

## **MASTER OF 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.

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

Subject Code	Subject	Instruction Hours	EXAMINATIONS				
			Dur Hrs	CA	CE	Total	Credit
<b>SEMESTER I</b>							
16PCS13A	Core- I :Real Time Operating System	4	3	25	75	100	4
16PCS13B	Core- II : Advanced Java Programming	4	3	25	75	100	4
16PCS13C	Core -III : Advanced Relational Database Management System	4	3	25	75	100	4
16PCS13D	Core-IV: Advanced Computer Architecture	4	3	25	75	100	4
16PCS13P	Core Practical -I : Real Time Operating System	5	3	40	60	100	4
16PCS13Q	Core Practical-II : Advanced Java Programming	5	3	40	60	100	4
	Elective- I :	4	3	25	75	100	4
						<b>700</b>	<b>28</b>
<b>SEMESTER II</b>							
16PCS23A	Core-V : Design and Analysis of Algorithms	4	3	25	75	100	4
16PCS23B	Core -VI : Internet Programming	4	3	25	75	100	4
15PCS23A/ 16PCS23C	Core-VII : Data Mining and Data warehousing	4	3	25	75	100	4
16PCS23D	Core- VIII : Network Security	4	3	25	75	100	4
16PCS23P	Core Practical- III : Algorithms	5	3	40	60	100	4
16PCS23Q	Core Practical-IV: Internet Programming	5	3	40	60	100	4
16PCS23V	Core Project-I	-	3	20	30	50	2
	Elective- II:	4	3	25	75	100	4
						<b>750</b>	<b>30</b>
<b>SEMESTER III</b>							
16PCS33A	Core- IX : Open Source Technology	4	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

16PCS33B	Core- X : Digital Image Processing	4	3	25	75	100	4
16PCS33C	Core- XI : Big Data Analytics	4	3	25	75	100	4
16PCS33D	Core- XII : Cyber Security	4	3	25	75	100	4
16PCS33P	Core Practical-V: Open Source Technology	5	3	40	60	100	4
16PCS33Q	Core Practical -VI : MATLAB	5	3	40	60	100	4
	Elective- III:	4	3	25	75	100	4
						<b>700</b>	<b>28</b>
<b>SEMESTER IV</b>							
16PCS43V	Core Project-II			40	60	100	4
						<b>100</b>	<b>4</b>
<b>Total</b>						<b>2250</b>	<b>90</b>

**ELECTIVE -I**

(Student shall select any one of the following subject as Elective-I in First semester)

S.No	Subject Code	Name of the Subject
1.	16PCS1EA	Internet of Things
2.	16PCS1EB	Object Oriented Analysis and Design
3.	16PCS1EC	Advanced Software Engineering

**ELECTIVE- II**

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

<b>S.No</b>	<b>Subject Code</b>	<b>Name of the Subject</b>
1.	16PCS2EA	Software Testing
2.	16PCS2EB	Principles of Programming Languages
3.	16PCS2EC	Artificial Intelligence and Expert Systems

**ELECTIVE- III**

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

<b>S.No</b>	<b>Subject Code</b>	<b>Name of the Subject</b>
1.	16PCS3EA	Mobile Computing
2.	16PCS3EB	Soft Computing
3.	16PCS3EC	Human Computer Interaction

**Earning Extra credits is not mandatory for course completion****Extra credits**

<b>Part</b>	<b>Subject</b>	<b>Credit</b>	<b>Total credits</b>
	Publication with ISSN Journal	1	<b>1</b>
	Hindi /Other Foreign language	1	<b>1</b>
	Paper Presented in Sponsored National/ International	1	<b>1</b>
	Online Courses Prescribed By Department / Self study paper	1	<b>1</b>
	Representation - Academic/Sports /Social Activities/ Extra Curricular Activities at University/	1	<b>1</b>
	<b>Total</b>	5	<b>5</b>

**Rules:**

The students can earn extra credits only if they complete the above during the course period (I to III semester) and based on the following criteria. Proof of Completion must be submitted in the office of the Controller of Examinations before the commencement of the IV Semester. (Earning Extra credits are not mandatory for Course completion)

1. Publication with ISSN Journal by a student and co-authored by staff member will be given one credit extra.
2. Student can opt Hindi/ French/ Other foreign Language approved by certified Institutions to earn one credit. The certificate (Hindi) must be obtained from **Dakshina Bharat Hindi Prachar Sabha** and He/ she has to enroll and complete during their course period ( **first to third semester**)

3. Award winners in Paper Presentation in Sponsored International Seminar/conference/Participation in short term workshop (minimum 5 days) will be given one credit extra.
4. Student can earn one credit, if they complete any one Online certification courses / Self study paper prescribed by the concerned department.

**Self study paper offered by the PG and Research Department of Computer Science**

S. No.	Semester	Subject Code	Subject Title
1.	I to III	16PCSSS1	M -Commerce
2.		16PCSSS2	Management Information System

5. Award Winners in /Social Activities/ Extra Curricular /Co-Curricular Activities / Representation in Sports at University/ District/ State/ National/ International level can earn one extra credit.
6. Earning Extra credits is not mandatory for course completion

16PCS13A	<b>CORE- I : REAL TIME OPERATING SYSTEM</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn the basic concepts of RTOS
2. To Learn about scheduling, Deadlocks, allocation and the concepts of RTOS

**CONTENTS**

**UNIT-I**

Introduction-Mutual Exclusion, Thread Synchronization & Scheduling: Mutex implementation in SROS -Interrupts handling in RTOS -Interrupt Handler in SROS -Creation of thread in RTOS & SROS -RTOS & SROS Initialization and starting -Semaphore-Mailbox

**UNIT-II**

Timer Support: Need for Timer Support -Timer Support Implementation in RTOS & SROS-Priority Inversions: Bounded & Unbounded Priority Inversion

**UNIT-III**

Deadlocks: Simple Examples -Resource Allocation Graph-Necessary Conditions for Deadlocks -Dealing with Deadlocks

**UNIT-IV**

Schedulability of a real-time Application: Basic Rate Monotonic Analysis - Extended Rate Monotonic Analysis.

**UNIT-V**

Other Components of RTOS: I/O Sub System -Network Stack -File System.

**TEXT BOOK:**

1. *Chowdary Venkateswara Penumuchu, "Simple Real-time Operating System: A Kernel Inside View for a Beginner" --Trafford Publishing, 2007.Chapters (1, 2, 3, 4, 5, 6 and 7)*

**REFERENCE BOOKS:**

1. *Khawar M. Zuberi*, "**Real-time operating system services for networked embedded systems**", University of Michigan, 1998.
2. Hephaestus Books, "**Articles on Real-Time Operating Systems, Including: Plan 9 from Bell Labs, Real-Time Operating System, Transaction Processing Facility, OS-9, Dnix, Rsx-11, Qnx, Rt-11, Symbian OS, Psos, Vxworks, Rdos, Versatile Real-Time Executive**", Hephaestus Books, 2011.
3. Books, LLC, General Books LLC, "**Real-Time Operating Systems: Real-Time Operating System, Os-9, Qnx, Rsx-11, Plan 9 from Bell Labs, Psos, Rt-11, Symbian**", General Books LLC, 2010.



<b>16PCS13B</b>	<b>CORE - II : ADVANCED JAVA PROGRAMMING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To focus on Graphical User Interface (GUI), multithreading.
2. To learn about networking, and Database manipulation.

**CONTENTS**

**UNIT - I**

Java Fundamentals-Data types -Operators -Control Statements-Classes and objects.

**UNIT - II**

Methods and Classes -Inheritance -Packages -Interfaces -Exceptional Handling.

**UNIT - III**

Collections-File and Streams -Networking -Event Handling -AWT: Windows, Controls, Layout Managers and Menus -Swing -JDBC.

**UNIT - IV**

Java Servlets: Design -Life Cycle-cookies -Session tracking-Java Server Pages: Overview -Implicit Objects -Scripting -Standard Actions-Directives.

**UNIT - V**

Remote Method Invocation: Remote Interface -Naming Class -RMI Security Manager Class -RMI Exceptions -Creating RMI Client and Server Classes.

**TEXT BOOKS:**

1. *Herbert Schildt*, "**The Complete Reference - JAVA 2**", Seventh Edition, 2006. Chapters: 1-10, 17, 19, 20, 22-24, 29, 31.
2. *Deitel & Deitel* , "**Java How to Program**" , Pearson Education ,Seventh Edition,2008. Chapters: 18,20,24,25

**REFERENCE BOOKS:**

1. *Muthu*, "**Programming with Java**", Vijay Nicole Imprints Private Ltd., 2004.
2. *Deitel H.M. & Deital P.J*, "**Java How to Program**", Prentice-Hall of India, Fifth Edition, 2003.
3. *Cay.S. Horstmann, Gary Cornel*, "**Core Java 2 - Vol. II- Advanced Features**", Pearson Education, 2004.
4. *Tom Valsky*, "**Enterprise JavaBeans - Developing component based Distributed Applications**", Pearson Education, 1999.

