the course successfully within a period of 4 years (8 semesters) from the date of his/her joining, he/she will be disqualified from the course.

#### **CLASSIFICATION OF SUCCESSFUL CANDIDATES**

1. All candidates securing not less than 60% of the aggregate marks shall be declared to have passed the degree in **FIRST CLASS** provided they have passed the examination in every subject including practical, project work and Viva-Voce within two years of joining the course.
2. Other successful candidates shall be declared to have passed the examinations in **SECOND CLASS**
3. He / She earns a progress certificate from the Head of the Institution of having satisfactorily completed the course

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018  
DEPARTMENT OF COMPUTER SCIENCE

**M. Sc., Computer Science Syllabi and Scheme of Examinations for the Students Admitted from  
2015-2016 academic year onwards**

Semester	Code	Part	Paper	Title of the Paper	Hrs (wk)	Internal (CA)Mar	External (SE)Mar	Total Marks	SE - Min.	TPM	Credits
<b>I</b>	15MCS11C	A	I	Computer Architecture and Parallel Processing	4	25	75	100	38	50	4
	15MCS12C	A	II	Design & Analysis of Algorithms	4	25	75	100	38	50	4
	15MCS13C	A	III	Object Oriented Analysis Design & C++	4	25	75	100	38	50	4
	15MCS14C	A	IV	Computer Networks and Communications	4	25	75	100	38	50	4
	15MCS15C	A	V	Relational Database Management Systems	4	25	75	100	38	50	5
	15MCS16P	A		<b>Practical 1</b> : Object Oriented Programming Lab	3	40	60	100	30	50	2
	15MCS17P	A		<b>Practical 2</b> : RDBMS Lab	2	40	60	100	30	50	2
					<b>25</b>			<b>700</b>			<b>25</b>
<b>II</b>	15MCS21C	A	VI	Software Engineering Concepts	4	25	75	100	38	50	4
	15MCS22C	A	VII	Advanced Operating System Concepts	4	25	75	100	38	50	4
	15MCS23C	A	VIII	Advanced Java Programming	4	25	75	100	38	50	4
	15MCS24C	A	IX	Data Mining and Big Data Analytics	4	25	75	100	38	50	4
	15MCS25E	B	X	<b>Elective 1:</b>	4	25	75	100	38	50	5
	15MCS26P	A		<b>Practical 3:</b> Java Programming Lab	3	40	60	100	30	50	2
	15MCS27P	A		<b>Practical 4:</b> Linux Shell Programming Lab	2	40	60	100	30	50	2
					<b>25</b>			<b>700</b>			<b>25</b>
<b>III</b>	15MCS31C	A	XI	Client Server Technology	4	25	75	100	38	50	4
	15MCS32C	A	XII	Digital Image Processing	4	25	75	100	38	50	4
	15MCS33C	A	XIII	ASP and XML	4	25	75	100	38	50	4
	15MCS38C	A	XIV	Cryptography and Network Security	4	25	75	100	38	50	4
	15MCS35E	B	XV	<b>Elective 2:</b>	4	25	75	100	38	50	5
	15MCS36P	A		<b>Practical 5:</b> XML Programming Lab	3	40	60	100	30	50	2
	15MCS37P	A		<b>Practical 6:</b> Network Security Lab	2	40	60	100	30	50	2
					<b>25</b>			<b>700</b>			<b>25</b>
<b>IV</b>	15MCS41V	B	<b>Project and Viva Voce</b>			40	160	200	80	100	15

			<b>Total / Credits</b>				<b>2300</b>			<b>90</b>

**ELECTIVES FOR SECOND SEMESTER  
ELECTIVE – I**

- 1.1 Principles of Compiler Design
- 1.2 Distributed Computing
- 1.3 Neural Network and Fuzzy Logic
- 1.4 Artificial Intelligence & Expert Systems
- 1.5 Software Testing
- 1.6 TCP/IP
- 1.7 Semantic Web Technology

**ELECTIVES FOR THIRD SEMESTER  
ELECTIVE – II**

- 2.1 Multimedia and its Applications
- 2.2 Embedded Systems
- 2.3 Natural Language Processing
- 2.4 Simulation and Modeling
- 2.5 Enterprise Resource Planning
- 2.6 WAP
- 2.7 Cloud Computing

## **SEMESTER – I**

### **Paper–I: COMPUTER ARCHITECTURE AND PARALLEL PROCESSING**

#### **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.

#### **TEXT BOOKS**

1. Kai Hwang, Faye A. Briggs, “Computer Architecture and Parallel Processing” Mc Graw – Hill Book Company, 1985 [ I, III UNITS).
2. V. Rajaraman, C. Siva Ram Murthy, “Parallel Computers Architectures and Programming”, PHI, 2003 [ II, IV UNITS]

#### **REFERENCE BOOKS**

1. Kai Hwang, “Advanced Computer Architecture – Parallelism, Scalability, Programmability”, McGraw Hill, 1993.
2. Michael J. Quinn, “Parallel Computing Theory and Practice”, TMCH, Second Edition, 2002.
3. Barry Wilkinson, Micheal Allen, “Parallel Programming: Techniques and Applications”, Prentice Hall, 1999.

## **SEMESTER – I**

### **Paper–II: DESIGN AND ANALYSIS OF ALGORITHMS**

#### **UNIT I**

Algorithm Specification –Recursive Algorithms – Performance Analysis – Space Complexity – Time Complexity -.Asymptotic Notations – Asymptotic Complexity of SUM and Recursive SUM and ADD Algorithms - Analysis of Sequential Search.

#### **UNIT II**

Elementary Data Structures- Stacks and Queues – Trees – Binary Trees – Binary Search Trees – Iterative and Recursive Search of BST – Graphs – Konigsberg Bridge Problem – Graph Representations - Graph Traversals

#### **UNIT III**

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

#### **UNIT IV**

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

#### **UNIT V**

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

#### **TEXT BOOK:**

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithm, Galgotia Publications, 2007.

#### **REFERENCES:**

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and analysis of Computer Algorithms", Pearson Education, 1999.

## **SEMESTER – I**

### **Paper–III: OBJECT ORIENTED ANALYSIS DESIGN & C++**

#### **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 – Virtual functions – Files – Exception Handling – String Handling – Templates.

#### **TEXT 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.

#### **REFERENCE BOOKS**

1. Balagurusamy “Object Oriented Programming with C++”, TMCH, Second Edition, 2003.



## **SEMESTER – I**

### **Paper–IV: COMPUTER NETWORKS AND COMMUNICATIONS**

#### **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 Input processing – 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.

#### **TEXT BOOKS**

1. Douglas E. Comer, “Internetworking with TCP/IP Volume I”, Prentice Hall, 2003.
2. Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP Volume II”, Prentice Hall, 2003.
3. Uyles Black, “TCP/IP & Related Protocols” McGraw-Hill, 1995.

