

## **MASTER OF SCIENCE (COMPUTER SCIENCE) REGULATIONS**

### **ELIGIBILITY**


Candidates for admission to the first year course leading to the Degree of Master of Science (COMPUTER SCIENCE) will be required to possess a pass in B.Sc. Computer Science / B.C.A. /B.Sc. Computer Technology / B.Sc. Information Technology /B.Sc Information Sciences/B.Sc Information Systems/ B.Sc. Software Systems/B.Sc Software Sciences / B.Sc Applied Sciences (Computer Science/Computer Technology) of any University in Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **M.Sc., Computer Science Examination** of this College after a course of study of two academic years.

### **OBJECTIVES OF THE COURSE**

1. The objective of the Master degree in Computer Science is to form professionals and researchers with both theoretical and practical knowledge.
2. To impart knowledge in a larger partial area of computer science is being focused. Thus, the students are being taught up to the cutting edge of this particular partial area.
3. Understand and respect the professional standards of ethics expected of computer scientists and software engineers and appreciate the social impact of computing.
4. To provide students with the tools needed to compete in any marketplace.
5. To bring students to the forefront of research in these areas, equipping them to take leading roles in software and research development where the demands of reliability and efficiency are particularly important.

**SCHEME OF EXAMINATION**

Sub Code	Subjects	Ins. Hrs/ Week	Examination				
			Dur Hrs	CA	CE	Total	Credit
<b>SEMESTER I</b>							
15PCS13A	Paper I : Cloud Computing	4	3	25	75	100	4
15PCS13B	Paper II : Analysis and Design of Algorithms	5	3	25	75	100	4
15PCS13C	Paper III : Advanced Java Programming	5	3	25	75	100	4
15PCS13D	Paper IV : Advanced Networks	4	3	25	75	100	4
15PCS13E	Paper V : Advanced Software Engineering	4	3	25	75	100	4
15PCS13F	Paper VI : Software Project Management	3	3	25	75	100	4
15PCS13P	Lab I : Programming in Java	5	3	40	60	100	4
		<b>30</b>				<b>700</b>	<b>28</b>
<b>SEMESTER II</b>							
15PCS23A	Paper VII : Data Mining and Warehousing	5	3	25	75	100	4
15PCS23B	Paper VIII : Advanced Operating System	5	3	25	75	100	4
15PCS23C	Paper IX: Open Source Technology	4	3	25	75	100	4
15PCS23D	Paper X: Artificial Intelligence & Expert Systems	4	3	25	75	100	4
15PCS23E	Paper XI: Mobile and Pervasive Computing	4	3	25	75	100	4
15PCS23P	Lab II: Programming in Open Source Technology	4	3	40	60	100	4
	Elective - I	4	3	25	75	100	4
		<b>30</b>				<b>700</b>	<b>28</b>
<b>SEMESTER III</b>							
15PCS33A	Paper XII: Web programming	5	3	25	75	100	4

  
**BoS Chairman/HoD**  
 Department of Computer Science  
 Dr. N. G. P. Arts and Science College  
 Coimbatore - 641 048

  
**Dr. P. R. MUTHUSWAMY**  
 PRINCIPAL  
 Dr. NGP Arts and Science College  
 Dr. NGP - Kalapatti Road  
 Coimbatore - 641 048  
 Tamilnadu, India

M.Sc- CS (Students Admitted from 2015-2016 Onwards)

15PCS33B	Paper XIII: Network Security and Cryptography	5	3	25	75	100	4
15PCS33C	Paper XIV : Software Testing	3	3	25	75	100	4
15PCS33P	Lab- III: Web Programming	5	3	40	60	100	4
15PCS33Q	Lab- IV : Software Testing	3	3	40	60	100	4
15PCS23V	PROJECT I : Mini Project and Viva Voce	5	3	40	60	100	4
	Elective -II	4	3	25	75	100	4
		<b>30</b>				<b>700</b>	<b>28</b>
<b>SEMESTER IV</b>							
15PCS43V	Project and Viva Voce	-		60	90	150	6
		-				<b>150</b>	<b>6</b>
<b>Total</b>						<b>2250</b>	<b>90</b>

**ELECTIVE - I**

(Student shall select any one of the following subject as Elective in Second semester)

S.No	Subject Code	Name of the Subject
1.	15PCS2EA	Android Technology
2.	15PCS2EB	Neural Network and Fuzzy Logic
3.	15PCS2EC	Multimedia and its Applications
4	15PCS2ED	Big Data Analytics

**ELECTIVE - II**

(Student shall select any one of the following subject as Elective in Third semester)

S.No	Subject Code	Name of the Subject
1.	15PCS3EA	Information Security
2.	15PCS3EB	Embedded Systems
3.	15PCS3EC	Enterprise Resource Planning
4	15PCS3ED	Social networks and The Semantic Web

**Total Credit Distribution**

Subjects	Credits	Total		Credits	Cumulative Total
Core	4	14 x 100	1400	56	<b>90</b>
Core Practical	4	4x 100	400	16	
Elective	4	2x 100	200	08	
Mini Project and Viva-Voce	4	1x100	100	4	
Project work and Viva-	6	1 x150	150	6	

<b>15PCS13A</b>	<b>PAPER I: CLOUD COMPUTING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To provide students with the fundamentals and essentials of Cloud Computing.
2. To provide students a sound foundation of the Cloud computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
3. To enable students exploring some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

### **CONTENTS**

#### **UNIT- I**

Cloud Computing Basics- Cloud Computing Overview- Applications- Intranets and the Cloud- Cloud Computing Benefits -Limitations- Security Concerns. Cloud Computing with the Titans: Google-EMC- NetApp - Microsoft- IBM- Amazon- Cloud Computing Services.