<b>16PCS13C</b>	<b>CORE - III : ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To understand the concepts, techniques, and applications of the database management technology.
2. To have the hands-on experience to use an existing database management system to develop a database application system.

**CONTENTS**

**UNIT - I**

Database system architectures: Centralized systems – Client/Server systems – Parallel and Distributed systems. Advanced Querying and Information Retrieval: Decision-support systems – Data mining – Data warehousing – Information Retrieval system: Relevance ranking using Terms – Relevance using Hyperlinks – Directories.

**UNIT - II**

Storage and File Structure: File Organization – Organization of Records in Files – Data Dictionary storage – Database Buffer. Indexing and Hashing: Basic concepts - Ordered Indices- Static Hashing - Dynamic Hashing.

**UNIT - III**

Transactions: Concept – A simple Transaction Model – Storage structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability – Transaction Isolation and Atomicity. Recovery System: Failure Classification – Storage - Recovery and Atomicity Recovery Algorithm – Buffer Management – Failure with loss of Non-volatile storage.

**UNIT - IV**

Parallel Databases: I/O Parallelism – Interquery Parallelism – Intraquery Parallelism – Interoperation Parallelism– Design of Parallel Systems. Distributed Databases: Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency control in Distributed Database – Availability – Distributed Query Processing

## **UNIT - V**

Advanced Application Development: Performance Tuning, Advanced Transaction Processing: Transaction Processing Monitors - Transactional Workflows - Main Memory Databases - Real-time Transaction System - Long-Duration Transactions.

### **TEXT BOOK:**

1. *Abraham Silberchatz, Henry F.Korth, S.Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill. (Unit I - Unit V), 2011.*

### **REFERENCE BOOK:**

1. *Kevin Loney, George Koch, "ORACLE 9i-The Complete Reference", Tata McGraw Hill, 2008.*

16PCS13D	<b>CORE- IV : ADVANCED COMPUTER ARCHITECTURE</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn about major components of Advanced Computer Architecture.
2. To learn about parallel processing, solving problems in parallel and SIMD processors, SIMD arrays.

**CONTENTS**

**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 Iliac – 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”,* MGH, [Unit I, III, IV], 1985.
2. *Rajaraman.V, C. Siva Ram Murthy,. Parallel Computers Architectures and Programming,* [Third Edition], PHI, [Unit II, V], 2004.

#### **REFERENCE BOOKS:**

1. *Kai Hwang, “Advanced Computer Architecture – Parallelism, Scalability, Programmability”,* Tata McGraw Hill, 2011.
2. *Michael J. Quinn, “ Parallel Computing Theory and Practice”,* [Second Edition], TMH, 2009.

<b>16PCS13P</b>	<b>CORE PRACTICAL - I: REAL TIME OPERATING SYSTEM</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To demonstrate the process, memory, file and directory management issues under the UNIX/ LINUX operating system
2. To introduce LINUX basic commands , simple programs in LINUX and administrative task of LINUX

**LAB LIST**

1. Scheduling
2. Interrupt Handling
3. Priority Handling
4. Resource Allocation
5. Deadlock Prevention
6. Deadlock Avoidance
7. Semaphores
8. File System

<b>16PCS13Q</b>	<b>CORE PRACTICAL - II : ADVANCED JAVA PROGRAMMING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To learn and development of Programs using JAVA Language.
2. To Learn and Implement Servelets, JDBC and RMI Concepts.

**LAB LIST**

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



16PCS23A	<b>CORE - V : DESIGN AND ANALYSIS OF ALGORITHMS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn the various design and analysis of the algorithms
2. 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 – Finding the maximum and Minimum- Merge Sort-Quick sort- Strassen’s Matrix Multiplication.

**UNIT- III**

Greedy Method: General Method-Knapsack problem-Tree vertex splitting-Job sequencing with deadlines-Minimum Cost Spanning Trees- Prim’s Algorithm-Kruskal’s Algorithm-Single Source shortest paths.

**UNIT- IV**

Dynamic Programming: General Method-Multistage graph-All pair shortest path-Optimal Binary search Trees-0/1 Knapsack -Traveling sales person problem-Flow Shop Scheduling.

**UNIT- V**

Backtracking: General Method, 8- Queen’s problem-Sum of Subsets-Graph Coloring-Hamilton cycles-Knapsack problem. Branch and Bound: The method-0/1 Knapsack problem-Traveling salesmen problem.

**TEXT BOOKS:**

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran “**Fundamentals of Computer Algorithms**”, Second Edition, University Press, 2013.

**REFERENCE BOOKS:**

1. Jean-Paul Trembley, Paul.G.Sorenson, “**Introduction to Data structures with Applications**”, Tata McGraw Hill, and Second Edition, 2010.

<b>16PCS23B</b>	<b>CORE - VI : INTERNET PROGRAMMING</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To Learn the Basics of XHTML and CSS and their implementation.
2. To Focus on the Concepts of JavaScript, ASP and Ajax

### **CONTENTS**

#### **UNIT- I**

Introduction to computers and the Internet: history of the World Wide Web – Hardware trends –software trends –Web Resources. Introduction to XHTML: Introduction –markup language –editing XHTML –common tags –headers –text styling–linking–images–special characters–tables–forms–CSS–inline styles–embedded style sheets –linking external style sheets–backgrounds–user style sheets.

#### **UNIT- II**

Java Script –Introduction to scripting–simple program –obtaining user input with prompt dialogs–decision making–Java script control structures: If, if / else selection structure while, for do/while repetition structure –Logical Operators–Java Script Functions: Introduction –Program Modules in Java Script –Functions –Scope Rules –Recursion –Recursion Vs Iteration –Java Script Global Functions.

#### **UNIT- III**

Java Script Arrays: Introduction –Arrays –Declaring and Allocating Arrays –Reference Parameters –Passing Arrays to functions –Sorting Arrays –searching Arrays –Multiple Subscripted Arrays–Java Script Objects: Introduction –Math String, Data, Boolean and Number Objects–JavaScript events :Registering event handler–event onload –Event on mouse move, the event object and this–Form processing with onfocus and onblur–more events.

#### **UNIT- IV**

XML and RSS: Introduction –XML Basics–Structuring data–XML Namespaces–Document Type definitions –XML Schema documents–XML Vocabularies –MathML –Other markup Languages–Extensible style sheet Language and XSL Transformations–Document Object Model–RSS Web Resources.

## UNIT- V

Ajax Enabled Rich Internet Applications-Introduction -Traditional web applications vs Ajax applications -RIAs with Ajax-history of Ajax-Raw Ajax Example -Creating a full scale Ajax Enabled application-Active Server Pages (ASP): Introduction -How ASP Work -Client -Side Scripting Versus Server Side Scripting -Web Server -Activex Components -File System Objects Session Tracking and cookies -Accessing a Database form an ASP.

### TEXT BOOKS:

1. *Deitel, Deitel, Nieto*, "**Internet and World Wide Web - How to program**", Fourth Edition-Pearson Education Asia, 2011.
2. *Thomas A. Powell*, "**The Complete Reference HTML and XHTML**", fourth Edition, Tata McGraw Hill Pub.

### REFERENCE BOOKS:

1. *Ralph Bravaco, Shai Simonson*, "**Java Programming : From the Ground Up**", Tata McGraw Hill Edition, 2012
2. *John Dean, Raymond Dean*, "**Introduction to Programming with JAVA - A Problem Solving Approach**", Tata Mc Graw Hill, 2012

<b>15PCS23A/ 16PCS23C</b>	<b>CORE - VII : DATA MINING AND DATA WARHOUSING</b>	<b>SEMESTER - II</b>
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**Total Credits: 4  
Hours Per week: 4**

**OBJECTIVES:**

1. To provide fundamental knowledge about data mining and data mining techniques
2. Can have sound knowledge about data mining tool

**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: an 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.

### TEXT BOOKS:

1. *Margaret H. Dunham*, "**Data Mining Introductory and Advanced Topics**", Pearson education, 2006, (Unit I to III).
2. *C.S.R. Prabhu*, "**Data Warehousing- Concepts, Techniques, Products and Applications**", PHI, Second Edition. (Unit IV & V).

### REFERENCE BOOKS:

1. *Aler Berson, Stephen J. Smith*, "**Data Warehousing, Data Mining, & OLAP**", TMCH, 2001.
2. *Arun K.Pujari*, "**Data Mining Techniques**", Universities Press (India) Pvt. Ltd., 2003.