## SEMESTER – I

### Paper–V: RELATIONAL DATABASE MANAGEMENT SYSTEMS

#### UNIT I :

Introduction - Database system applications - purpose of database system – View of data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture – Database Users and Administrators.

#### UNIT II :

Relational Databases – Relational Model – Structure of Relational Databases – Fundamental Relational Algebra Operations – Additional Relational Algebra Operations.

SQL – Background – Data Definition – Basic Structure of SQL Queries – Set Operations – Aggregate Functions – Null values – Nested Subqueries – Views – Modification of the Database.

#### UNIT III :

Database design : Database Design and the E – R Model – Design Phases – Design Alternatives – The Entity Relationship Model – Constraints – Entity Relationship Diagrams – Extended E – R features – Specialization – Generalization – Aggregation – Reduction to Relational Schemas.

#### UNIT IV :

Relational Database Design – Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Keys and Functional Dependencies – Boyce – Codd Normal Form – BCNF and Dependency Preservation – Third Normal Form – Functional Dependency Theory – Lossless Decomposition – Dependency Preservation – BCNF Decomposition Algorithm – 3NF Decomposition – Multivalued Dependencies – Fourth Normal Form – 4NF Decomposition.

#### UNIT V :

Database System Architectures – Centralized and Client / Server Architectures – Centralized Systems – Client / Server Systems – Server System Architectures – Parallel Systems – Distributed Systems – Network Systems.

#### TEXT BOOK :

“ Database System Concepts “ by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Fifth edition, 2006, Mc Graw Hill International Edition.

#### REFERENCE BOOKS :

1. “An Introduction to Database Systems “ by Bipin c. Desai
2. “ Database Management Systems” by Elmasri and Navathe

## SEMESTER – I

### Practical 1: OBJECT ORIENTED PROGRAMMING LAB

1. **Book Shop Management:** Write a program to develop a shopping management system which maintains stock details of a book shop using constructor and destructor.
2. **Student details using Virtual Functions:** Write a program to maintain student particulars.
3. **Pay Slip using Functions:** Write a program to create a Pay Slip using manipulation of function.
4. Write a function called **circerea( )** that finds the area of a circle. It should take an argument of type float and return an argument of the same type. Write a **main( )** function that gets a radius value from the user calls **circarea( )** and displays the result.
5. Create a class called time that has separate **int** member data for hours, minutes and seconds. One constructor should initialize this data to 0, and another should initialize it to fixed values. A member function should display it in 11:59:59 format. The final member function should add two objects of type time passed as arguments.

A **main( )** function should create a two initialized time objects and one that isn't initialized. Then it should add the two initialized values together leaving the result in the third time variable finally it should display the value of this third variable.

6. Create a class that imitates parts of the functionality of the basic type **int** call the class **int** (not different spelling) the only data in this class is an int variable Include member functions to initialize an **int** to 0, to initialize it to an **int** value, to display (it looks just like an **int**) and to add two **int** values.

Write a program that exercise this class by creating two initialized and one uninitialized **int** values, adding these two initialized values and placing the response in the uninitialized value and then displaying this result.

7. Create a class called employee that contains a name (an array of data char) and an employee number (type long). Include a member function called **getdata( )** to get data from the user for insertion into the

object, and another function called **putdata()** to display the data assume the name has no embedded blanks.

Write a **main()** program to exercise this class. It should create an array of type employee and then invite the user to input data for up to 100 employees it should print the data for all the employee.

8. Overload all five integer arithmetic operators (+, -, \*, / and %) so that they operate on objects of type int. If the result of any such arithmetic operators exceed the normal range of int from -32,768 to 32,767 have the operator print a warning and terminate the program.
9. Imagine a publishing company that markets both book and audio-cassette versions of its works. Create a class publication that stores the title (a string) and price (type float) of a publication from this class derive two classes book which adds a pages count (type int) and tape, which adds a playing time in minutes (type float) each of these three classes should have a **getdata()** function to get its data from the user at the keyboard and a **putdata()** function to display its data.

Write a **main()** program to test the book and tape classes by creating instances of them, asking the user to fill in their data with **getdata()** and then displaying the data with **putdata()**.

10. Write a program that reads a group of numbers from the user and places them in an array of type float. Once the numbers are stored in the array the program should average them and print the result. Use pointer notation wherever possible.
11. In the Distance class create an overloaded \* operator, so that two distance can be multiplied together, make it a friend function so that you can use such expressions as
$$\text{dist1} = 7.5 * \text{dist2};$$
you'll need a one-argument constructor to convert floating point values into distance value. Write a **main()** program to test this operator in several ways.
12. **Exception Handling in C++:** Write a program to implement stack operations.

## **SEMESTER – I**

### **Practical 2: RDBMS LAB**

#### **LIST OF PRACTICALS**

##### **SQL – ORACLE, SQL SERVER**

1. Working with DDL and DML commands of SQL for creation and manipulation of single, multiple tables.
2. Working with PL/SQL- Triggers and stored procedures.
3. Developing a Package using a database.

## **SEMESTER – II**

### **Paper–VI: SOFTWARE ENGINEERING CONCEPTS**

#### **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**

Applying 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.

#### **TEXT BOOKS**

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

## **SEMESTER – II**

### **Paper–VII: ADVANCED OPERATING SYSTEM CONCEPTS**

#### **UNIT – I**

Introduction – Evolution of Operating systems – Serial, Simple Batch, Mutiprogrammed Batch , Timesharing, Distributed and Real time operating systems – Computer Hardware review – Interrupts – Operating System Concepts – Processes – Model – Creation – Termination – Process Hierarchy – Process States – Implementation of Processes – Threads – Thread Usage – Multi threading.

#### **UNIT – II**

Inter Process Communication – Race condition – Critical Region – Mutual Exclusion – Sleep and wakeup – Semaphores – Mutexes – Message Passing. Classical IPC Problems: The Dining Philosophers Problem – The Readers and Writers Problem – The Sleeping Barber Problem – Producer Consumer problem.

#### **UNIT – III**

**UNIX :** Architecture of Unix Operating System – Introduction to system concepts – Kernel data structures – Internal representation of Files – Inodes – Algorithms for allocation and Releasing inode – Structure of a Regular file – Directories – Super block.

#### **UNIX – IV**

**UNIX:** Algorithm for assigning new Inode and freeing Inode – Allocation of Disk blocks – Process states and transition – Layout of system memory – The context of a Process. Process Control in Unix – Algorithm for Fork system call – Algorithm for Exit – Algorithm for Wait – Algorithm for Exec – Uses of Exec system call.