#### **UNIT- II**

Cloud Computing Technology: Hardware and Infrastructure - Clients- Security- Network-Services- Accessing the Cloud:- Platforms -Web Applications- Web APIs- Web Browsers -Cloud Storage :- Overview- Cloud Storage Providers - Standards.

#### **UNIT- III**

Cloud Technologies: Web Services, AJAX and Mashups- Virtualization Technology - Multi-tenant software. Cloud Development: Data in the Cloud- Map Reduce and Extensions-Dev 2.0 Platforms.

#### **UNIT -IV**

Software Architecture: Enterprise Software: ERP, SCM, CRM - Custom enterprise application and Dev 2.0- Workflow and business processes - Enterprise analytics and Search.

#### **UNIT- V**

The Mobile Cloud: Working with Mobile Devices- Working With Mobile Web Services: Under Standing Service Types - Performing Service Discovery.

#### **TEXT BOOKS:**

1. *Gautam Shroof*, 2010, **Enterprise Cloud Computing Technology Architecture Applications**, Cambridge University Press.
2. *Anthony T. Velte, Robert Elsenpeter, Toby J. Velte*, 2009, **Cloud Computing: A Practical Approach**, Tata McGraw- Hill Education Pvt Ltd.
3. *Barrie Sosinsky*, 2010, **Cloud Computing Bible**, Wiley Publishing, Inc.

<b>15PCS13B</b>	<b>PAPER II: ANALYSIS AND DESIGN OF ALGORITHMS</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To analyze the asymptotic performance of algorithms.
2. To demonstrate a familiarity with major algorithms and data structures.
3. To apply important algorithmic design paradigms and methods of analysis.

### **CONTENTS**

#### **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 problems - 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 and Sartaj Sahni, 1984, "Computer Algorithms", Galgotia Publications.*
2. *Lakshmiarahan.S and Sundarshan K.Dhall, 1990, "Analysis and Design of Parallel Algorithms", Illustrated Edition, McGraw-Hill publication.*
3. *Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman, 1983, "Data Structures and Algorithms", illustrated reprint, Addison-Wesley.*
4. *Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser, 2014, Data Structures and Algorithms in Java, John Wiley & Sons.*



<b>15PCS13C</b>	<b>PAPER III: ADVANCED JAVA PROGRAMMING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To provide a students to understand the concepts of advance programming and practice on reusing components.
2. It focuses on Graphical User Interface (GUI), multithreading, networking, and database manipulation.
3. Develop Swing-based GUI and client/server applications and TCP/IP socket programming.

### **CONTENTS**

#### **UNIT- I**

Object-Oriented Programming - Encapsulation - Inheritance - Polymorphism - Java History -Java Features - Java Programming Techniques - Lexical issues - Variables - Types - Arrays -Operators- Type Casting.

#### **UNIT- II**

File - Directory - File name filter - Input stream - Output stream -File streams - Applets:HTML applet tags - Order of Applet initialization - Sizing graphics -Simple graphics - EventHandling: Two Event Handling Mechanisms - The Delegation Event Model - Event Classes -Sources of Events - Event Listener Interfaces - Using the Delegation Event Model - AdapterClasses - Inner Classes.

#### **UNIT- III**

Database Programming with JDBC: Database Drivers - The java.sql Package - The javax.sql Package: JDBC Data Sources - Connection Pooling - Distributed Transactions.

## UNIT- IV

Servlet Programming: Servlet Implementation - Servlet Configuration - Servlet Exceptions -The Servlet Lifecycle - Requests and Responses - Servlet Programming.JSP Basics andArchitecture: Introducing JSP - The Nuts and Bolts - JSP Technical Support - JSP DesignStrategies.

## UNIT- V

Distributed Computing using RMI - The RMI Architecture - Locating Remote Objects - RMIExceptions - Developing Applications with RMI - EJB Architecture and Design - Working withEJB.

### TEXT BOOKS:

1. *Deitel and Deitel*, 2011, "**Java How to Program**", Third Edition, PHI/Pearson Education.
2. *Keyur shab*, 2002, "**Java 2 programming**", Tata McGraw- Hill.
3. *Xavier.c*, "**Programming with Java 2**", SciTech Publications (India) P. Ltd.

### REFERENCE BOOKS:

1. *Cay S. Horstmann and Gray Cornell*, 2008, **Core Java Volume-II Advanced Features**, Sun Microsystems.
2. *Subrahmanyam Allamaraju and Cedric Bues*, 2005, **Professional Java Server programming**, Apress, SPD.