<b>16PCS23D</b>	<b>CORE- VIII : NETWORK SECURITY</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To know the concepts and trends in Network security
2. To understand the Working of Different Security Algorithms.

**CONTENTS**

**UNIT- I**

Need for Network Security -Security Approaches -Principles of Security - Types of Attacks - Cryptography concepts & Techniques: Plain text & Cipher text -Substitution Techniques -Transposition Techniques -Encryption & Decryption -Symmetric & Asymmetric key cryptography -Steganography

**UNIT- II**

Symmetric key algorithms: Algorithm types & modes -Overview of Symmetric key Cryptography -Data Encryption Standard

**UNIT- III**

IDEA -RC5 -Advanced Encryption Standard Overview and History of symmetric key Cryptography -RSA algorithm -Digital Signatures -Knapsack Algorithm

**UNIT -IV**

Digital Certificates -Private Key management Internet Security Protocols: Basic concepts -SSL -TLS-SHTTP

**UNIT- V**

TSP -SET -Electronic money -Email Security -WAP Security - Security in 3G- Security in GSM-User authentication & Kerberos: Authentication basics - Passwords -Authentication Tokens -Certificate based authentication - Biometric authentication -Kerberos

**TEXT BOOK:**

1. *Atul Kahate*, "**Cryptography & Network Security**", TMH Second Edition, 2008.

**REFERENCES BOOKS:**

1. *William Stallings*, "**Cryptography & Network Security Principles of Practices**", PHI 4thEdition, 2006.
2. *Forouzan*, "**Cryptography & Network Security**", TMH, Special Indian Edition, 2007.



<b>16PCS23P</b>	<b>CORE PRACTICAL - III : ALGORITHMS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To implement and solve problems using various algorithm design methods.
2. To learn to do analysis of different Algorithm design methods.

**LAB LIST**

1. Graph and Tree traversals.
2. Divide and Conquer technique to arrange a set of numbers using merge sort.
3. Strassen's matrix multiplication using Divide and Conquer method.
4. Knapsack problem using greedy method.
5. Construct a minimum cost spanning tree using greedy method.
6. Construct optimal binary search trees using dynamic programming method
7. Traveling salesperson problem using dynamic programming approach.
8. Implement the 8-Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

16PCS23Q	<b>CORE PRACTICAL - IV : INTERNET PROGRAMMING</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To learn the concepts of website designing.
2. To learn client& server side programming and web services.

**LAB LIST**

1. Web page creation using XHTML.
  - i) To embed an image map in a web page.
  - ii) To fix the hot spots.
  - iii) Show all the related information when the hot spots are clicked.
2. Web page creation with all types of cascading style sheets.
3. Programs for Implementing JavaScript using Operators and Functions.
4. Programs for Implementing JavaScript using Arrays.
5. Programs using XML-schema-XSLT/XSL.
6. Programs using AJAX.
7. Programs for Implementing Client side and Server side Scripting in ASP.
8. Programs in java to create three-tier applications using ASP and Databases.
  - i) For conducting online examination.
  - ii) For displaying students mark list.

16PCS23V	CORE PROJECT- I	SEMESTER - II
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**Total Credits: 2**  
**Hours Per week: -**

**OBJECTIVES:**

1. Enable to enhance their skills for software development.

**PROJECT AND VIVA VOCE:**

**MINI PROJECT:**

Each Student in the M.Sc CS First Year must compulsorily undergo Project work in the 2<sup>nd</sup> SEMESTER. Projects shall be done on Individual Basis. The Project Coordinator will allocate the project title and the Guide for each student. The Project Work Should be done Inside the College. Three Project Reviews will be conducted in which the Progress of Project work will be strictly evaluated by Respective Project Guide and Project Coordinator. Viva Voce will be conducted only in the presence of Industrialists or Academicians. In the total of 50 Marks, 40% of marks are allocated for CA and 60% for CE Viva Voce.

**Following guidelines are hereby enlisted for all the students based on the necessity and importance of the project**

**Basic framework**

The stages in Project Work are given below:

- The student has to select a project in a related field of Computer Science / Information Technology.
- Students can opt various types of organizations for their major project. But before the training actually starts, profile of the organization must be submitted for evaluating the various parameters of the company like *Turnover of the organization, No. of employees and Location of the organization(Major Project Only)*

- After obtaining the approval from project guide, the student has to carry out the project work.

Student has to maintain the **project work diary**. The Project Work carried out should be in accordance with the approved project proposal

- All communication must be in writing. No verbal communication will be accepted.
- Student should adhere to the timings for submission of various reports as mentioned in the guidelines. No excuse will be entertained in any case.
- Student should prepare a Project Report at the end of his/her work, which his /her supervisor would certify and approve for submission (the Project Report should conform to the Standard Format laid down for Project Report).
- The student should submit the Project Report to the college.

#### **Guide for the Project:**

- Project guide will be allotted by the department to each student
- Each student will be working under a Project Guide for the project to be done.
- Student must report to his/her project guide regularly.

The student can also have a guide who could be the person under whose supervision the student is doing the project in the industry

#### **Selection of Project:**

- The selection of the project can be done in consultation with the project guide.
- Group of the students are not allowed to do a single project at a time.

It is possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project

### **Submission of project report.**

- The student will submit his/her project report in the prescribed format.
- Project Report will be submitted in triplicate (Hard Bound Copies) with the proper certification by the organization concerned in the specified format and color. None of copies of the project report will be returned to the student.
- The project reports along with a CD should be submitted to the HoD/Supervisor / Controller of examinations twenty days prior to the final semester examination.

A certificate from the supervisor should also be enclosed in the Project Report as provided in the format for project report.

### **Fields for Project:**

- **GUI Tools (Front End)** - Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000, VC++, Jbuilder
- **RDBMS(Back End)** - Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
- **Languages** - C, C++, Java, VC++, C#
- **Scripting Languages** - PERL, SHELL Scripts (Unix), Tcl/TK, PHP
- **.NET Platform** - Dyalog APL, VB.Net, C#.Net, Visual C#.Net, Net, ASP.Net, Delphi
- **Middle Ware (Component) Technologies** - COM/DCOM, Active-X, EJB, WINCE, MSMQ, BEA, Message Q, MTS, CICS
- **Unix Internals** - Device Drivers, RPC, Threads, Socket programming
- **Architectural Concepts** - CORBA, TUXEDO, MQ SERIES
- **Internet Technologies** - DHTML, Java script, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Servlets, Visual Age for JAVA, UML, VRML, WML,

Vignette, EDA, Broad vision, Ariba, iPlanet, ATG, Big Talk, CSS, XSL, Oracle ASP server, AWT, J2EE, LDAP, ColdFusion, Haskell 98

- **Wireless Technologies** - Blue Tooth, 3G, ISDN, EDGE
- **Real time Operating System/ Embedded Skills** - QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus
- **Operating Systems** - WINDOWS 2000/ME, WINDOWS NT, WINDOWS XP, UNIX, LINUX, IRIX, SUN SOLARIS, HP/UX, PSOS, VxWorks, AS400, AIX, DOS
- **Application Areas** - Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking- Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

**NOTE:**

- i. **Projects should not be developed using the packages like Dbase III Dbase IV, FoxPro, Visual FoxPro, CYBASE and MS-Access. Also, projects should not be developed using the combination of Visual Basic as the front end and MS-Access as the back end.**

Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies

**Phases of Training Period**

- At the time of Review – I, students should present Title, Synopsis/Abstract of the project and module description.
- Students should present the Mid Term Report at the time of Review – II.
- Students should present the Development and Testing Report at the time of Review – III.

- Students should submit the complete Project Report at the time of Model Viva-Voce./

The external Viva-Voce will be conducted for all the students.

**Formatting of Project:**

- The whole project report should be nicely composed and presented.
- The dimension of the project report should be in A4 size only.
- Page Specification : (Written paper and source code)

*Left margin - 3.0 cms/1.18 inches*

*Right margin- 2.0 cms/0.78 inches*

*Top margin 2.54 cms/1 inch*

*Bottom margin 2.54 cms/1 inch*

- The project report should be typed in good word processor and should avoid spellings and grammatical mistakes.
- The impression on the typed copies should be black in color.

**Normal Body Text: Font Size:** 12, Times New Roman, 1.5 lines Spacing, Justified.

**Paragraph Heading Font Size:** 14, Times New Roman, Left Aligned. 12 points above & below spacing

**Chapter Heading Font Size:** 16, Times New Roman, Centre Aligned, 30 points above and below spacing.

**Coding Font size:** 10, Courier New, Normal

- Students should use only one side of paper for printing.
- Page numbers - All text pages as well as Program source code listing should be numbered at the bottom center of the page.