#### **UNIX – V**

**UNIX:** Algorithm for Booting the Unix system – Algorithm for Init process – Process scheduling algorithm – Example of Process scheduling in Unix. Example C programs by using fork, execl, wait, exit system calls. Memory management policies in UNIX – Swapping – Demand paging.

#### **TEXT BOOKS**

1. Andrew S.Tanenbaum, "Modern Operating Systems", PHI/Pearson Education Asia, Second Edition, 2001 [Units I, II].
2. Maurice J. Bach, "The Design of the Unix Operating System", Prentice Hall of India, 2002. [Units III, IV, V]

#### **REFERENCE BOOKS**

1. William Stallings, "Operating Systems", Prentice Hall of India, Second Edition, 2000.

## SEMESTER – II

### Paper–VIII: ADVANCED JAVA PROGRAMMING

#### UNIT – I

Overview of Java – Data types – Operators – Declarations – Control Structures – Arrays and Strings – Java Classes – Fundamentals – Methods – Constructors – Scope rules – this keyword – Object based and Object oriented programming – Inheritance – Reusability – Composing class – Method overloading – Abstract Classes – Virtual functions.

#### UNIT – II

Packages and Interfaces – packages – Access protection – Importing packages – Interface – Defining and implementing interface – Applying interface – Variable in Interface.

**Exception Handling :** Fundamentals – Exception types – Uncaught exceptions – Using try and catch – Multiple catch clauses – Nested try statements – Throw – Throws – Java Built in Exception – Creating your own sub classes.

#### UNIT – III

**Multithreaded Programming:** Java thread model – Priorities – Synchronization – Messaging – Thread class and runnable interface – Main thread – Creating the thread – Synchronization – Interthread communication – Deadlock.

#### UNIT – IV

**I/O Applets :** I/O basics – Stream – Stream Classes – Predefined stream – Reading/Writing console input – Applet fundamentals – Native methods – GUI components – Applets – Java Scripts – Java development kit – Java API - **JAVABEANS:** Preparing a class to be a JavaBean – Creating a JavaBean – Adding Beans and Properties to a JavaBean – Connecting Beans with Events in the BeanBox – the BeanInfo class.

#### UNIT – V

**Introduction to Java Network Connections:** Basic structure of JDBC – Socket Programming - Overview of Servlet technology - Handling HTTP GET and POST requests – Session tracking – RMI: defining, implementing the RMI – Define the Client – Compile Execute the server and the client – Networking: Reading a file on a web server – Establishing a simple server and a simple client (using stream sockets) – Random and BitSet Class – Class arrays – Interface Collection and Class Collections – Sets – Maps.

#### REFERENCE BOOKS

1. Patric Naughton and Herbert Schildt, “Java: The Complete Reference”, Tata McGraw Hill, 1997.
2. Deitel and Deitel, “JAVA – How to Program “, Prentice Hall International Inc, 1998.
3. Wiiliam Stanek and Peter Norton, “Peter Norton’s Guide to Java Programming”, Tech media Publications, 1997.
4. Mark Grand, “Java Language Reference”, O’Reily & Associates Inc. 1997.



**SEMESTER – II**  
**Paper–IX: DATA MINING AND BIG DATA ANALYTICS**

**Objectives**

- To know the basic concepts of Data Mining and Big Data Analytics.

**UNIT – I**

Introduction – Data Mining – Relational Databases – Data Warehouses – Transactional databases – Data Mining functionalities – Classification of Data Mining systems – Major Issues in Data Mining.

**UNIT – II**

Data Preprocessing – Data cleaning – Missing value, noising data and inconsistent data – Data integration and Transformation – Data reduction – Data cube aggregation – Dimensionality reduction and data compression – Data mining primitives.

**UNIT – III**

Classification and predictions – Issues regarding classification and prediction – Classifications by decision tree induction – Classification by Back propagation – Other classification methods

**UNIT – IV**

Cluster Analysis – Types of Data in Cluster Analysis – Interval – Scaled variables, Binary variables, Nominal ordinal and ratio-scaled variables – Clustering methods – Partitioning methods – K-means, k-medoids and CLARANS – Hierarchical methods – Agglomerative and Divisive, BIRCH, CURE – Outlier analysis – Data Mining applications.

**UNIT-V**

The Big Deal about Big Data: What is Big Data-Why Is Big data important- Big Data. Applying Big Data to Business problems: A sampling of use cases-Big Data use cases-IT for IT – Customer state. Analytics for Big Data at Rest: The Big Data platform for high performance deep analytics- Appliance simplicity – Hardware Acceleration-Balance, massively parallel architecture- Modular design.

**TEXT BOOKS**

1. Jinweihan, Micheline Kambler, "Data Mining: Concepts and Techniques", Morgan Kaufman Publishers, New Delhi. (For Unit I, II, III and IV).
2. Paul C Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, David Corrigan, James Giles, "Harness the Power of Big Data", The McGraw-Hill Publications, 2013, First Edition. (For Unit V ).

**REFERENCE BOOKS**

1. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1998.
2. Sam Anohory, Dennis Murrey, "Dataware housing in the real world", Pearson, 2004.

**SEMESTER – II**  
**Practical 3: JAVA PROGRAMMING LAB**

- 1 Employee Details
- 2 Menu Driven Program
- 3 Moving and Blinking Banner
- 4 Telephone Billing using Constructor
- 5 Radio Button
- 6 Multiple Selection List Box
- 7 Moving shapes according to Key Press
- 8 Wishes by Pressing Key
- 9 Web Page
- 10 Mouse Events

**SEMESTER – II**  
**Practical 4: LINUX SHELL PROGRAMMING LAB**

1. Arithmetic Operation
2. Employee Details
3. Electricity Bill Preparation
4. Sorting
5. Factorial
6. Sum of Numbers
7. Exponent using shell Program
8. Swapping of two numbers
9. Greatest among three numbers
10. Odd or Even
11. Testing the files and directories
12. Expansion and Substitution

## SEMESTER – III

### Paper–XI: CLIENT/SERVER TECHNOLOGY

#### UNIT – I

**Client / Server Computing:** Main frame – Centric Client / Server Computing – Down sizing and Client / Server Computing. **Advantages of Client / Server Computing:** The Advantages of Client / Server Computing – Technology Revolution – Connectivity – User Productivity – Ways to Improve Performance – How to Reduce Network Traffic – Vendor Independence – Faster Delivery of System.

#### UNIT – II

**Components of Client / Server Applications:** The Client – The Role of the Client – Client Services – Request for services. **Components of Client / Server Applications:** The Server – The Role of the server – Server Functionality in Detail – The Network operating system – What are the available Platforms? – The Server Operating System.