<b>15PCS13D</b>	<b>PAPER IV: ADVANCED NETWORKS</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

### **CONTENTS**

#### **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 datagram - 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 datagram. 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.

#### **REFERENCE BOOKS:**

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

<b>15PCS13E</b>	<b>PAPER V: ADVANCED SOFTWARE ENGINEERING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To be able to design a software.
2. To Use CASE tools for analyzing and designing software.
3. Be able to confirm, verify and validate software.

### **CONTENTS**

#### **UNIT- I**

Introduction to Software Engineering : The evolving role of software - The changing nature of software - Software myths - A process framework - 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.

#### **REFERENCE BOOKS:**

1. *Roger S. Pressman*, 2005, "**Software Engineering - A practitioner's Approach**", Sixth edition, McGraw Hill International Edition.

<b>15PCS13F</b>	<b>PAPER VI: SOFTWARE PROJECT MANAGEMENT</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 3**

**OBJECTIVES:**

The subject aims to build the concepts regarding:

1. The capability to work in a team environment and be aware of different modes of Communications.
2. Examine the software project management principles in real life scenarios.
3. Be able to independently evaluate a particular topic of research interest and critically analyze the issues.

**CONTENTS**

**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, 1995, "Software Project Management"*, Inclusion/Thomas Computer Press.
2. *Darrel Ince, H.Sharp and M.Woodman, 1995, "Introduction to Software Project Management and Quality Assurance"*, Tata McGraw Hill.



15PCS13P	LAB I : PROGRAMMING IN JAVA	SEMESTER - I
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding

1. To learn and development of Programs using JAVA Language.
2. To Learn and development of JDBC programs.
3. To Learn and development of RMI Concepts.

### **LIST OF PROGRAMS**

1. Create an employee package to maintain the information about the employee. Use constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package create a java program.
2. Program to implement polymorphism, inheritance and inner classes.
3. Create a frame with user specific size and position it at user specific position (use command line argument). Then different shapes with different colors (use menus).
4. Implementing Java program to handle different mouse events.
5. Create an applet for a calculator application.
6. Java program to maintain the student information in text file.
7. Construct a java application to Animate images at different intervals by using multi threading concepts.
8. Program to send a text message to another system and receive the text message from the system (use socket programming).
9. Constructing a Java program by using JDBC concepts to access a database.
10. Creating a Java program to implement RMI.
11. Creating a Java program by using to implement the tree viewer.
12. Creating a Java bean program to view an image.
13. Java program that prohibit to reading of text files that containing bad words.

<b>15PCS23A</b>	<b>PAPER VII: DATA MINING AND WAREHOUSING</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Differentiate Online Transaction Processing and Online Analytical processing.
2. Learn Multidimensional schemas suitable for data warehousing.
3. Inculcate knowledge on data mining query languages.

### **CONTENTS**

#### **UNIT- I**

Basic data mining tasks - data mining versus knowledge discovery in databases - data mining issues - data mining metrics - social implications of data mining - data mining from a database perspective. Data mining techniques: Introduction - a statistical perspective on data mining - similarity measures - decision trees - neural networks - genetic algorithms.

#### **UNIT- II**

Classification: Introduction - Statistical - based algorithms -distance - based algorithms - decision tree -based algorithms -neural network - based algorithms -rule -based algorithms - combining techniques.

#### **UNIT- III**

Clustering: Introduction - Similarity and Distance Measures - Outliers - Hierarchical Algorithms -Partitional Algorithms. Association rules: Introduction -large item sets -basic algorithms - parallel & distributed algorithms - comparing approaches-incremental rules - advanced association rules techniques - measuring the quality of rules.

## UNIT- IV

Data warehousing: introduction -characteristics of a data warehouse - data marts - other aspects of data mart. Online analytical processing: introduction -OLTP & OLAP systems - data modeling -star schema for multidimensional view -data modeling - multifact star schema or snow flake schema - OLAP TOOLS - State of the market - OLAP TOOLS and the internet.

## UNIT- V

Developing a data WAREHOUSE: why and how to build a data warehouse -data warehouse architectural strategies and organization issues -design consideration - data content - metadata distribution of data - tools for data warehousing - performance considerations - crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction national data warehouses - other areas for data warehousing and data mining.

## REFERENCE BOOKS:

1. *Margaret H. Dunham*, 2003, "**Data mining introductory and advanced topics**", Pearson education.
2. *C.S.R. Prabhu*, "**Data warehousing concepts, techniques, products and a applications**", PHI, Second Edition.
3. *Arun K.Pujari*, 2003, "**Data mining and its Techniques**", Universities Press (India) Pvt. Ltd.

<b>15PCS23B</b>	<b>PAPER VIII: ADVANCED OPERATING SYSTEM</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Define, explain, and apply operating systems concepts: process management, CPU scheduling, synchronization, memory management, file system, and the like.
2. Use the operating system interface.
3. Gain experience in implementing and debugging operating system components, including the kernel module, system call, synchronization primitives, and the file system.

