

**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN**  
**[AUTONOMOUS]**  
**M.Sc. , (COMPUTER SCIENCE)**  
**(Candidates admitted from 2014-2015 Onwards)**

## **REGULATIONS**

### **I. SCOPE OF THE PROGRAMME**

Master of Computer Science can be considered to be one of the most prominent Master's level programs in our country. This program mainly deals with the development of computer applications for the purpose of updating computer programming languages. M.Sc. [CS] also aims at creating strong knowledge of theoretical computer science subjects who can be employed in research and development units of industries. The course has a time period of 2 years with 4 semesters.

### **II. SALIENT FEATURES**

- Regular conduct of guest lectures and seminars
- Campus recruitment
- Provides facilities such as Internet Access and In-House Library
- Provides Career Guidance for Post Graduate Courses like MCA, and the Certifications in programming languages
- Conduct of Personality Development Program
- Visiting Faculties from Industries

### **III. OBJECTIVES OF THE COURSE**

The Course Objective of the M.Sc. Computer Science program is to provide advanced and in-depth knowledge of computer science and its applications to enable students pursue a professional career in Information and Communication Technology in related industry, business and research. The course designed to impart professional knowledge and practical skills to the students.

### **IV. ELIGIBILITY FOR ADMISSION**

A Candidate who has passed B.Sc. Computer Science / BCA/ B.SC. Computer Technology / B.Sc. Information Science Degree of Periyar university or any of the Degree of any other university accepted by the syndicate as equivalent thereto subject to such conditions as may be prescribed therefore shall be permitted to appear and qualified for the M.Sc. Compute Science Degree Examinations of the Periyar University after a course of study of two academic years.

## V. DURATION OF THE PROGRAMME

- The course shall extend over a period of two academic years consisting of four semesters. Each academic year will be divided into two semesters. The First semester will consist of the period from July to November and the Second semester from December to April.
- The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women with the approval of Periyar University.

## VI. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously and the Internal Assessment Marks will be as under:

1. Average of two Tests - 10 Marks
2. Seminar - 05 Marks
3. Assignment - 05 Marks
4. Attendance - 05 Marks

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Total = 25 Marks

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### Internal Assessment Marks for Practical

1. Attendance - 10 Marks
2. Observation - 10 Marks
3. Test - 20 Marks

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Total = 40 Marks

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### PASSING MINIMUM (Theory)

#### EXTERNAL

In the University Examinations, the passing minimum shall be 50 % out of 75 Marks.  
(38 Marks)

## **PASSING MINIMUM (Practical)**

### **EXTERNAL**

In the University Examinations, the passing minimum shall be 50 % out of 60 Marks. (30 Marks)

Distribution of Marks

Problem Understanding : 05 Marks

Program writing : 10 Marks

Debugging : 10 Marks

For Correct Results : 05 Marks

The Passing minimum shall be 50% out of 60 marks (30 Marks)

## **VII. ELIGIBILITY FOR EXAMINATION**

<b>PERCENTAGE</b>	<b>MARKS</b>	
	<b>THEORY</b>	<b>PRACTICAL</b>
75-80	1	2
81-85	2	4
86-90	3	6
91-95	4	8
96-100	5	10

A candidate will be permitted to appear for the University Examination only on earning 75 % of attendance and only when her conduct has been satisfactory. It shall be opened to grant exemption to a candidate for valid reasons subject to conditions prescribed.

## **VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES**

Successful candidates passing the examination of Core Courses (main and allied subjects) and securing marks

- a) 75 % and above shall be declared to have passed the examination in first class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
- b) 60% and above but below 75 % shall be declared to have passed the examinations in first class without Distinction.

- c) 50% and above but below 60% shall be declared to have passed the examinations in second class.
- d) Candidates who pass all the examinations prescribed for the course at the first appearance itself and within a period of two consecutive academic years from the year of admission only will be eligible for University rank.
- e) If she fail to complete her course within the specified period, she can extend for two year's to complete her course.

## **IX. ELIGIBILITY FOR AWARD OF THE DEGREE**

A candidate shall be eligible for the award of the degree only if she has undergone the above degree for a period of not less than two academic years comprising of four semesters and passed the examinations prescribed and fulfilled such conditions have been prescribed therefore.

## **X. PROCEDURE IN THE EVENT OF FAILURE**

If a candidate fails in a particular subject, she may reappear for the semester Examination in the concerned subject in subsequent semesters and shall pass the examination.

## **XI. COMMENCEMENT OF THE REGULATIONS**

The regulations shall take effect from the academic year 2014-15 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2014-15 and thereafter.