#### UNIT – III

**Components of Client / Server Applications Connectivity:** Open Systems Interconnect – Communications interface Technology – Interprocess Communication – Wide Area Network Technologies. **Client / Server Systems Development-Software:** Factors Driving Demand for Application Software Development – Rising Technology Staff Costs – Need to Improve Technology Professional's Productivity – Need for Platform Migration and Reengineering of Existing Systems – Need for a Common Interface Across Platforms – Increase in Applications Development by Users.

#### UNIT – IV

**Client / Server System Development - Hardware:** Hardware / Network Acquisition – PC-Level processing units – Macintosh – Notebooks – Pen – Unix Workstation – X-Terminals – Server hardware – Data storage – Mirrored disk – Network Interface Cards (NICs) – Ethernet – FDDI – CDDI – Power production Devices – Uninterruptible Power Supply [UPS] – Surge protectors. **Client / Server system development - Service and Support:** System Administration – Availability – Reliability – Serviceability – Software Distribution – Performance – Network Management – Help Desk – Remote Systems Management – Security – LAN and Network Management Issues – Licensing.

#### UNIT – V

**Client / Server System Development – Training:** Training Advantages of GUI Application – System Administrator Training – Programmer's Resistance to new Technologies – Database Administrator Training – End users training – Training Delivery Technology. **The Future of Client / Server Computing:** What's in store for Networking – Everyone's a peer! – What's in store for Software Development – Everything's an object! – Enabling Technologies – Transformational Systems – The Challenge of the 1990's.

**TEXT BOOKS**

1. "Client / Server computing", Patrick Smith, Steve Guengerich, Second Edition, Prentice-Hall of India (P) Ltd., 2002.

**REFERENCE BOOKS**

1. Robert Orfali, Dan Harkey and Jerri Edwards, "Essential Client / Server Survival Guide", John Wiley & Sons Inc., 1996.
2. Joe Salami, "Client / Server Databases".
3. Patrick Smith et.al., "Client / Server Computing".
4. Larry I. Vaughn, "Client / Server System Design and Implementation".

## **SEMESTER – III**

### **Paper–XII DIGITAL IMAGE PROCESSING**

#### **UNIT – I**

Introduction: What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.

#### **UNIT – II**

Image Enhancement in the Spatial Domain: Background – some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic / Logic operations – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.

#### **UNIT – III**

Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.

#### **UNIT – IV**

Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.

#### **UNIT – V**

Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Thresholding – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation.

#### **TEXT BOOKS**

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, Second Edition, PHI/Pearson Education.

#### **REFERENCE BOOKS**

1. B. Chanda, D. Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2003.
2. Nick Efford, “Digital Image Processing a practical introducing using Java”, Pearson Education, 2004.

## SEMESTER – III

### Paper–XIII: ASP and XML

#### UNIT – I

**XML:** Introduction to XML Markup – Parsers and Well formed XML Documents – Parsing a Document with msxml – Characters – Markup – CDATA Sections – XML Namespaces – Case study: A Day Planner Application. **Document Type Definition (DTD):** Introduction – Parsers, Well formed and valid XML Documents – Document Type Declaration – Element Type Definitions – Attribute Types – Conditional Selection – White space characters – Case Study: Writing a DTD for the Day Planner Application.

#### UNIT – II

**Schemas:** Introduction – Schemas Vs DTD – Microsoft XML Schema: Describing Elements – Describing Attributes – Data Types – W3C XML Schema – Case Study: Writing a Microsoft XML Schema for the Day Planner Application. **Document Object Model (DOM):** Introduction – DOM Implementation – DOM and Java Script – Setup – DOM Components – Creating Nodes – Traversing the DOM – Modifying the Day Planner Application to use DOM.

#### UNIT– III

**XML Technologies and Applications:** Introduction – XML Query Language – Directory Services Markup Language – Resource Definition Framework – XML Topic Maps – Virtual Glossary – Channel Definition Format – Information and Content Exchange Protocol – Rich Site Summary – P3P – Blocks Extensible Exchange Protocol – XML Digital Signatures – Extensible Tights Markup Language – XML Metadata Interchange – W3C’s XML Protocol – XAML.

#### UNIT – IV

**ASP.NET:** Introduction – .NET Framework – ASP – Operating Systems – Servers – ASP Objects – ADO and ADO.NET Objects – ASP Components – Relational DBMS and Other Data Sources – Developing Distributed Online Application – Client/Server or Tiered Applications. **Programming ASP.NET with Visual Basic .NET:** VB .NET Programming Language Structures – Built in ASP .NET Objects and Interactivity – Using the Response Object – The ASP Server Object.

#### UNIT -V

**Web Forms and ASP .NET:** Programming Web Forms – Web Forms Capabilities – Web Forms Processing – Web Forms and Events – Creating Web Forms Events Handlers – Building Interactive Applications with VS .NET – Solutions and Project in VS .NET – Solution Explorer – Creating a Web Form.

#### TEXT BOOKS

1. Dave Mercer, “ASP.NET: A Beginner’s Guide”, Tata McGraw-Hill Publishing Company Limited Edition 2002.
2. H.M. Deitel P.J.Deitel T.R. Nieto T.M. Lin P.Sadu, “XML How to Program“.

#### REFERENCE BOOK

1. AI Williams, Kim Barber, ”ASP Solutions” , DreamTech Press 2000.

## **SEMESTER – III**

### **Paper–XIV: CRYPTOGRAPHY AND NETWORK SECURITY**

#### **UNIT – I**

Introduction to Cryptography – Security Attacks – Security Services – Security Algorithm – Stream cipher and Block cipher – Symmetric and Asymmetric-key Cryptosystem Symmetric Key Algorithms: Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.

#### **UNIT – II**

Public-key Cryptosystem: Introduction to Number Theory – RSA Algorithm – Key Management - Diffie-Hell man Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.

#### **UNIT – III**

Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques. E-mail Security – PGP – S / MIME – IP Security.

#### **UNIT – IV**

Web Security – Secure Socket Layer – Secure Electronic Transaction. System Security – Intruders and Viruses – Firewalls– Password Security

#### **UNIT – V**

Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C / JAVA Programming). Network Forensic – Security Audit – Other Security Mechanism: Introduction to: Stenography – Quantum Cryptography – Water Marking – DNA Cryptography.

#### **TEXT BOOKS**

1. William Stallings, “Cryptography and Network Security”, PHI/Pearson Education.

#### **REFERENCE BOOKS**

1. Bruce Schneir, “Applied Cryptography”, CRC Press.
2. A.Menezes, P Van Oorschot and S.Vanstone, “Hand Book of Applied Cryptography”, CRC Press, 1997 (Free Downloadable).
3. Ankit Fadia, ”Network Security”, MacMillan.