### **CONTENTS**

#### **UNIT- I**

Introduction - Evolution of Operating systems - Serial, Simple Batch, Multiprogrammed 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 - Implementation of Threads in User Space and Kernel space - 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

Distributed Operating System Concepts & Design -Fundamentals - Remote Procedure Calls -The RPC Model -Transparency of RPC - Implementing RPC mechanism -Stub Generation -RPC Messages -Server Management -Parameter-Passing Semantics -Call Semantics - Communication Protocol for RPCs. Distributed File System: Introduction Desirable Features -File Models -File -Accessing Models -File Sharing Semantics -File Caching Schemes -File Replication .

### UNIT- IV

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 – 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 .

### UNIT- V

Process Control in Unix – Algorithm for Fork system call – Algorithm for Exit – Algorithm for Wait – Algorithm for Exec – Uses of Exec – 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, exec, wait, exit system calls.

### REFERENCE BOOKS:

1. *Andrew S.Tanenbaum*, 2001, "**Modern Operating Systems**", Second Edition, PHI/Pearson Education.
2. *Pradeep K. Sinha*, 2002, "**Distributed operating systems concepts and design**", Prentice Hall.
3. *Maurice J. Bach*, 1998, "**The Design of the Unix Operating System**", Prentice-Hall.
4. *William Stallings*, 2000, "**Operating Systems**", Second Edition, Prentice Hall.

<b>15PCS23C</b>	<b>PAPER IX: OPEN SOURCE TECHNOLOGY</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To introduce the concept of open Source Software.
2. To enable students to learn Linux Environment.
3. To make students well versed with Android and Shell Programming.

### **CONTENTS**

#### **UNIT- I**

Open source Softwares: Introduction - Initiatives- Licences - Features and Advantages - Linux: Introduction - Getting Started - File System - Basic Commands - Editors - Openoffice.org.

#### **UNIT- II**

Python: Introduction - Setting Up - Features - Statements and Syntax - Variables and Identifiers - Basic Style Guidelines - Memory Management - Objects - Numbers - Sequences: Strings, Lists and Tuples.

#### **UNIT- III**

Mapping and Set Types - Conditionals and Loops: If - Else - Elif - While - For - Break - Continue - Pass - Iterators - Files and Input/output - Errors and Exceptions.

#### **UNIT- IV**

Functions and Functional Programming: Calling - Creating - Passing - Arguments - Recursion - Generators - Scope - Modules.

#### **UNIT- V**

Object Oriented Programming: Classes - Inheritance - Instances - Composition. Execution Environment.

**REFERENCE BOOKS:**

1. *Petersen, Richard*, 2008, **Linux: The Complete Reference (6<sup>th</sup> Edition)**, McGraw-Hill.
2. *Dawson, Michael*, 2009, **Python Programming for the Absolute Beginner (Third Edition)**, Course Technology/Cengage Learning.

<b>15PCS23D</b>	<b>PAPER X: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To study the concepts of Artificial Intelligence.
2. Methods of solving problems using Artificial Intelligence.
3. Introduce the concepts of Expert Systems and machine learning.

### **CONTENTS**

#### **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 -IV**

Statistical reasoning - Knowledge representation - Planning- Understanding.



## **UNIT- V**

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

### **REFERENCE BOOKS:**

1. *Elaine Rich and Kevin Knight, 1991," Artificial Intelligence",* Tata McGraw Hill, Second Edition.
2. *George F Luger, 2002, "Artificial Intelligence", 4th Edition,* Pearson Education.

15PCS23E	PAPER XI: MOBILE AND PERVASIVE COMPUTING	SEMESTER - II
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To learn and understand the basics of Wireless networks, its transmission mechanisms and media access.
2. To make the understand the networking concept of mobile networks .
3. To make the students understand the basics of pervasive computing, its applications, and the devices used.

**UNIT- I**

**Mobile Computing:**

Adaptability - The Key to Mobile Computing - Mechanisms for Adaptation - Development or incorporation of adaptations in applications.

**Mobility Management:**

Concept of Mobility Management - Location Management - Principles and techniques.

**UNIT- II**

Data Dissemination - Mobile Data Caching - Mobile Cache Maintenance Schemes - Mobile Web Caching - CONTEXT-AWARE COMPUTING : Ubiquitous of pervasive Computing - Various Definitions and types of contexts - Context Aware Computing & Applications - Middleware Support.

**Introduction to Mobile Middleware:**

Definition of Mobile Middleware -Application - Agents - Service Discovery.

### **UNIT- III**

#### **Introduction to Ad-hoc and Sensor Networks:**

Overview - Properties of an Ad-hoc Network - Unique Features of Sensor Networks - Proposed Applications - Challenges - Constrained Resources - Security - Mobility.

### **UNIT -IV**

#### **Wireless Security:**

Traditional Security Issues - Mobile and Wireless Security Issues. MOBILITY: Problems in Ad-hoc Networks. ADDITIONAL ISSUES: Commerce - Additional Types of Attacks. APPROACHES TO SECURITY: Limit the Signal - Encryption - Integrity Codes - IPSec - Other Security Related Mechanisms.