Candidates who were admitted to the PG course of study before 2014-15 shall be permitted to appear for the examinations under those regulations for the period of three years ie., upto and inclusive of the examinations of 2016-17. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

**EVALUATION OF EXTERNAL EXAMINATIONS (EE)  
QUESTION PAPER PATTERN – Theory**

Time duration: 3 Hours

Max. Marks: 75

PART- A: 5x5 = 25

Answer all the questions

One Question from each unit (either or type)

PART- B: 5x10 = 50

Answer all the questions

One Question from each unit (either or type)

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

**QUESTION PAPER PATTERN – Practical**

Time duration: 3 Hours

Max. Marks: 60

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

The Passing minimum shall be 50% out of 60 marks (30 marks)

**Distribution of Marks**

Problem Understanding : 05 Marks

Program writing : 10 Marks

Debugging : 10 Marks

For Correct Results : 05 Marks

**EVALUATION PATTERN – Software Development Lab**

Evaluation (External) : 40 Marks

Viva-voce (Internal/External): 20 Marks

**M.Sc. – COMPUTER SCIENCE**  
**COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS**  
**Candidates admitted from the year 2014-2015 (Onwards)**

Sem	Course Code	Courses	Credits	Hours	Marks		
					I.A. Marks	E.E. Marks	Total Marks
I	14P1CS01	Core Course-I - Advanced Computer Architecture	4	5	25	75	100
	14P1CS02	Core Course-II -Design and Analysis of Algorithms	4	5	25	75	100
	14P1CS03	Core Course-III -Programming in .Net	4	5	25	75	100
	14P1CS04	Core Course-IV- Wireless Application Protocol	4	5	25	75	100
	14P1CSE__	Elective Course- I -	4	5	25	75	100
	14P1CSP01	Core Course-V- .Net Lab	2	5	40	60	100
	<b>TOTAL</b>			<b>22</b>	<b>30</b>	<b>165</b>	<b>435</b>
II	14P2CS05	Core Course-VI –Advanced Operating System	4	4	25	75	100
	14P2CS06	Core Course-VII -Advanced Java Programming	4	4	25	75	100
	14P2CS07	Core Course-VIII – Advanced Database Management Systems	4	5	25	75	100
	14P2CS08	Core Course-IX –PC Hardware and Trouble Shooting	4	5	25	75	100
	14P2CSE__	Elective Course -II	4	4	25	75	100
	14P2CSP02	Core Course-X - Operating System Lab	2	4	40	60	100
	14P2CSP03	Core Course-XI - Advanced Java Programming Lab	2	4	40	60	100
<b>TOTAL</b>			<b>24</b>	<b>30</b>	<b>205</b>	<b>495</b>	<b>700</b>
III	14P3CS09	Core Course-XII – Open Source Technologies	4	5	25	75	100
	14P3CS10	Core Course-XIII - Soft Computing	4	5	25	75	100
	14P3CS11	Core Course-XIV – Network Security	4	5	25	75	100
	14P3CSE__	Elective Course III	4	5	25	75	100
		EDC- I	4	4	25	75	100
	14P3CSP04	Core Course-XIV - Open Source Technologies Lab	2	6	40	60	100
	14P3HR01	Human Rights	1	-	25	75	100
<b>TOTAL</b>			<b>23</b>	<b>30</b>	<b>190</b>	<b>510</b>	<b>700</b>
IV	14P4CS12	Core Course-XV – Distributed Computing	4	5	25	75	100
	14P4CS13	Core Course-XVI – Data Mining and Warehousing	4	5	25	75	100
	14P4CSE__	Elective Course -IV	4	5	25	75	100
	14P4CSPR 1	Core Course-XVI – Software Development Lab	10	-	40	60	100
	<b>TOTAL</b>			<b>22</b>	<b>15</b>	<b>115</b>	<b>285</b>
<b>Total No. of credits (Core + EDC + H R + Elective)</b>			<b>70+4+1+16=91</b>	<b>105</b>	<b>675</b>	<b>1725</b>	<b>2400</b>

## **EDC-EXTRA DISCIPLINARY COURSE**

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

I.A. – INTERNAL ASSESSMENT

E.E. – END SEMESTER EXAMINATIONS

The content of the syllabus and regulations may be followed for first and second Semesters as per the regulations passed in the academic year 2014-2015.

### **ELECTIVE COURSES**

#### **Elective-I:**

<b>Course Code</b>	<b>Course Name</b>
14P1CSE01	Client / Server Technology
14P1CSE02	Software Project Management and Quality Assurance
14P1CSE03	Advanced Networks

#### **Elective-II:**

<b>Course Code</b>	<b>Course Name</b>
14P2CSE04	Embedded Systems
14P2CSE05	Object Oriented Analysis and Design
14P2CSE06	Artificial Intelligence & Expert Systems

#### **Elective-III:**

<b>Course Code</b>	<b>Course Name</b>
14P3CSE07	Mobile Computing
14P3CSE08	Compiler Design
14P3CSE09	Multimedia and Virtual Reality

#### **Elective-IV:**

<b>Course Code</b>	<b>Course Name</b>
14P4CSE10	Cloud Computing
14P4CSE11	Artificial Neural Networks
14P4CSE12	Digital Image Processing