**SEMESTER – III**  
**Practical 5: XML PROGRAMMING LAB**

**LIST OF PRACTICALS**

- 1 XML Document Using Elements and Attributes
- 2 XML Document Using DTD
- 3 XML Document implementing Schema
- 4 XML Document to implement Cascading Style Sheet
- 5 XML Document implementing Entities
- 6 Employee Details
- 7 Department Store details using W3C Scheme
- 8 Patient Details
- 9 Company Details
- 10 Student Details

**SEMESTER – III**  
**Practical 6: NETWORK SECURITY LIST OF PRACTICALS**

- 1 Trace out Debug Message
- 2 Random Number checking
- 3 Password Checking
- 4 Generate Public Key and Private Key
- 5 Ceaser Cipher
- 6 RSA Algorithm
- 7 DSA Algorithm



## **ELECTIVE – I**

### **1.1 PRINCIPLES OF COMPILER DESIGN**

#### **UNIT – I**

Introduction – Structure of a Compiler – Compiler writing Tools – Basic constructs of High level Programming languages: Data structures, Parameter transmission. Lexical analysis – Role of lexical analyser – Finite automata – Regular expressions to Finite automata – NFA to DFA – Minimising the number of states of a Deterministic Finite Automata – Implementation of a Lexical Analyser.

#### **UNIT – II**

Parsing techniques – Context free grammars – Derivations and Parse trees – Ambiguity – Capabilities of Context free grammars – Top down and Bottom up parsing – Handles – Shift Reduce parsing – Operator precedence parsing – Recursive descent parsing – Predictive parsing.

#### **UNIT – III**

Automatic parsing techniques – LR parsers – Canonical collection of LR(0) items – Construction of SLR parsing table – LR(1) sets of items Construction – Construction of canonical LR Parsing Tables.

#### **UNIT – IV**

Syntax Direction Translation – Semantic actions – Implementation of Syntax Directed Translators – Intermediate Code: Postfix notation, Quadruples, Triples, Indirect triples – Methods of translation of Assignment statements, Boolean expressions.

#### **UNIT – V**

Symbol tables and Code generation: Representing information in a Symbol Table – Data Structures for Symbol table – Introduction to Code Optimization: Basic blocks – DAG representation – Error detection and recovery – Introduction to Code Generation.

#### **TEXT BOOKS**

1. Aho A. V. R, Ullman J. D., Compilers, Principles, Techniques and Tools, Addison Wesley, 2002.

#### **REFERENCE BOOKS**

1. Dhamdhare D. M., Compilers construction Principles and Practice, Macmillan India Ltd.

## ELECTIVE – I

### 1.2 DISTRIBUTED COMPUTING

#### UNIT – I

**Distributed Systems:** Fully Distributed Processing Systems – Networks and Interconnection Structures – Designing a Distributed Processing System.

#### UNIT – II

**Distributed Systems:** Pros and Cons of Distributed Processing – Distributed Databases – The Challenge of Distributed Data – Loading Factors – Managing the Distributed Resources – Division of Responsibilities.

#### UNIT – III

**Design Considerations:** Communication Line Loading – Line Loading Calculations – Partitioning and Allocation – Data Flow Systems – Dimension Analysis – Network Database Design Considerations – Ration Analysis – Database Decision Trees – Synchronization of Network Databases.

#### UNIT – IV

**Client/Server Network Model:** Concept – File Server – Printer Server – an e-mail Server.

#### UNIT – V

**Distributed Databases:** An overview – Distributed Databases – Principles of Distributed Databases – Levels of Transparency – Distributed Database Design – The R\* Project Technique Problems of Heterogeneous Distributed Databases.

#### TEXT BOOKS

1. John A. Sharp, “An Introduction to Distributed and Parallel Processing”, Blackwell Scientific Publications, 1987 (For UNIT I & UNIT III).
2. Uyles D. Black, “Data Communications & Distributed Networks”, (UNIT II).
3. Joel M. Crichlow, “Introduction to Distributed & Parallel Computing”, (UNIT IV).
4. Stefans Ceri, Ginseppe Pelagatti, “Distributed Databases Principles and systems”, McGraw Hill Book Co., New York, 1985 (UNIT V).

## ELECTIVE – I

### 1.3 NEURAL NETWORKS AND FUZZY LOGIC

#### UNIT – I

**Fundamentals of Neural Networks:** Basic concepts of Neural Networks – Human Brain – Model of an Artificial Neuron – Neural Network Architectures – Characteristics of Neural Networks – Learning methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Easy Neural Network Architectures – Some Application domains.

#### UNIT – II

**Back propagation Networks:** Architecture of a Back propagation Network – Back propagation Learning – Illustration – Applications – Effect of Tuning parameters of the Back propagation Neural Network – Selection of various parameters in BPN – Variations of standard Back Propagation algorithm.

#### UNIT – III

**Adaptive Resonance Theory: Introduction:** Cluster Structure, Vector Quantization, Classical ART Networks, Simplified ART Architecture. **ART1:** Architecture of ART1–Special features of ART1 Models-ART1 Algorithms-illustration. **ART2:** Architecture of ART2– ART2 Algorithms-illustration- Applications.

#### UNIT – IV

**Fuzzy Set Theory:** Fuzzy versus crisp, **Crisp sets:** Operation on Crisp sets- Properties of Crisp sets- Partition and Covering. **Fuzzy sets:** Membership Function – Basic fuzzy set Operations-properties of fuzzy sets. **Crisp relations:** Cartesian product-Other Crisp Relation-Operations on Relations. **Fuzzy relations:** Fuzzy Cartesian product- Operations on Fuzzy Relations.

#### UNIT – V

**Fuzzy Systems: Crisp logic:** Laws of Propositional Logic-Inference in propositional Logic. **Predicate logic:** Interpretations of Predicate Logic Formula – Inference in Predicate Logic. **Fuzzy logic:** Fuzzy Quantifiers – Fuzzy Inference, Fuzzy rule based system – Defuzzification Methods.

#### TEXT BOOKS

1. S.Rajasekaran, G.A.Vijayalakshmi Pai – “Neural Networks, Fuzzy logic, and Genetic Algorithms Synthesis and Applications, PHI, 2003.

#### REFERENCE BOOKS

1. James A. Freeman, David M. Skapura – “Neural Networks – Algorithms, Applications, and Programming Techniques”, Pearson Education.
2. Fredric M. Ham, Ivica Kostanic, “Principles of Neuro computing for science of Engineering”, TMCH.
3. Simon Haykin – “Neural Networks-a comprehensive foundation”, PHI/Pearson Edition.

## ELECTIVE – I

### 1.4 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

#### UNIT – I

**Introduction:** AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.

#### UNIT – II

**Heuristic Search techniques:** Generate and Test – Hill Climbing – Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem.