### **UNIT- V**

#### **Security in Wpan:**

Security in Wireless Personal Area Networks - Basic Idea - Bluetooth Security Modes - Basic Security Mechanisms - Encryption: Authentication - Limitation and Problems.

#### **Security In Wlan:**

Security in Wireless Local Area Networks - Basic Ideas - Wireless Alphabet Soup - Wired- Equivalent Privacy (WEP) - WPA Fixes and Best Practices.

#### **TEXT BOOKS:**

1. *Frank Adelstein, Sandeep K.S., Gupta , Golden G. Richard III and Loren Schwibert, 2005, "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hill.*

**REFERENCE BOOKS:**

1. *Jochen Burkhardt, Horst Henn, Stefan Hepper and Thomas Schaeck,* 2002, "**Pervasive Computing**", Pearson Publications.
2. *Asoke K Talukder, Hasan Ahmed and Roopa Yavagal,* 2010, "**Mobile Computing**" Second Edition Tata Mcgraw Hill.

<b>15PCS23P</b>	<b>LAB II : PROGRAMMING IN OPEN SOURCE TECHNOLOGY</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

The subject aims to build the concepts regarding

1. To learn and development of Programs using PHP, MYSQL Language.
2. To Learn and development of Web Applications using PHP.
3. To Learn and development of File using Python language.

**List of Programs**

1. Implementing various operators and loops.
2. Constructing a program to implement string operation.
3. Creating a program to implement lists.
4. Creating a program to implement tuples.
5. Creating a program to perform file operations.
6. Implementing a program to handle exceptions.
7. Creating a program to implement user defined functions.
8. Creating a program to implement recursion in functions
9. Creating a program to implement package concept.
10. Creating a program to implement class concept.
11. Creating a program to implement inheritance.

<b>15PCS33A</b>	<b>PAPER XII: WEB PROGRAMMING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To Gain knowledge in XML, DOM technologies.
2. To understand the basics of ASP.NET, and Programming in ASP.NET and Web forms.
3. To Learn and understand the concepts of application development tools.

### **CONTENTS**

#### **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 - u\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 . ASP .NET Configuration, Scope and State - ASP Application -ASP .NET Applications - ASP .NET and State - The Application Object - ASP Sessions - The Session Object. ASP .NET Objects and Components : The Scripting Object Model - Active Server Components and Controls - More Active Server Components.

### REFERENCE BOOKS:

1. *Dave Mercer, 2002, "ASP.NET: A Beginner's Guide", Tata McGraw-Hill.*
2. *Deitel, Deitel, Nieto, Lin and Sadhu, 2009, XML How to Program, Pearson Education, Second Impression.*
3. *AI William and Kim Barber, 2000, ASP Solutions, DreamTech Press.*

<b>15PCS33B</b>	<b>PAPER XIII: NETWORK SECURITY AND CRYPTOGRAPHY</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To provide a practical survey of both the principles and practice of cryptography and network Security.
2. Gain familiarity with prevalent network and distributed system attacks.
3. To learn defences against security issues and forensics to investigate the aftermath.

### **CONTENTS**

#### **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

#### **REFERENCE BOOKS:**

1. *William Stallings, "Cryptography and Network Security", PHI/Pearson Education.*
2. *Bruice Schneier, 2008, Applied Cryptography Protocols, Algorithms and Source Code in C, Second Edition, Willey India, Reprint.*
3. *Ankit Fadia, 2006, Network Security, Second Edition, Macmillan Publishers India Ltd.*

<b>15PCS33C</b>	<b>PAPER XIV: SOFTWARE TESTING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 3**

**OBJECTIVES:**

1. To describe the principles of system and component testing.
2. To describe strategies for generating system test cases.
3. To understand the essential characteristics of tool used for test automation.

**CONTENTS**

**UNIT- I**

Purpose of Software testing – Some Dichotomies – a model for testing – Playing pool and consulting oracles – Is complete testing possible – The Consequence of bugs – Taxonomy of Bugs.

**UNIT- II**

Software testing Fundamentals – Test case Design – Introduction of Black Box Testing and White Box testing – Flow Graphs and Path testing – Path testing Basics - Predicates, Pathpredicates and Achievable Paths - Path Sensitizing – Path Instrumentation –Implementation and Application of Path Testing.

**UNIT- III**

Transaction Flow testing – Transaction Flows – techniques – Implementation Comments – Data Flow Testing – Basics – Strategies – Applications, Tools and effectiveness – Syntax Testing – Why, What, How – Grammar for formats – Implementation – Tips.

## UNIT- IV

Logic Based Testing - Motivational Overview - Decision tables - Path Expressions - KV Charts - Specifications - States, State Graphs and transition Testing - State Graphs - Good & bad states - state testing Metrics and Complexity.

## UNIT -V

Testing GUIs - Testing Client - Server Architecture - Testing for Real-time System - A Strategic Approach to Software testing - issues - unit testing - Integration Testing -Validation testing - System testing - The art of Debugging.