**Cover Page** - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, month of submission etc.

**COLOR** - Cover Page Color is silver Gray

**Letter of Authentication** - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization where such Project have been implemented with certificate showing the student name, register number and project name.

**Certificate from Project Guide** - Certificate from the Project Guide certifying the project work done under his/her guidance along with course, student, and project details complete in all respects.

### **Draft of Project Report**

The size of the project report can be approximately **130 - 150** pages, which include the following details:

**Certificate of the project guide**

**Certificate of the Organization**

**Acknowledgement**

**Synopsis/ Abstract**

**Table of Contents**

#### **1 Introduction**

1.1 About Organization

1.2 Problem Definition

1.3 System Configuration

1.3.1 Hardware configuration

1.3.2 Software configuration

#### **2 System Study**

2.1 Existing System with limitations

2.2 Proposed System with objectives

2.3 Problem description

#### **3 System Design & Development**

3.1 System Flow Diagrams / Control Flow Diagrams



3.2 E-R Diagrams / Use Case Diagrams

3.3 Data Flow Diagram / Activity Diagrams

3.4 Input Design

3.5 File / Database Design

3.6 Output design (includes Report Design)

3.7 User Interface Design (if Needed)

#### **4 System Testing**

4.1. Unit Testing

4.2. Integration Testing

4.3. System Testing

#### **5. System Implementation and Maintenance**

5.1. System Security Measures

#### **6 .Conclusion**

6.1. Scope for Future Prospects

#### **Bibliography and Web References**

#### **Appendices**

Forms (input screen shots)

Sample Source Code

Output Screen shots

Reports

Sample Coding / Abstract Coding

- Along with it, if the student feels to add on any other topics as per the demand of the project or want to include the functionalities as per the SDLC(Software Development Life Cycle) or the Software Engineering model used, that can be done and included in the Project Report.

The project report must include all the components as per the SDLC. It is highly recommended to follow the approaches of Software Engineering methodology.

## Arrangement of Contents

- Cover Page & Title Page
- Bonafide Certificate
- Synopsis / Abstract
- Table of Contents
- Chapters
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Appendices
- References

The table and figures shall be introduced in the appropriate places

- **List of Symbols, Abbreviations and Nomenclature** – One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.
- **Chapters** – The chapters may be broadly divided into 3 parts. Introductory chapter, Chapters developing the main theme of the project work and Conclusion.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

- ❖ Each chapter should be given an appropriate title.
- ❖ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- ❖ Footnotes should be used sparingly. They should be typed with single space and placed directly underneath in the very same page, which refers to the material they annotate.

- **Appendices** – Appendices are provided to give supplementary information, which is included in the main text as they may serve as a distraction and cloud the central theme.
  - ❖ Appendices should be numbered using Arabic numerals.
  - ❖ Appendices, Tables and References appearing in appendices should be numbered and referred to an appropriate place just as in the case of chapters.
  - ❖ Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
- **List of References** – The listing of references should be typed 4 spaces below the heading “REFERENCES” in alphabetical order in single spacing and left justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

16PCS33A	<b>CORE - IX : OPEN SOURCE TECHNOLOGY</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn the overview of PHP and also it helps in understanding PHP as a powerful server-side scripting language for creating dynamic and interactive websites.
2. To gain knowledge on MySQL Programming

**CONTENTS**

**UNIT- I**

Creating PHP Pages Using PHP5 : Overview of PHP Structure and Syntax - Creating Your First Program -Using HTML to Spice Up Your Page - Using Constants and Variables to Add Functionality - Passing Variables between Page - Using if/else Arguments - Using Includes for Efficient Code -Using Functions for Efficient Code - Arrays - Alternate Syntax for PHP.

**UNIT- II**

Using PHP5 with MySQL: Overview of MySQL Structure and Syntax - How PHP Fits with MySQL -Connecting to the MySQL Server - Querying the Database. Using Tables to Display Data: Creating a Table -Populating the Table - Lasting Relationship.

**UNIT- III**

Form Elements: Letting the User Work with Data: First Form - User Input - Form Elements. Editing the Database: Inserting a Simple Record from PHP MyAdmin - Inserting a Record in a Relational Database -Deleting a Record - Editing Data in a Record.

**UNIT- IV**

Validating User Input: Incorporating Validation -Checking for Format Errors. Handling and Avoiding Errors: Error Handling in PHP- Error Types- Coding Practice - Breaking Code - Receiving Input from Users - Debugging PHP Script.

## UNIT- V

File and Directory Handling - Working with Files - Working with directories-  
Uploading Files

Case Study: Online Stores- Creating a Bulletin Board System - Online  
Examination.

### TEXT BOOKS:

1. Elizabeth Naramore et al, "**Beginning PHP5, Apache, MySQL Web Development**", Wiley dream tech publishing, 2006. (Unit I, II, III, IV, V)
2. Wankyu Choi, S.Allan Kent, Chris Lea, Ganesh Prasad, Chris "**Beginning PHP 4**" UllmanPress Ltd Publications, 2000 Edition (Unit IV,V)

### REFERENCE BOOK:

1. *W. Jason Gilmore*, "**Beginning PHP and MySQL From Novice to Professional**", Apress, Fourth Edition, 2010.

<b>16PCS33B</b>	<b>CORE - X : DIGITAL IMAGE PROCESSING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn the basics of image processing
2. To learn the features like Enhancement, Image Compression, Image Restoration and Image Segmentation.

**CONTENTS**

**UNIT - I**

Fundamentals of Digital Image Processing: Introduction – Steps in image processing – Building blocks digital Image processing systems. Digital Image Representation: Introduction – Digital Image Representation – Sampling and Quantization – Basic relationships between pixels.

**UNIT - II**

Image Enhancement: Introduction – Spatial domain and frequency domain approaches – Spatial Domain techniques – Spatial Filtering – Frequency domain – Grey level to colour transformation.

**UNIT - III**

Image Compression: Introduction – Coding redundancy – Inter – Pixel redundancy – Psycho – Visual Redundancy – Image Compression models – The source encoder and decoder – The Channel encoder and decoder – Information Theory – Classification – Huffman Coding – Lossy Compression technique – Threshold coding – Vector quantization – Image compression standard (JPEG).

**UNIT - IV**

Image Restoration: Introduction – Degradation model – Degradation model for continuous function – Discrete degradation model – Estimation degradation function – Estimation by experimentation – Estimation by modeling – Inverse filtering approach – Least Mean Square Filter – Interactive restoration – Constrained Least Squares Restoration.

## UNIT - V

Image Segmentation: Introduction-Detection and Isolated Points-Line Detection-Edge Detection- Edge Linking and Boundary Detection-Region Oriented Segmentation-Segmentation Using Threshold-Accumulative difference Image.

### TEXT BOOK:

1. *S. Annadurai, R. Shanmugalakshmi, "Fundamentals of Digital Image Processing"*, Pearson Education, 2007.

### REFERENCE BOOKS:

1. *Anil K. Jain, "Fundamentals of Digital Image Processing"*, Prentice Hall of India Pvt. Ltd, 2008.
2. *Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing using MATLAB"*, Second Edition, Prentice Hall, 2010.

<b>16PCS33C</b>	<b>CORE - XI : BIG DATA ANALYTICS</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. Overview about Big data and introduces the technology behind it.
2. Recent technologies available in the market dealing with big data.

### **CONTENTS**

#### **UNIT- I**

Big Data: Characteristics of Big Data- The volume of Data- the Variety- the Velocity of Data-Data in the Warehouse and Data in Hadoop. Why Data is Important? - When to consider a Big Data Solution- Big Data Use cases: Patterns for Big Data Deployment- IT for IT Log Analytics.

#### **UNIT- II**

Big Data: From the Technology Perspective-All about Hadoop: The Big Data Lingo Chapter-The history of Hadoop- Components of Hadoop- Application Development in Hadoop-Getting your data into Hadoop- Other Hadoop Components.

#### **UNIT- III**

Just Hadoop- Integrated Hadoop System- Analytical Databases with Hadoop Connectivity-Hadoop-Centered Companies. Big Data in the Cloud: IaaS and Private Clouds-Platform Solutions-Big Data Cloud platforms compared.

#### **UNIT- IV**

The No SQL Movement: Size, Response, Availability-Changing Data and Cheap Launches-The sacred Cows-other features. The Future of Big Data: More Powerful and expressive tools for Analysis- Streaming Data Processing- Rise of Data Marketplaces- Development of Data Science Workflows and Tools- Increased Understanding of and Demand for Visualization.