#### UNIT – III

**Using Predicate logic:** Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge.

#### UNIT – II

**Statistical reasoning:** Probability and Bayes Theorem- Certainly Factors and Rule- Based systems- Bayesian Networks- Dempster-Shafer Theory-Fuzzy logic .

**Knowledge representation:** Syntactic-Semantic Spectrum of Representation-Logic and Slot-and Filter Structures- Other Representational Techniques – Planning – Understanding.

#### UNIT – II

Learning – Common sense – Perception and Action – Expert System.

#### TEXT BOOKS

1. Elaine Rich and Kevin Knight, " Artificial Intelligence", Tata McGraw Hill Publishers company Pvt. Ltd, Second Edition, 1991. (Chapters 1 – 6 only).

#### REFERENCE BOOKS

1. George F Luger, "Artificial Intelligence", 4<sup>th</sup> Edition, Pearson Education Publ., 2002.

## **ELECTIVE – I**

### **1.5 SOFTWARE TESTING**

#### **UNIT – I**

Developing a test approach – Addressing software system business risk – Defining a software system strategy – Developing software system testing tactics – Testing a software using a life cycle methodology – Requirements phase testing.

#### **UNIT – II**

Design phase testing – Program phase testing – Desk debugging and program peer view test tools – Evaluating test results – Installation phase testing – Acceptance testing.

#### **UNIT – III**

Testing methodology for software maintenance – Testing the correctness of the installing a software change – Testing the validity of a software cost estimate – Testing the progress of the software system – Inspecting test plan and test cases.

#### **UNIT – IV**

Accessing Client–Server and LAN risks – A testing strategy for a rapid prototyping – Testing techniques – Testing tools.

#### **UNIT – V**

Test documentation – Reporting test results – Final test reporting – Evaluating test effectiveness – Use of testing metrics – Improving test process.

#### **TEXT BOOKS**

1. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons, Inc., 1995.

#### **REFERENCE BOOKS**

1. Renu & Pradeep “Software Testing: Methodologies, Tools and Processes”, Tata McGraw Hill Publishing Co. Ltd.

## **ELECTIVE – I**

### **1.6. TCP/IP**

#### **UNIT – I**

A Brief History: Arpanet – (TCP/IP) – Milnet – Csnnet – Nsfnet – Ansnet – Protocols and Standards – Standards Organisations – TCP/IP Protocol Suite – Addressing – Connection Devices. Introduction – Classful addressing – Subnetting – Supernetting – Classless addressing

#### **UNIT – II**

ARP & RARP – ARP over ATM – Proxy ARP. ARP Package – RARP – Internet Protocol (IP) – Datagram – Fragmentation – options – Checksum: IP Package. Internet Control Messang Protocol (ICMP) – Types of Message – Message format – error Reporting – Query – Checksum – ICMP Package

#### **UNIT – III**

Group Management – IGMP Message: IGMP operation – Process to Process Communication – UDP Operation – TCP services – Flow control – Multicast Routing: Multicast routing protocols. Bootp & DHCP – Booth – UDP Ports – using TFTP – Dynamic host Configuration Protocols (DHCP) – Domain Name system (DNS) – Name Space – Domain Name Space – distribution of Name space – DNS in the Internet – Resolution – DNS Message – Types of records

#### **UNIT – IV**

File Transfer Protocol (FTP): Connections – Communication Command Processing – file Transfer – User interface – Anonymous FTP. Simple Mail Transfer Protocol (SMTP): User Agent (UA) – Addresses – delayed Delivery – Aliases – Mail transfer agent (MTA) – Commands and Responses – Mail Transfer Phases – Multipurpose Internet Mail Extensions (MIME) – Mail Delivery – Mail Access Protocols

#### **UNIT – V**

Simple Network Management Protocols: (SNMP) – Concept – Management Components – SMI – MIB – SNMP – Messages – UDP Ports – Security. IP over ATM: ATM Wans – Carrying Datagram in cells – Routing the cells – Atmarp – Logical IP Subnet (LIS). Mobile IP: Addressing – Agents – Three Pahses – Agent Discovery – Registration – Data Transfer – Inefficiency in Mobile IP. – Virtual Private Networks (VPN).

#### **TEXT BOOKS**

1. Behrouz A. Forouzan, “TCP/IP Protocol Suite”, Second edition, Tata Mcgraw – Hill Publishing Company

#### **REFERENCE BOOKS**

1. W. Richard Stevens, “TCP/IP Illustrated Volume1, The Protocols”, Pearson Education.
2. Comer, “Internetworking with TCP / IP, Vol 1: Principles, Protocols & Architecture, “ Fourth Edition, Pearson Education.

## ELECTIVE – I

### 1.7 SEMANTIC WEB TECHNOLOGY

#### UNIT – I

**INTRODUCTION:** Current Web - Transition to the Semantic Web – Examples - Semantic Web Technologies - A Layered Approach. (5+4)

**STRUCTURED WEB DOCUMENTS IN XML:** Introduction - The XML Language - Structuring - Namespaces - Addressing and Querying XML Documents - Processing. (6+6)

#### UNIT – II

**DESCRIBING WEB RESOURCES IN RDF:** Introduction - RDF: Basic Ideas, XML-Based Syntax - RDF Schema: Basic Ideas, The Language - RDF and RDF Schema in RDF Schema - An Axiomatic Semantics for RDF and RDF Schema - A Direct Inference System for RDF and RDFS. (6+4)

#### UNIT – III

**ONTOLOGY ENGINEERING:** Introduction - Constructing Ontologies Manually - Reusing Existing Ontologies - Using Semiautomatic Methods - On-To-Knowledge Semantic Web Architecture. (6+4)

**WEB ONTOLOGY LANGUAGE:** Introduction - The OWL Language - Examples - OWL in OWL - Future Extensions. (5+4)

#### UNIT – IV

**LOGIC AND INFERENCE:** Rules - Introduction - Example of Monotonic Rules: Family Relationships - Monotonic Rules: Syntax, Semantics, Nonmonotonic Rules: Motivation and Syntax - Example of Nonmonotonic Rules: Brokered Trade - Rule Markup in XML: Monotonic Rules, Nonmonotonic Rules. (9+4)

#### UNIT – V

**APPLICATIONS:** Introduction - Horizontal Information Products at Elsevier - Data Integration at Audi - Skill Finding at Swiss Life - Think Tank Portal at EnerSearch - e-Learning - Web Services - Other Scenarios. (8+4)

#### TEXT BOOK:

1. Grigoris Antoniou and Frank van Harmelen, “Semantic Web Primer”, MIT press, USA, 2008.
2. Michael C Daconta, Leo J Obrst and Kevin T Smit, “The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management”, Wiley, USA, 2003.