## REFERENCE BOOKS:

1. *Boris Beizer*, 2003, **Software testing techniques**, Dreamtech Press, Second Edition.
2. *Myers and Glenford.J.*, 1979, **The Art of Software Testing**, John Wiley & Sons.
3. *Roger.S.Pressman*, 2001, **Software Engineering - A Practitioner's Approach** ,Mc-Graw Hill, Fifth edition.
4. *Marnie.L. Hutcheson*, 2007, **Software Testing Fundamentals**, Wiley-India.

<b>15PCS33P</b>	<b>LAB III: WEB PROGRAMMING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 5**

### **OBJECTIVES:**

The subject aims to build the concepts regarding

1. To learn and enhance skills in VB.net and ASP.net Language.
2. To Learn and develop skills in eb Applications using ASP.
3. To Learn and develop skills in application design using VB.net.

### **List of Programs**

1. Creating a VB.Net Program list out Data types & Functions.
2. Preparing a VB.Net program to implementing Student Mark list.
3. Preparing a VB.Net Program to create Login form using ADODB with SQL server
4. Preparing a VB.Net program to System Date & Time using Calendar functions ().
5. Constructing a ASP.Net Program using Radio Button Controls
6. Constructing Asp.Net Program to Find the Values using Range-Validator.
7. Constructing Asp.Net Program to compare two values using Compare-Validator.
8. Constructing Asp.Net Program to create a Credit Card Type using Required Field Validator.
9. Create Web site Applications to create Registration form using SQL Server Database Connectivity.
10. Constructing a Asp.Net Server Side script using Application object & Server object.
11. Constructing Asp.Net program using select a city using Drop-down List.
12. Constructing Asp.Net program develop a college websites using WPF Applications.
13. Write Asp.Net program using Ad Rotator Controls.

<b>15PCS33Q</b>	<b>LAB IV: SOFTWARE TESTING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 3**

### **OBJECTIVES:**

The subject aims to build the concepts regarding

1. To learn and developing test cases.
2. To learn and development of test case programs.
3. To learn and explore to various test case tools.

### **List of Programs**

1. Testing Flight Reservation Project using Win Runner Tool.
2. Testing Calculator application using Win Runner Tool.
3. Testing notepad application using Win Runner Tool.
4. Create a login screen using VB and test it using Win Runner tool.
5. Constructing a VB program to display the day in a week and test it using Win Runner tool.
6. Constructing a VB program to display the student information and test it using Win Runner tool.
7. Constructing a VB program to create a notepad and test t using Win Runner Tool.
8. Constructing a VB program to implement database connectivity and test it using Win Runner tool.
9. Experiment: Study of Any Bug Tracking Tool (Bugzilla, Bugbit)
10. Experiment: Study of any open source testing tool (Test Link)

<b>15PCS2EA</b>	<b>ELECTIVE I - ANDROID TECHNOLOGY</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To study about the android architecture and the tools for developing android application.
2. To create an android application.
3. To learn about how to handle and share android data.

### **CONTENTS**

#### **UNIT I - Introduction**

Android - Android Versions - Features of Android - Architecture of Android - Obtaining the Required Tools - Android SDK - Installing the Android SDK Tools - Configuring the Android SDK Manager - Eclipse - Android Development Tools (ADT) - Creating Android Virtual Devices (AVDs) - Creating Your First Android Application - Types of Android Application - Anatomy of an Android Application.

#### **UNIT II- Activities, Fragments and Intents**

Understanding Activities - Creating Activities - Linking Activities Using Intents - Resolving Intent Filter Collision - Returning Results from an Intent - Passing Data Using an Intent Object - Fragments - Adding Fragments Dynamically - Life Cycle of a Fragment - Interactions between Fragments - Calling Built-In Applications Using Intents - Understanding the Intent Object - Using Intent Filters - Adding Categories - Displaying Notifications.

#### **UNIT III-Android User Interface**

Understanding the Components of a Screen - Adapting to Display Orientation - Managing Changes to Screen Orientation - Utilizing the Action Bar - Creating the User Interface Programmatically - Listening for UI Notifications - Designing Your User Interface With Views - Using

Basic Views - Using Picker Views - Using List Views to Display Long Lists - Understanding Specialized Fragments - Displaying Pictures And Menus With Views - Using Image Views to Display Pictures - Using Menus with Views - Additional Views.

#### **UNIT IV-Databases, Content Providers and Messaging**

Saving and Loading User Preferences - Persisting Data to Files - Creating and Using Databases - Content Providers - Sharing Data in Android - Using a Content Provider - Creating Your Own Content Providers - Using the Content Provider - Messaging - SMS Messaging - Sending E-mail.