#### **UNIT- V**

Big Data Analytics in Banking Sector, Manufacturing, Telecommunication and E-commerce.



**TEXT BOOKS:**

1. *Chris Eaton, Dirk Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data, Analytics for Enterprise Class Hadoop and Streaming Data"*, Tata Mc Graw Hill,. Edition. (E-book) (Unit-I and II) (Refer e-book repository), 2012.
2. *O'Reilly Radar Team, "Planning for Big Data"*, (eBook) (Unit III and IV) (Refer eBook repository). 2012.

**REFERENCE BOOK:**

1. *David Iosifidis "Big Data Analytics, From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph"*, Morgan Kaufmann, First Edition, 2013.

<b>16PCS33D</b>	<b>CORE- XII : CYBER SECURITY</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To Learn the Basics of Cyber Security.
2. To Learn about the Cyber Security Management Issues.

### **CONTENTS**

#### **UNIT- I**

Introduction: Cyber Security–Cyber Security policy–Domain of Cyber Security Policy–Laws and Regulations –Enterprise Policy–Technology Operations–Technology Configuration–Strategy Versus Policy –Cyber Security Evolution–Productivity–Internet–E commerce–Counter Measures- Challenges.

#### **UNIT- II**

Cyber Security Objectives and Guidance: Cyber Security Metrics–Security Management Goals–Counting Vulnerabilities–Security Frameworks–E Commerce Systems–Industrial Control Systems–Personal Mobile Devices–Security Policy Objectives–Guidance for Decision Makers–Tone at the Top–Policy as a Project –Cyber Security Management–Arriving at Goals–Cyber Security Documentation–The Catalog Approach–Catalog Format–Cyber Security Policy Taxonomy.

#### **UNIT- III**

Cyber Security Policy Catalog: Cyber Governance Issues–Net Neutrality–Internet Names and Numbers–Copyright and Trademarks–Email and Messaging–Cyber User Issues–Malvertising–Impersonation–Appropriate Use–Cyber Crime–Geolocation–Privacy–Cyber Conflict Issues–Intellectual property Theft– Cyber Espionage–Cyber Sabotage–Cyber Welfare.

#### **UNIT- IV**

Cyber Management Issues: Fiduciary Responsibility–Risk Management–Professional Certification–Supply Chain – Security Principles

#### **UNIT- V**

Research and Development–Cyber Infrastructure Issue–Banking and finance–Health Care–Industrial Control Systems. Case Study: A Government’s Approach to Cyber Security Policy.

**TEXT BOOKS:**

1. *Jennifer L, Bayuk J, Heale P, Rohmeyer, Marcus Sachs, Jeffrey Schmidt and Joseph Weiss* "**Cyber Security Policy Guidebook**", John Wiley & Sons, 2012.

**REFERENCE BOOKS:**

1. *Rick Howard*, "**Cyber Security Essentials**", Auerbach Publications, 2011.

<b>16PCS33P</b>	<b>CORE PRACTICAL -V : OPEN SOURCE TECHNOLOGY</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To give the practical knowledge of PHP
2. To learn to implement rich internet applications using PHP

**LAB LIST**

1. Simple PHP program using variables and control structures
2. PHP loops and PHP Arrays
3. Passing variables between pages
4. Creating a table and inserting records to table in MySQL
5. Deleting and updating in MySQL table
6. Manipulating form elements through PHP
7. Connecting PHP to MySQL database
8. Viewing MySQL table data through PHP
9. Manipulating MySQL database through PHP
10. Validating user input through PHP

<b>16PCS33Q</b>	<b>CORE PRACTICAL -VI : MATLAB</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 5**

**OBJECTIVES:**

1. To learn to utilize MATLAB applications.
2. To learn to implement various operations like image Restoration, Noise Removal.

**LAB LIST**

1. Implement the spatial image enhancement functions on a bitmap image -Mirroring (Inversion)
2. Implement (a) Low Pass Filter (b) High Pass Filter
3. Implement Smoothing and Sharpening of an eight bit color image
4. Implement (a) Edge Detection (b) Line Detection
5. Display an image and its histogram
6. Perform shrinking, zooming and cropping of an image
7. Perform the experiment for histogram equalization.
8. Perform blurring and de-blurring on an image.
9. Removal of salt and pepper noise
10. Implement a function in MATLAB for image segmentation.

<b>16PCS1EA</b>	<b>ELECTIVE - I : INTERNET OF THINGS</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To Know about IoT concepts, IoT technologies, Creative thinking techniques, Co-creation techniques.
2. To focus on the possibilities offered by the different technologies, and the creative thinking techniques to find innovative applications of combinations of various technologies in real-life scenarios.

### **CONTENTS**

#### **UNIT- I**

Introduction to Internet of Things: Introduction-Physical Design of IoT-Logical Design of IoT-IoT Enabled Technologies-IoT Levels and Deployment Templates. **IoT and M2M:** Introduction-M2M-Difference between IoT and M2M-SDN and NFV for IoT.

#### **UNIT- II**

Domain Specific IoTs: Introduction-Home Automation-Cities-Environment-Energy-Retail-Logistics-Agriculture-Industry-Health and Lifestyle. IoT System Management: Need for IoT System Management-SNMP-Network Operator Requirements.

#### **UNIT- III**

IoT Platforms Design Methodology: Introduction-IoT Design Methodology-Case Study on IoT System for Weather Monitoring -Motivation for Using Python. IoT Systems-Logical Design using Python: Introduction- Installing Python-Python Data Types and Data Structures-Control Flow-Functions-Modules-Packages-File Handling-Date/Time Operations-Classes-Python Packages of Interest for IoT.

#### **UNIT- IV**

IoT Physical Devices and Endpoints: IoT Device-Exemplary Device: Raspberry Pi-About the Board-Linux on Raspberry Pi-Raspberry Pi Interfaces-Programming Raspberry Pi with Python-Other IoT Devices. IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs-WAMP-Autobahn for IoT-Xively Cloud for IoT-Python Web Application Framework-Django-Designing a RESTful Web API-Amazon Web Services for IoT- SkyNet IoT Messaging Platform

#### **UNIT- V**

Case Studies Illustrating IoT Design: Introduction-Home Automation-Cities-Environment-Agriculture-Productivity Applications. Data Analytics for IoT: Introduction-Apache Hadoop-Using Hadoop Map Reduce for Batch Data Analysis-Apache Oozie-Apache Spark-Apache Storm-Using Apache Storm for Real-Time data Analysis

#### **TEXT BOOK:**

1. *Arshdeep Bahga, Vijay Madisetti, "Internet of Things-A Hands-on Approach"*, University Press, 2015.

#### **REFERENCE BOOK:**

1. *Ian G.Smith, "The Internet of Things2012 New Horizons"*, IREC-Internet of Things European Research Cluster, 2012.

<b>16PCS1EB</b>	<b>ELECTIVE- I :OBJECT ORIENTED ANALYSIS AND DESIGN</b>	<b>SEMESTER - I</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To acquire knowledge on trends and principles of object oriented methodologies.
2. To Gain problem solving skills using object based models.

**CONTENTS**

**UNIT - I**

Object Oriented System Development: Introduction- Object Oriented Systems Development Methodology- Why an Object Orientation. Object Basics: Introduction - Objects - Attributes - Object Behavior and Methods - Encapsulation and Information Hiding - Class Hierarchy - Object Relationships and Associations - Polymorphism - Aggregations and Object Containment. Static and Dynamic Binding.

**UNIT - II**

Object Oriented System Development: Analysis - Design - Prototyping. Methodologies: The Booch Methodology: The Macro Development - The Micro Development Process. The Jacobson et al Methodologies: Use cases- Object Oriented Software Engineering - Object Oriented Business Engineering. Patterns: Generative and Non generative patterns- Pattern Templates- Anti patterns- capturing patterns. Unified approach: Analysis - Design - Modeling based on Unified Modeling Language



### **UNIT - III**

Unified Modeling Language: Introduction - Static and Dynamic Models - UML Diagrams - UML Class Diagram: Class Notation - Object Diagram - Class Interface Notation- Binary Association Notation- Association Rule - Qualifier- Multiplicity- OR Association- N-Ary Association - Aggregation and composition-Generalization - Use Case Diagram - UML Dynamic Modeling: UML Interaction Diagrams - Sequence diagrams - collaboration diagrams - state chart diagram - Activity diagram.

### **UNIT - IV**

OO Design axioms: Design axioms. Designing Classes: Introduction - Design philosophy - UML Object Constraint Language- The process - Class visibility: Private and protected protocol Layers - Public Protocol Layer- Refining attributes: Attribute types - UML Attribute Presentation. Designing Methods and Protocols: Design Issues - UML Operation presentation. Access layer: Introduction - OODBMS: OOD Vs Traditional Databases- Object Relational Systems: Mapping - Table class Mapping - Table Multiple class Mapping- Table Inherited Classes Mapping- Keys for Instance Navigation. View layer: Introduction - Designing view layer classes.