#### REFERENCES:

1. John Davies, Rudi Studer and Paul Warren, “Semantic Web Technologies: Trends and Research in Ontology-based Systems”, Wiley, USA, 2006.

## ELECTIVE – II

### 2.1 MULTIMEDIA AND ITS APPLICATIONS

#### UNIT – I

What is Multimedia –Where to use Multimedia- Introduction to making Multimedia – The Stages of Project- What you need to making Multimedia - Macintosh and Windows Production platforms – **Basic Software tools:** Text Editing and Word processing Tools-OCR Software-Painting and Drawing Tools-3-D Modeling and Animation Tools-Image Editing Tools-Sound Editing Tools-Animation, Video and Digital Movie Tools.

#### UNIT – II

**Multimedia authoring tools:** Making Instant Multimedia –Types of Authoring Tools – Card and Page Based Authoring tools- Icon and Object based Authoring Tools-Time Based Authoring tools-Cross-Platform Authoring Notes. **Multimedia building blocks: Text:** About Font and Faces- using Text in Multimedia-Computers and Text-Font editing and Design Tools-Hypermedia and Hypertext.

#### UNIT – III

**Sound:** The Power of Sound- Multimedia System Sounds-Digital Audio-Audio File Formats-Making MIDI Audio-MIDI versus Digital Audio-Adding Sound to your Multimedia project. **Images:** Making Still Images-Color-Image File Formats. **Animation:** Principles of Animation – Making Animation That Work. **Video:** Broadcast Video Standards-Analog Video-Digital Video-Video Recording and Tape Formats-shooting And editing Videos.

#### UNIT – IV

**Multimedia and the Internet:** The Internet and how it works – **Tools for World Wide Web:** Web Servers-Web Browsers- Web Page Makers and Site Builders- Plugs-in and Delivery Vehicles. **Designing for the World Wide Web:** working on the Web- Text for the Web-Images for the Web-Sound for the Web-Animation for the Web

#### UNIT – V

**Planning and Costing:** The Process of Making Multimedia- Scheduling-Estimating-REPs and Bid Proposals. **Content and Talent:** Acquiring Content- Using Content Created by Others-Using Talent. **Delivering:** Testing Preparing For Delivery-Delivering on CD-ROM- Delivering on the World Wide Web.

#### TEXT BOOKS

1. Tay Vaughan, “Multimedia making it work”, Fifth Edition, Tata McGraw Hill.

#### REFERENCE BOOKS

1. Judith Jeffloat, “Multimedia in Practice (Technology and Applications)”, PHI, 2003.
2. John F. Koegel Bufford, “Multimedia Systems”, Pearson Education.



## **ELECTIVE – II**

### **2.2 EMBEDDED SYSTEMS**

#### **UNIT – I**

8051 Microcontroller: Introduction – 8051 Architecture – Input / Output Pins, Ports and Circuits - External Memory – Counters / Timers – Serial Data Input / Output – Interrupts.

#### **UNIT – II**

Instruction Set and Programming Moving Data – Addressing Modes – Logical operations – Arithmetic Operation – Jump and Call Instructions – Simple Program. Applications: Keyboard Interface – Display Interface – Pulse Measurements – DIA and AID Conversions – Multiple Interrupts.

#### **UNIT – III**

Concepts on RTOS: Introduction to RTOS – Selecting an RTOS – Task and Task states – Tasks and data – Semaphores and shared data. MORE operating systems services: Interrupt Process communication – Message Queues, Mailboxes and pipes – Timer Functions – Events – Memory Management – Interrupt Routines in an RTOS Environment.

#### **UNIT – IV**

Basic Design using a RTOS: Principles – Encapsulating semaphores and Queues – Hard real time scheduling considerations – Saving memory space and power – introductions to RTL & QNX.

#### **UNIT – V**

Software Tools: Embedded Software Development Tools: Hosts and Target Machines – Linker/Locators for Embedded software-getting Embedded software into the Target systems. Debugging Techniques: Testing on your Host machine – Instruction set simulators – The assert macro – using laboratory tools.

#### **TEXT BOOKS**

1. David.E.Simon, "An Embedded Software Primer", Pearson Education, 2001.
2. The 8051 Microcontroller and Architecture Programming and Application II Edition -Kenneth J Ayala, Penram International.

## **ELECTIVE – II**

### **2.3 NATURAL LANGUAGE PROCESSING**

#### **UNIT – I**

Introduction to natural language processing – the study of language, applications of natural language understanding, evaluating language understanding systems. Syntactic Processing: Linguistic background: An outline of English syntax – words, the elements of simple noun phrases, verb phrases and simple sentences.

#### **UNIT – II**

Grammars and parsing – grammars and sentence structure, a top down parser, a bottom up chart parser, transition network grammars. Features and Augmented grammars – featured system and augmented grammars, some basic feature systems for English, morphological analysis and the lexicon, a simple grammar using features, Grammars for natural language – auxiliary verbs and verb phrases, movement phenomena in language, handling questions in context free grammar, the hold mechanism in ATN's gap threading.

#### **UNIT – III**

Toward Efficient – human preferences in parsing, encoding uncertainty, a deterministic parser, techniques for efficient encoding of ambiguity, partial parsing, Ambiguity Resolution: statistical methods – basic probability theory, estimating probabilities, part of speech tagging, obtaining lexical probabilities, probabilistic context free grammars, best firing parsing, a simple context.

#### **UNIT – IV**

Semantic Interpretation: Semantic and logical form – semantics and logical form, word senses and ambiguity, the basic logical form language, encoding ambiguity in the logical form, verbs and states in logical form, thematic roles, speech acts and embedded sentences, linking syntax and semantics – semantic interpretation and compositionality, a simple grammar and lexicon with semantic interpretation, prepositional phrases and verb phrases, lexicalized semantic interpretation and semantic roles, ambiguity resolution – selectional restrictions, semantic filtering using selectional restrictions, semantic networks, statistical word sense disambiguation, statistical semantic preferences, combining approaches to disambiguation.

#### **UNIT – V**

Other strategies for semantic Interpretation – grammatical relations, smenatic grammars, template matching, semantically driven parsing techniques, scoping and the Interpretation of noun phrases – scoping phenomena, definite descriptions and scoping, a method for scoping while parsing, co-references and binding constraints, adjective phrases, relational nouns and nominalizations.

#### **TEXT BOOKS**

1. “Natural Language Understanding” - James Allen, Second edition, Pearson Education.

## **ELECTIVE – II**

### **2.4 SIMULATION AND MODELING**

#### **UNIT – I**

Principle of computer modeling and simulation, Monte Carlo simulation. Nature of computer modeling and simulation. Limitations of simulation, areas of application. System and environment – components of a system – Discrete and continuous systems. Models of a system – A variety of modeling approaches.