#### **UNIT V- Location Based Services, Networking and Android Services**

Location-Based Services - Displaying Maps - Getting Location Data - Monitoring a Location - Project – Building a Location Tracker - Networking - Consuming Web Services Using HTTP - Consuming JSON Services - Sockets Programming - Developing Android Services - Creating Your Own Services - Establishing Communication between a Service and an Activity - Binding Activities to Services - Understanding Threading - Publishing Android Applications - Preparing for Publishing - Deploying APK Files

#### **TEXT BOOKS:**

1. *Wei - Meng Le*, 2012, “**Beginning Android 4 Application Development**”, John Wiley & Sons Inc.
2. *Reto Meier*, 2012, “**Professional Android 4 Application Development**”, John Wiley & Sons Inc.

#### **REFERENCES BOOKS:**

1. *Zigurd Mednieks, Laird Dornin, Blake Meike G, and Masumi Nakamura*, 2001 “**Programming Android**”, O’Reilly books.

<b>15PCS2EB</b>	<b>ELECTIVE I - NEURAL NETWORK AND FUZZY LOGIC</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Understood the fundamentals of neural networks.
2. Understood the fundamentals of Back propagation networks.
3. Gained knowledge in Fuzzy systems.

### **CONTENTS**

#### **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 – ART1-ART2-Applications.

#### **UNIT- IV**

Fuzzy Set Theory: Fuzzy versus crisp-Crisp sets –Fuzzy sets –Crisp relations – Fuzzy relations.



## UNIT -V

Fuzzy Systems: Crisp logic -Predicate logic -Fuzzy logic -Fuzzy rule based system-Defuzzification Methods.

### REFERENCE BOOKS:

1. *S.Rajasekaran, G.A.Vijayalakshmi Pai*, 2003, "**Neural Networks, Fuzzy logic, and Genetic Algorithms Synthesis and Applications**", PHI.
2. *James A. Freeman, David M.Skapura*, 2008, "**Neural Networks, Algorithms, Applications, and Programming Techniques**", Pearson Education, Third Impression.
3. *Fredric M. Ham, and Ivica Kostanic*, 2001 "**Principles of Neurocomputing for science of Engineering**", Illustrated Edition, McGraw Hill.
4. *Simon Haykin*, 1999, "**Neural Networks-a comprehensive foundation**", Second Edition, Prentice Hall.

<b>15PCS2EC</b>	<b>ELECTIVE I - MULTIMEDIA AND ITS APPLICATIONS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Develop your knowledge and understanding of multimedia concepts.
2. Principles of Multimedia Systems. Build up your capacity to evaluate different techniques.
3. Creating multimedia applications. Develop your competence in analysing multimedia systems.

### **CONTENTS**

#### **UNIT- I**

What is Multimedia - Introduction to making Multimedia - Macintosh and Windows Production platforms - Basic Software tools.

#### **UNIT- II**

Making Instant Multimedia - Multimedia authoring tools - Multimedia building blocks - Text - Sound.

#### **UNIT -III**

Images - Animation - Video.

#### **UNIT -IV**

Multimedia and the Internet - The Internet and how it works - Tools for World Wide Web - Designing for the World Wide Web.

#### **UNIT -V**

High Definition Television and Desktop Computing - Knowledge based Multimedia systems.

**REFERENCE BOOKS:**

1. *Tay Vaughan*, "**Multimedia making it work**", Fifth Edition, Tata McGraw Hill.
2. *John F. Koegel Bufford*, "**Multimedia Systems**", Pearson Education.
3. *Judith Jeffloate*, 2007, **Multimedia in Practice Technology and Applications**, Pearson Education, Second Impression

<b>15PCS2ED</b>	<b>ELECTIVE I - BIG DATA ANALYTICS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. This paper focuses on big data handling concepts, R Programming.
2. Map Reduce and Hadoop based analytics.

**CONTENTS**

**UNIT- I**

Importance of Big Data: A Flood of Mythic “Start-Up” Proportions- A convergence of KeyTrends- A Wider Variety of Data - The Expanding Universe of Unstructured Data. IndustryExamples of Data: Digital Marketing and the Non - line World - Database Marketers, Pioneersof Big Data - Big Data and the New School of Marketing.

**UNIT- II**

Installing R - Installing RStudio - Understanding the features of R language - Using R packages -Performing data operations - Increasing community support - Performing data modeling in R

**UNIT -III**

Installing Hadoop - Understanding different Hadoop modes - Understanding Hadoop installationsteps - Installing Hadoop on Linux, Ubuntu flavor (single node cluster) - Installing Hadoop onLinux, Ubuntu flavor (multinode cluster) - Installing Cloudera Hadoop on Ubuntu

**UNIT- IV**

Understanding Hadoop features - Understanding HDFS - Understanding the characteristics of HDFS - Understanding MapReduce -Learning the HDFS and MapReduce architecture

## UNIT- V

Understanding the HDFS architecture - Understanding HDFS components - Understanding the MapReduce architecture - Understanding MapReduce components - Understanding the HDFS and MapReduce architecture by plot - Understanding Hadoop subprojects

### REFERENCE BOOKS:

1. *Michael Minelli , Michele Chambers , Ambiga Dhiraj*, 2014, “ **BIG DATA BIG ANALYTICS** ”, Wiley Publications, Indian Reprint
2. *Vignesh Prajapathi*, 2013 ,”**Big Data Analytics with R and Hadoop**, PACKT Publishing.