### **UNIT - V**

Quality Assurance testing: Quality assurance tests- Testing Strategies- Impact of Inheritance in testing - Test Cases: Guidelines for developing Quality Assurance Test cases. Test Plan: Guidelines for Developing test plans. Usability testing: Guidelines for developing Usability Testing. User Satisfaction Testing: Guidelines for developing a User Satisfaction Testing

**TEXT BOOKS:**

1. *Ali Brahmi, "Object Oriented System Development"*, Tata McGraw-Hill International Edition, [Unit I to V], 2013.

**REFERENCE BOOKS:**

1. *Addison-Wesley, Grady Booch, "Object-Oriented Analysis and Design"*, [Second Edition]. Pearson Education Asia, 2010.
2. *James Rumbaugh, Micheal Blah, "Object Oriented Modeling and Design"*, [Tenth Edition], Prentice Hall of India, 2001.

<b>16PCS1EC</b>	<b>ELECTIVE - I : ADVANCED SOFTWARE ENGINEERING</b>	<b>SEMESTER - I</b>
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**Total Credits: 4  
Hours Per week: 4**

**OBJECTIVES:**

1. To Focus on software process, process models, Agile development, requirement analysis, planning
2. To learn about function oriented design, OO design, detailed design and coding.

**CONTENTS**

**UNIT-I**

Software and software engineering: Nature of the software-Nature of WebApps -Software engineering-Software process-Software myths. Process models: Generic process model-Process assessment and improvement-Prescriptive process model-Specialized process model-Process technology.

**UNIT-II**

Agile development: Agility-Agile process-Extreme programming - SCRUM-A tool set for the agile process. A Case Study on Agile Project Development. Understanding requirements: Requirements engineering-Establishing the groundwork-Eliciting requirements-Developing use cases-Building the requirements model-Negotiating requirements-Validating requirements.

**UNIT-III**

Software requirements analysis and specification: Software requirements- Problem analysis- Requirements specification-Functional specification with use cases. Software architecture: Role of software architecture-Architecture views-Component and connector view- Planning a software project: Process planning-Effort estimation-Project scheduling and staffing-Software configuration management plan-Quality plan-Risk management-Project monitoring plan.

#### **UNIT-IV**

Function oriented design: Design principles-Module level concepts-Design notations and specification-Structured design methodology-Verification-Metrics. Object Oriented Design: OO Analysis and OO Design-OO concepts-Design concepts-Unified modeling language-Design methodology.

#### **UNIT-V**

Detailed design: Detailed design and PDL-Verification-Metrics. Coding: Programming principles and guidelines-Coding process-Refactoring-Verification-Metrics. A Case Study on Software Metrics in Open Source Software

#### **TEXT BOOKS:**

1. *Roger S. Pressman, "Software Engineering - a Practitioner's Approach"*, Seventh Edition, Tata McGraw Hill Higher Education, 2010.
2. *Pankaj Jalote, "Integrated Approach to Software Engineering"*, Third Edition, Narosa Publishing House, Twenty Ninth Reprints, 2011.

#### **REFERENCE BOOKS:**

1. *Ian Somerville, "Software Engineering"*, Addison Wesley, Ninth Edition, 2011.

<b>16PCS2EA</b>	<b>ELECTIVE - II : SOFTWARE TESTING</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To know the strategy in testing.
2. To understand the test methodologies and the testing techniques.

**CONTENTS**

**UNIT-I**

Tackling the testing maze: Introduction -Sample application -The incremental testing approaches. Test Outline: Introduction -Sample application -The outline approaches -Evaluating the outline -Schedule estimation.

**UNIT-II**

Building a software testing environment: Creating an environment supportive of software testing -Minimizing risk -Writing a policy of software testing -Economic of testing -Testing -An organizational issues -Management support for software testing -Building a structured approach to software testing -Developing a test strategy. Building a software testing process: Software testing guidelines -workbench concepts -Customizing the software testing process -Process preparation checklist.

**UNIT-III**

Overview of the software testing process: Advantages of software testing process -The cost of computer testing -Seven steps software testing process -Workbench Skills. Using tables and spreadsheets: Introduction -Sample application -Documenting test cases -State machines -Test case table with multiple inputs -Decision tables -Applications with complex data -Managing tests.

#### **UNIT-IV**

Testing software system security: Overview -Where vulnerabilities occur - Functional vulnerabilities -Vulnerable areas -Accidental versus intentional losses -Do Procedures -Output -guidelines.

#### **UNIT-V**

Testing objects oriented software: Introduction -Comparing object-Oriented and Procedural software -System testing example -Unit testing of classes. Testing web applications: Sample application -functional and usability issues - Security testing -Database testing.

#### **TEXT BOOKS:**

1. *Louise Tamres*, "**Introducing software testing**", Pearson education, 2007. (Chapters 1, 2 -Unit -I, Chapters 4, 5 -Unit -III, Chapters 6, 7 - Unit -V)
2. *William Perry*, "**Effecting methods for software testing**", Wiley-India and sons, 2008. (Chapters 2, 3 -Unit -II, Chapter 6 -Unit -III, Chapter 20 -Unit -IV)

#### **REFERENCE BOOKS:**

1. *Bovis Beizer*, "**Software testing Techniques**", Dreamtech Press 2003.
2. *Ilene Burnstein*, "**Practical software testing-A Process oriented approach**", Springer -Verlay, 2004.
3. *Elfriede Dustin*, "**Effective software is testing**", Pearson Education, 2003.

<b>16PCS2EB</b>	<b>ELECTIVE - II : PRINCIPLES OF PROGRAMMING LANGUAGES</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To understand and describe syntax and semantics of programming languages
2. To understand data, data types, and basic statements, object-orientation, concurrency, and event handling in programming languages

### **CONTENTS**

#### **UNIT-I**

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

#### **UNIT-II**

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

#### **UNIT-III**

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

#### **UNIT-IV**

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

## UNIT-V

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

### TEXT BOOKS :

1. *Terrence W Pratt, Marvin V Zelkowitz and Tadepalli V Gopal*, "**Programming Languages - Design and Implementation**", PHI Publications, 4th edition, 2013.
2. *Kenneth C. Loudon*, "**Programming Languages-Principles and Practices**", Cengage Learning Publications, 2<sup>nd</sup> Edition, 2008.

### REFERENCE BOOKS :

1. *Daniel P Friedman, Mitchell Wand and Christopher T Haynes*, "**Essentials of programming languages**", 2<sup>nd</sup> Edition, PHI Publishers, 2005.



16PCS2EC	<b>ELECTIVE - II : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS</b>	<b>SEMESTER - II</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To know the basic concepts of artificial Intelligence.
2. To learn various AI techniques.

### **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 is a relationships - computable functions and predicates - resolution - natural deduction

#### **UNIT - IV**

Representing knowledge using rules: Procedural Vs declarative knowledge logic programming - forward Vs backward reasoning - matching - control knowledge.

#### **UNIT - V**

Expert Systems - Definition - Features- Organization - Characteristics - Prospector - Knowledge Representation in expert systems-Nature of Expert system Tools -Stages in the development of Expert system tools - EMYCIN.

**TEXT BOOKS:**

1. *Elaine Rich and Kevin Knight, "Artificial Intelligence",* Tata McGraw Hill Publication, 2<sup>nd</sup> Edition, 2001
2. *Donald A. Waterman, 'A Guide to Expert Systems',* Pearson Education, 2009.

**REFERENCE BOOKS:**

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

<b>16PCS3EA</b>	<b>ELECTIVE - III : MOBILE COMPUTING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To understand the concept of wireless mobile computing
2. To Learn the mobile technologies

**CONTENTS**

**UNIT- I**

Introduction -Applications -History of wireless communication -A Simplified reference model -Wireless transmission -Frequencies for radio transmission - Regulations -Signals -Antennas -Signal propagation: Path loss of radio signals -Additional signal propagation effects -Multi-path propagation -Multiplexing -Modulation

**UNIT-II**

Spread spectrum -Direct sequence spread spectrum -Frequency hopping spread spectrum -Cellular systems. Medium access control: Hidden and exposed terminals -Near and far terminals -SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, slotted Aloha, Carrier sense multiple access - Reservation TDMA -Multiple access with collision avoidance -Polling - CDMA -Spread Aloha multiple access.