#### **UNIT – II**

Random number generation, technique for generating random numbers – Midsquare method – The midproduct method – Constant multiplier technique – Additive congruential method – Linear congruencies method – Tests for random number – The Kolmogorov Smirnov test – The chi-square test. Random variable generation – Inverse transform technique – Exponential distribution – Uniform distribution – Weibull distribution, empirical continuous distribution – Generating approximate normal variants.

#### **UNIT – III**

Empirical discrete distribution – Discrete uniform distribution – Poisson distribution – Geometric distribution – Acceptance – Rejection technique for Poisson distribution – Gamma distribution.

#### **UNIT – IV**

Design and evaluation of simulation experiments – Input – Output analysis – Variance reduction technique – Verification and validation of simulation models. Discrete event simulation – Concepts in discrete – event simulation – Manual simulation using event scheduling, single channel queue, two server queue, simulation of inventory problems.

#### **UNIT V**

Simulation languages – GPSS – SIMSCRIPT – SIMULA – Programming for discrete event systems in GPSS and C. Case Study: Simulation of LAN – Manufacturing system – Hospital management system.

#### **TEXT BOOKS**

1. Jerry Banks and John S. Carson II, “Discrete Event System Simulation”, Prentice Hall Inc, 1984.
2. Narsingh Deo, “System Simulation with Digital Computer”, Prentice Hall of India, 1979.

#### **REFERENCE BOOKS**

1. Francis Neelamkovil, “Computer Simulation and Modeling”, John Wiley & Sons, 1987.
2. Averil M. Law and W. David Kelton, “Simulation Modeling and Analysis”, McGraw Hill International Editions, 1991.

## **ELECTIVE – II**

### **2.5 ENTERPRISE RESOURCE PLANNING**

#### **UNIT - I**

Introduction to ERP: Introduction – Evolution of ERP – What Is ERP – Reasons For The Growth of The ERP Market – The Advantages of ERP – Why do Many ERP Implementations Fail – Why are ERP Packages Being used now. Enterprise – An Overview: Introduction – Integrated Management Information – Business Modeling – Integrated Data Model.

#### **UNIT - II**

ERP and Related Technologies: Introduction – Business Process Reengineering – Management Information System – Decision Support System – Executive Information Systems – Data Warehousing – Data Mining – Online Analytical Processing – Supply Chain Management. ERP A Manufacturing Perspective: Introduction – ERP CAD / CAM – Materials Requirement Planning – Bill of Material – Closed Loop – Manufacturing Resource Planning – Distribution Requirements Planning – JIT and Kanban Product Data Management – Data Management – Benefits Of PDM – Make to Order and Make to Stock – Assemble to Order – Engineer to Order – Configure to Order.

#### **UNIT - III**

ERP Modules: Introduction – Finance – Plant Maintenance – Quality Maintenance – Material Management. Benefits of ERP: Introduction – Reduction of Lead Time – On Time Shipment – Reduction in Cycle Time – Improved Resource Utilization – Better Customer Satisfaction – Improved Supplier Performance – Increased Flexibility – Reduced Quality Costs – Improved Information Accuracy and Decision Making Capability.

#### **UNIT - IV**

ERP Market: Introduction – SAP AG – Baan Company – Oracle Corporation – People Soft – JD Edwards World Solutions Company – System Software Associate QAD. ERP Implementation Life Cycle: Introduction – Preevaluation Screening – Package Evaluation – Project Planning Phase – Gap Analysis – Reengineering Configuration – Implementation Team Training – Testing – Going Live – End User Training – Post Implementation.

#### **UNIT – V**

Vendors, Consultants and Users: Introduction – In House Implementation – Pros and Cons – Vendors – Consultants – End Users. Future Directions In ERP: Introduction – New Markets – New Channels – Faster Implementation Methodologies – Business Models and Bapis Convergence on Windows NT – Application Platforms – New Business Segments – More Features – Web Enabling – Market Snapshot.

#### **TEXT BOOKS**

1. “Enterprise Resource Planning”, Alexis Leon, Tata McGraw Hill, 2002.

## ELECTIVE – II

### 2.6 WIRELESS APPLICATION PROTOCOL (WAP)

#### 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, Tasks 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, “The Wireless Application Protocol”, Pearson Education, 2003.

## ELECTIVE – II

### 2.7 CLOUD COMPUTING

#### UNIT – I

**Introduction to Parallel and Distributed Computing:** Introduction, Architecture and Distributed computing models and technologies SOA, Web Services

**Grid, Cluster and Utility Computing:** Introduction, Architecture, Pros & Cons, Real time applications.

#### UNIT – II

**Introduction To Cloud Computing:** Definition, History, Comparison of Cloud Computing with Grid, Cluster and Utility Computing, Deployment models – Private, Public, Hybrid and Community - Pros and Cons of Cloud Computing. SaaS, PaaS, IaaS etc.

#### UNIT – III

**Virtualization:** Types of Virtualization, Tools for Virtualization, Architecture of VMM, Virtualization for Cloud.

**Advanced Web Technologies:** AJAX and Mashup – Programming examples using applications.

#### UNIT – IV

**Map Reduce Paradigms:** Introduction, GFS Architecture, HDFS Architecture, Hbase, Google big Table, Amazon's (key value) pair storage and Microsoft's Azure infrastructure, Map reduce programming examples

#### UNIT – V

**Cloud Computing Framework:** Amazon EC3, S3 storage services, Aneka framework, IBM blue Cloud.

**Applications:** Distributed search engine and distributed data mining in the cloud.

#### TEXT BOOKS:

1. Anthony T Velte, Toby J Velte and Robert Elsenpeter, "Cloud Computing : A Practical Approach", Tata McGraw Hill, New Delhi, 2010
2. Liu M L, "Distributed Computing Principles and Applications", Pearson Education, New Delhi, 2009.

## MODEL QUESTION PAPER

### Question Paper Pattern (External 75 marks)

- Section-A** 20 marks (10 Short answer Type Questions of 2 mark each; No choice)  
(10 X 2 = 20)
- Section-B** 25 marks (5 Questions either or type of 5 marks each)  
(5 X 5 = 25)
- Section-C** 30 marks (Three Questions out of 5 Questions, 10 marks each)  
(3 X 10 = 30)

### Question Paper Pattern (Internal 50 marks)

- Section-A** 10 marks (5 Short answer Type Questions of 2 mark each; No choice)  
(5 X 2 = 10)
- Section-B** 20 marks (4 Questions either or type of 5 marks each)  
(4 X 5 = 20)
- Section-C** 20 marks (Two Questions out of 3 Questions, 10 marks each)  
(2 X 10 = 20)