<b>15PCS3EA</b>	<b>ELECTIVE II - INFORMATION SECURITY</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. Symmetric key and public key cryptography, steganography, data integrity and biometric are also discussed.
2. To provide students with basic concepts in information system and the benefits with these systems in modern society.
  - a) To differentiate between data, information, and knowledge.

### **CONTENTS**

#### **UNIT- I**

Overview: Cryptography- Information Security and attacks- Encryption- Decryption-Steganography- Hash functions- Key- Smart card- Biometric Security- Security Standards- E-voting- Virus-Web- Security Policy- Encryption methods.

#### **UNIT- II**

Confidentiality: Cipher model - Attacks - Block Vs Stream Cipher - Stream Ciphers - Criteria - Modes of operation- Cascades- DES-AES. Information Hiding: Steganography.

#### **UNIT- III**

Public Key: Basic Principles - Chinese Remainder Theorem - RSA key - Factorization Problem - Logarithm Problem - Knapsack Key - Probabilistic key - Elliptic Curve and Quantum Cryptographic.

#### **UNIT- IV**

Data Integrity: Introduction-Preventing Unauthorized manipulation- Hash Functions- Properties- Birthday Attack- Design issues- Cryptanalysis - Attacks - Hashing Algorithms - Authentication.

## **UNIT- V**

Biometric: Features- Applications- Systems- Face, Finger print and Iris recognition- Voice-DNA-Multimodal Biometric system. Virus and Malware.

### **TEXT BOOKS:**

1. *Dhiren R.Patel*, 2008, **Information Security Theory and Practice**, Prentice-Hall.

<b>15PCS3EB</b>	<b>ELECTIVE II - EMBEDDED SYSTEMS</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

On Successful completion of the course the students should have:

1. To learn and understand the Instruction Set and Programming.
2. To learn and understand embedded software Development.
3. To learn and understand the principles of RTOS.

**CONTENTS**

**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.

### REFERENCE BOOKS:

1. David.E.Simon, 2001, **An Embedded Software Primer**, Pearson Education.
2. Kenneth J Ayala, **The 8051 Microcontroller and Architecture programming and application**, Second Edition, Penram International.

<b>15PCS3EC</b>	<b>ELECTIVE II - ENTERPRISE RESOURCE PLANNING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per Week: 4**

### **OBJECTIVES:**

The subject aims to build the concepts regarding:

1. To learn and understand to Improve Service Experience.
2. To learn and Understand Automate Business Solutions.
3. To learn Modernize Business Processes and Systems.

### **CONTENTS**

#### **UNIT - I**

Introduction to ERP: Evolution of ERP – What is ERP? – Characteristics of ERP – Features of ERP- Need for ERP- Benefits of ERP – Enterprise – an Overview – ERP and related Technologies

Business Process Reengineering – Management Information System – Decision Support System – Executive Information System – Data Warehousing – Data Mining – On-line Analytical Processing(OLAP) – Supply Chain Management.

#### **UNIT - II**

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

#### **UNIT - III**

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

#### **UNIT - IV**

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

#### **UNIT - V**

ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure Factors, Integrating ERP into organizational culture. Using ERP tool: either SAP or ORACLE format to case study. ERP Resources on the Internet - ERP Case studies

#### **TEXT BOOKS:**

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

#### **REFERENCE BOOKS:**

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

15PCS3ED	<b>ELECTIVE II - SOCIAL NETWORKS AND THE SEMANTIC WEB</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn and understand to Improve Social network.
2. To learn and understand ontological representation.
3. To learn Modernize analysis on web

**CONTENTS**

**UNIT- I**

The Semantic web: Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web Social Network Analysis: What is network analysis?, Development of Social Network Analysis, Key concepts and measures in network analysis.

**UNIT- II**

Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks. Knowledge Representation on the Semantic Web: Ontologies and their role in the Semantic Web, Ontology languages for the semantic Web.

**UNIT- III**

Modelling and Aggregating Social Network Data: State of the art in network data representation, Ontological representation of Social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

**UNIT- IV**

Developing social semantic applications: Building Semantic Web applications with social network features, Flink- the social networks of the Semantic Web community, Open academia: distributed, semantic-based publication management.

## UNIT- V

Evaluation of Web-Based Social Network Extraction: Differences between survey methods and electronic data extraction, context of the empirical study, Data collection, Preparing the data, Optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.

The Perfect Storm: Looking back-the story of Katrina People Finder, Looking ahead-a Second Life.

### TEXT BOOKS:

1. Peter Mika, "Social Networks and the Semantic Web", Springer International Edition.



**BoS Chairman/HoD**  
**Department of Computer Science**  
**Dr. N. G. P. Arts and Science College**  
**Coimbatore – 641 048**



**Dr. P. R. MUTHUSWAMY**  
**PRINCIPAL**  
**Dr. NGP Arts and Science College**  
**Dr. NGP - Kalapatti Road**  
**Coimbatore - 641 048**  
**Tamilnadu, India**