**UNIT-III**

Comparison of S/T/F/CDMA.GSM: Mobile services -System architecture - Radio interface -Protocols -Localization and calling -Handover -Security - New Data services. UMTS and IMT-2000 -Satellite Systems: Applications - Basics -Routing -Localization -Handover

#### **UNIT-IV**

Wireless LAN: Infra red vs. radio transmission -Infrastructure and ad-hoc network -IEEE 802.11 -System architecture -Protocol architecture -Physics layer -Medium access control layer -MAC management -Blue tooth. Mobile network layer: Mobile IP: Goals, assumptions and requirements -entities and terminology -packet delivery -Agent discovery -Registration - Tunneling and encapsulation

#### **UNIT-V**

Mobile ad-hoc networks -World Wide Web -WAP: Architecture -wireless datagram Protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script -Mobile computing applications.

#### **TEXT BOOKS:**

1. *Jochen Schiller, "Mobile Communications",* Second Edition, Pearson Education, 2009.

#### **REFERENCES BOOKS:**

1. *Rifaat A. Dayen, "Mobile Data & Wireless LAN Technologies",* Prentice Hall, 1997.
2. *Steve Mann and Scoot Schibli, "The Wireless Application Protocol",* John Wiley & Inc, 2000.

<b>16PCS3EB</b>	<b>ELECTIVE - III : SOFT COMPUTING</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

### **OBJECTIVES:**

1. To know the basic concepts of Neural Networks and Artificial Intelligence.
2. To Learn about Fuzzy Systems and Genetic Algorithm and their Concepts

## **CONTENTS**

### **UNIT-I**

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

### **UNIT-II**

Back propagation Networks: Architecture of Back propagation Network-Back propagation Learning-Illustrations-applications-Effect of Tuning Parameters of the Back propagation Neural Network-Selection of various parameters in Back propagation Neural Network-Variations of Standard Back propagation algorithms.

### **UNIT-III**

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

### **UNIT-IV**

Genetic Algorithms: Genetic Algorithms: History -Basic concepts -Creation of offspring's-Working principle -Encoding -Fitness function -Reproduction.

### **UNIT-V**

Genetic Modeling: Inheritance operators -Cross over -Inversion and deletion - Mutation operator -Bitwise operators -Bitwise operators used in GA - Generation cycle -Convergence of Genetic algorithm-Applications.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

<b>16PCS3EC</b>	<b>ELECTIVE - III : HUMAN COMPUTER INTERACTION</b>	<b>SEMESTER - III</b>
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**Total Credits: 4**  
**Hours Per week: 4**

**OBJECTIVES:**

1. To learn the importance of good interfaces and the relationship of interface design to effective human interaction with computers.
2. To develop quality user interaction designs

**CONTENTS**

**UNIT-I**

The Interaction: Introduction - Models of interaction - Frameworks and HCI Ergonomics - Interaction styles - Elements of the WIMP interface - Interactivity - The context of the interactions. Paradigms: Introduction - Paradigms for interaction.

**UNIT-II**

Interaction, Design basics: Introduction - What is design? - User focus - Scenarios - Navigation design - Screen design and layout - Interaction and prototyping. HCL in the software process: Introduction - The software lifecycle - Usability engineering - interactive design and prototyping - Design rationale.

**UNIT-III**

Design rules: Introduction - Principles to support usability - Standards - Guidelines - Golden rules and heuristics - HCI patterns. Implementation Support: Introduction - Elements of windowing systems - Programming the application Using toolkits - User interface management systems.

#### **UNIT-IV**

Evaluation techniques: What is evaluation - Goals of evaluation - Evaluation through expert analysis - Evaluation through user participation - Choosing an evaluation method. Universal Design: Introduction - Universal design principles - Multi-modal interaction - Designing for diversity - summary.

#### **UNIT-V**

User support: Introduction Requirements of user support - Approaches to user support - Adaptive help systems designing user support systems.

#### **TEXT BOOKS:**

1. *Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale, "Human Computer Interaction", Third Edition, Pearson Education, 2004.*

#### **REFERENCE BOOKS:**

1. *John C. Carroll, "Human Computer Interaction in the New Millennium", Pearson Education, 2002.*



16PCS43V	CORE PROJECT- II	SEMESTER - IV
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**Total Credits: 4**  
**Hours Per week: 30**

**OBJECTIVES:**

2. Enable to enhance their skills for software development.

**PROJECT AND VIVA VOCE**

**Major Project**

Each Student in the M.Sc CS Final Year must compulsorily undergo Project work in the 4<sup>th</sup> SEMESTER. Projects shall be done on Individual Basis. The Project Coordinator will allocate the project title and the Guide for each student. The Project Work Should be done Inside the College. Three Project Reviews will be conducted in which the Progress of Project work will be strictly evaluated by Respective Project Guide and Project Coordinator. Viva Voce will be conducted only in the presence of Industrialists or Academicians. In the total of 150 Marks, 60% of marks are allocated for CIA and 90% for ESE Viva Voce.

**Course Inputs:**

- Project is an integral and important component in the last semester (4<sup>th</sup> semester) and passing the M.Sc Project is mandatory for all students.
- Project is basically meant for the implementation of the various technologies learned during the three semesters in the real life scenario.

**Following guidelines are hereby enlisted for all the students based on the necessity and importance of the project**

**Basic framework**

The stages in Project Work are given below:

- The student has to select a project in a related field of Computer Science / Information Technology.

- Students can opt various types of organizations for their major project. But before the training actually starts, profile of the organization must be submitted for evaluating the various parameters of the company like *Turnover of the organization, No. of employees and Location of the organization(Major Project Only)*
- *If Mini Project the students should do the project in Lab Hours Only .(The Students can get data from an organization but only develop the project in the College lab Hours only)*
- After obtaining the approval from project guide, the student has to carry out the project work.

Student has to maintain the **project work diary**. The Project Work carried out should be in accordance with the approved project proposal

- All communication must be in writing. No verbal communication will be accepted.
- Student should adhere to the timings for submission of various reports as mentioned in the guidelines. No excuse will be entertained in any case.
- Student should prepare a Project Report at the end of his/her work, which his /her supervisor would certify and approve for submission (the Project Report should conform to the Standard Format laid down for Project Report).
- The student should submit the Project Report to the college.

**Guide for the Project:**

- Project guide will be allotted by the department to each student
- Each student will be working under a Project Guide for the project to be done.
- Student must report to his/her project guide regularly.

The student can also have a guide who could be the person under whose supervision the student is doing the project in the industry

**Selection of Project:**

- The selection of the project can be done in consultation with the project guide.
- The maximum number of students who can join one company for training is **one per location**. (Major Project Only)
- No student will change organization and change the project topic during the training period. (Major Project Only)
- Group of the students are not allowed to do a single project at a time.

It is possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project

**Submission of project report.**

- The student will submit his/her project report in the prescribed format.
- Project Report will be submitted in triplicate (Hard Bound Copies) with the proper certification by the organization concerned in the specified format and color. None of copies of the project report will be returned to the student.
- The project reports along with a CD should be submitted to the HoD/Supervisor / Controller of examinations twenty days prior to the final semester examination.

A certificate from the supervisor should also be enclosed in the Project Report as provided in the format for project report.

**Fields for Project:**

- **GUI Tools (Front End)** - Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000, VC++, Jbuilder

- **RDBMS(Back End)** - Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
- **Languages** - C, C++, Java, VC++, C#
- **Scripting Languages** - PERL, SHELL Scripts (Unix), Tcl/Tk, PHP
- **.NET Platform** - Dyalog APL, VB.Net, C#.Net, Visual C#.Net, Net, ASP.Net, Delphi
- **Middle Ware (Component) Technologies** - COM/DCOM, Active-X, EJB, WINCE, MSMQ, BEA, Message Q, MTS, CICS
- **Unix Internals** - Device Drivers, RPC, Threads, Socket programming
- **Architectural Concepts** - CORBA, TUXEDO, MQ SERIES
- **Internet Technologies** - DHTML, JavaScript, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Servlets, Visual Age for JAVA, UML, VRML, WML, Vignette, EDA, Broad vision, Ariba, iPlanet, ATG, Big Talk, CSS, XSL, Oracle ASP server, AWT, J2EE, LDAP, ColdFusion, Haskell 98
- **Wireless Technologies** - Blue Tooth, 3G, ISDN, EDGE
- **Real time Operating System/ Embedded Skills** - QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus
- **Operating Systems** - WINDOWS 2000/ME, WINDOWS NT, WINDOWS XP, UNIX, LINUX, IRIX, SUN SOLARIS, HP/UX, PSOS, VxWorks, AS400, AIX, DOS
- **Application Areas** - Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking- Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

**NOTE:**

- ii. **Projects should not be developed using the packages like Dbase III Dbase IV, FoxPro, Visual FoxPro, CYBASE and MS-Access. Also, projects should not be developed using the combination of Visual Basic as the front end and MS-Access as the back end.**

Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies

**Phases of Training Period**

- At the time of Review – I, students should present Title, Synopsis/Abstract of the project and module description.
- Students should present the Mid Term Report at the time of Review – II.
- Students should present the Development and Testing Report at the time of Review – III.
- Students should submit the complete Project Report at the time of Model Viva-Voce./

The external Viva-Voce will be conducted for all the students.

**Formatting of Project:**

- The whole project report should be nicely composed and presented.
- The dimension of the project report should be in A4 size only.
- Page Specification : (Written paper and source code)

*Left margin - 3.0 cms/1.18 inches*

*Right margin- 2.0 cms/0.78 inches*

*Top margin 2.54 cms/1 inch*

*Bottom margin 2.54 cms/1 inch*

- The project report should be typed in good word processor and should avoid spellings and grammatical mistakes.
- The impression on the typed copies should be black in color.

**Normal Body Text: Font Size: 12, Times New Roman, 1.5 lines Spacing, Justified.**

**Paragraph Heading Font Size:** 14, Times New Roman, Left Aligned. 12 points above & below spacing

**Chapter Heading Font Size:** 16, Times New Roman, Centre Aligned, 30 points above and below spacing.

**Coding Font size:** 10, Courier New, Normal

- Students should use only one side of paper for printing.
- Page numbers - All text pages as well as Program source code listing should be numbered at the bottom center of the page.

**Cover Page** - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, month of submission etc.

**COLOR - Cover Page Color is silver Gray**

**Letter of Authentication** - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization where such Project have been implemented with certificate showing the student name, register number and project name.

**Certificate from Project Guide** - Certificate from the Project Guide certifying the project work done under his/her guidance along with course, student, and project details complete in all respects.

**Draft of Project Report**

The size of the project report can be approximately **130 - 150** pages, which include the following details:

**Certificate of the project guide**

**Certificate of the Organization**

**Acknowledgement**

**Synopsis / Abstract**

**Table of Contents**

**1 Introduction**

## 1.4 About Organization

1.5 Problem Definition

1.6 System Configuration

1.3.1 Hardware configuration

1.3.3 Software configuration

## **2 System Study**

2.1 Existing System with limitations

2.2 Proposed System with objectives

2.3 Problem description

## **3 System Design & Development**

3.1 System Flow Diagrams / Control Flow Diagrams

3.2 E-R Diagrams / Use Case Diagrams

3.3 Data Flow Diagram / Activity Diagrams

3.4 Input Design

3.5 File / Database Design

3.6 Output design (includes Report Design)

3.7 User Interface Design (if Needed)

## **4 System Testing**

4.1. Unit Testing

4.2. Integration Testing

4.3. System Testing

## **5. System Implementation and Maintenance**

5.1. System Security Measures

## **6 .Conclusion**

6.1. Scope for Future Prospects

## **Bibliography and Web References**

## **Appendices**

Forms (input screen shots)

Sample Source Code

Output Screen shots

Reports

Sample Coding / Abstract Coding

- Along with it, if the student feels to add on any other topics as per the demand of the project or want to include the functionalities as per the SDLC(Software Development Life Cycle) or the Software Engineering model used, that can be done and included in the Project Report.

The project report must include all the components as per the SDLC. It is highly recommended to follow the approaches of Software Engineering methodology.

### **Arrangement of Contents**

- Cover Page & Title Page
- Bonafide Certificate
- Synopsis / Abstract
- Table of Contents
- Chapters
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Appendices
- References

The table and figures shall be introduced in the appropriate places

- **List of Symbols, Abbreviations and Nomenclature** – One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.
- **Chapters** – The chapters may be broadly divided into 3 parts. Introductory chapter, Chapters developing the main theme of the project work and Conclusion.



The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

- ❖ Each chapter should be given an appropriate title.
- ❖ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- ❖ Footnotes should be used sparingly. They should be typed with single space and placed directly underneath in the very same page, which refers to the material they annotate.
- **Appendices** – Appendices are provided to give supplementary information, which is included in the main text as they may serve as a distraction and cloud the central theme.
  - ❖ Appendices should be numbered using Arabic numerals.
  - ❖ Appendices, Tables and References appearing in appendices should be numbered and referred to an appropriate place just as in the case of chapters.
  - ❖ Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
- **List of References** – The listing of references should be typed 4 spaces below the heading “REFERENCES” in alphabetical order in single spacing and left justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

<b>16PCSSS1</b>	<b>SELF STUDY PAPER-I : M -COMMERCE</b>	<b>SEMESTER: I To III</b>
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**Total Credits : 1**

**OBJECTIVES:**

1. To understand basics of Mobile Commerce.
2. To understand about Mobile security and services.

**CONTENTS**

**UNIT-I**

Introduction: What is M-Commerce? - NTTDoCoMo's i-Mode Portal - Nordea's WAP Solo Mobile Banking Service - Webraska's SmartZone Platform -The Forces Behind the M-Commerce "Revolution" - Applications -and Services -What's So Special about M-Commerce?

**UNIT-II**

Mobile Communications: The Transition to 3G : Introduction -Mobile Communications: A Quick Primer -Historical Perspective -Basic Architecture - What Is So Special about Mobile -Communication? -Basic Multiplexing Schemes -Separating Uplink and Downlink Traffic -The 2G Landscape -A Closer Look at GSM -A Word about Roaming and Billing -Transition Toward 3G.

**UNIT-III**

Mobile Security and Payment: Introduction -Revisiting Security: The Role of Cryptography -Secret Key Cryptography -GSM's SIM-Based Authentication - Public Key Cryptography -Digital Signatures -Certificate Authorities - Combining Public and Secret Key Cryptography -Message Authentication Codes -The Combinations Are Many -Revisiting WAP Security and the Role of the WIM Module -Mobile Payment -Mobile Payment Standardization Efforts - Different Mobile Payment Scenarios -MeT in Slow Motion.

#### **UNIT -IV**

Mobile Commerce Services Today: Introduction -Revisiting Mobile Portals - Voice Portals -Mobile Information Services -Mobile Directory Services -Mobile Banking and Trading -Mobile E-Tailing and E-Ticketing -Mobile Entertainment - Digital Bridges-Mobile Business Applications and Services

#### **UNIT-V**

Next-Generation M-Commerce: -Introduction -Next-Generation M-Commerce Scenarios -Personalization -3GPP's Personal Service Environment -Microsoft's .NET Passport -Location-Based Services -A Brief Overview of Competing Positioning Solutions -Handset-Based Positioning Solutions -Network-Based Positioning Solutions -A Fragmented Landscape -Signal Soft -Toward Context-Aware Services.

#### **TEXT BOOK:**

1. *Norman Sadeh, "M-Commerce Technologies, Services, and Business Models"*, Wiley Computer Publishing, 2003.

#### **REFERENCE BOOKS:**

1. *Brian Ernest Mennecke, "Mobile Commerce: Technology, Theory, and Applications"*, IRM Press, 2003
2. *Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business"*, Cambridge University Press, 2001.
3. *Nansi Shi, "Mobile Commerce Applications"*, Idea Group Publishing, 2004.

<b>16PCSSS2</b>	<b>SELF STUDY PAPER-II : MANAGEMENT INFORMATION SYSTEM</b>	<b>SEMESTER: I To III</b>
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**Total Credits : 1**

**OBJECTIVES:**

To understand basics of Management Information System

**CONTENTS**

**UNIT - I**

Introduction - environment of organizations - management information system - information flow - need and sources - management decisions - importance and role.

**UNIT - II**

Characteristics of computer information system - importance of computer - role of the computer - types of computer - Software - Hardware - CPU - MU - Input - Output - application and operations

**UNIT - III**

System classification - concept characteristics - elements - feedback control - boundary - function and operations - system design - function of system analyst - assignment and investigation - implementation - evaluation and maintenance of MIS.

**UNIT- IV**

Transactions processing information systems - information systems for managers - intelligence system - decision support system - integration - data collection and preparation - database - components - utility of the operation of the data base technology.

**UNIT-V**

Functional Management information systems - production, marketing, accounting, personnel, financial, relationship - impact and their role in the managerial decision - making.

**TEXT BOOK:**

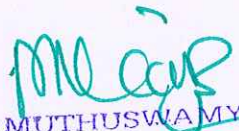
1. CVS Murthy, Management Information System, HPH.
2. Davis & Olson, Management Information System, MGH.

**REFERENCE BOOKS:**

1. R. Senapathi, MIS, Lakshmi Publications.
2. Lucas, The analysis, design and implementation of information system, MGH.
3. G.M. Scott, Principles of management information system, MGH.



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



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