2014-2015 Onwards	<b>ADVANCED COMPUTER ARCHITECTURE (14P1CS01/14P1IT01)</b>	M.Sc. Computer Science/ M.Sc. Information Technology
I Semester		Core: Theory
Hours: 50		Credit : 4

**Objective: To learn about Computer function, Mapping function, DRAM & SRAM, Multithreading and chip multiprocessors.**

#### UNIT I

**Hours: 07**

**Introduction:** Structure and Function-**Computer Evaluation and Performance:** History of computers- *Designing for Performance:* Microprocessor speed-performance balance-Improvement in chip organization and architecture. **Computer Function and Interconnection:** Computer Components- *Computer Function:* Instruction Fetch and Execute- I/O Function. Interconnection structure-*Bus interconnection:* Bus structure-Multiple bus hierarchies-Elements of Bus design. *PCI:* PCI Bus Structure- PCI Commands-Data transfers-Arbitration.

#### UNIT II

**Hours: 13**

**Cache Memory:** Characteristics of Memory Systems-Memory hierarchy-Cache memory principles- *Elements of cache design:* Cache size-Mapping function-replacement algorithms-write policy-line size-Number of caches. **Internal Memory:** *Semi-conductor main memory:* Organization-DRAM & SRAM-types of ROM- Chip Logic- Chip Packaging-Module Organization. **External Memory:** *Magnetic Design:* read and write mechanism-Data organization and Formatting-physical characteristics-Disk performance parameters. *Optical memory:* Compact Disk- DVD. Magnetic tape.

#### UNIT III

**Hours: 10**

**Computer Arithmetic:** ALU-*Integer Representation:* Sign magnitude representation-Twos complement Representation-Fixed point Representation. *Integer Arithmetic:* Negation-Addition & Subtraction-Multiplication-Division. Principles of Floating point Representation. **Instruction Sets: Characteristics & Functions:** Machine Instruction characteristics-Types of Operands-Types of Operations. **Instruction Sets: Addressing Modes and Formats:** *Addressing:* Immediate- Direct-Indirect- Register- Register Indirect- Displacement addressing- Stack addressing. *Instruction Formats:* Instruction Length- Allocation of Bits- Variable length instructions.

#### UNIT IV

**Hours: 08**

**Processor structure & Function:** Processor Organization- Register organization- Instruction cycle-instruction pipelining-The Pentium Processor. **Control Unit Operations:** *Micro Operations:* The fetch cycle- The Indirect Cycle- The Interrupt cycle- The Execute Cycle- The instruction Cycle. *Control of the Processor:* Functional Requirements-Control Signals-A control signals example- Internal Processor Organization-The Intel 8085. *Hardwired Implementation:* Control Unit Inputs-Control Unit Logic.

#### UNIT V

**Hours: 12**

**Parallel Processing:** *Multiple Processor Organizations:* Types of parallel processor Systems- Parallel Organizations. *Symmetric Multiprocessors:* Organization-Multiprocessor Operating System Design considerations- A mainframe SMP. *Cache Coherence and the MESI Protocol:* Software Solutions-Hardware Solutions-Snoopy Protocols-The MESI Protocol-Read Miss-Read Hit-Write Miss-Write Hit-Cache Consistency. Multithreading and chip multiprocessors- Clusters-Approaches to vector Computation.



**TEXT BOOK:**

1. Computer Organization & Architecture-Designing for Performance by William Stallings, 9<sup>th</sup> Edition, 2012, PEARSON Prentice Hall Publication.  
(Unit –I: Chapter 1,2 &3 Unit-II : Chapter 4,5&6 Unit-III : Chapter 9,10&11 Unit – IV: Chapter 12 &16 Unit –V: Chapter 18)

**REFERENCE BOOKS:**

1. Computer Systems Organizations & Architecture by John D. Carpinelli, First Edition, 2007, PEARSON Prentice Hall Publication.
2. Computer Architecture: Concepts and Evaluation by Gerrit A. Blaauw, First Edition, 2008, PEARSON Prentice Hall Publication.
3. Computer System Architecture and Parallel Processing by Kai Hwang, Faye A. Briggs, 2009, McGraw-Hill Publications.
4. Computer organization & Design by David A Peterson and John L Hennessy, 2013, Fifth Edition.

<b>2014-2015 Onwards</b>	<b>DESIGN AND ANALYSIS OF ALGORITHMS (14P1CS02/14P1IT02)</b>	<b>M.Sc. Computer Science/ M.Sc. Information Technology</b>
<b>I Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective: To learn about how to develop the algorithms and solving the problems.**

#### UNIT -I

Hours: 10

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations - and Mathematical Analysis of Recursive and Non-Recursive Algorithms.

#### UNIT-II

Hours: 11

Divide and conquer methodology – Merge Sort – Quick Sort – Binary search – Binary Tree Traversal – Multiplication of large integers- Strassen’s matrix multiplication Greedy method – Prim’s algorithm – Kruskal’s algorithm – Dijkstra’s Algorithm.

#### UNIT-III

Hours: 10

Transform and Conquer – Presorting - Balanced Search Tree – AVL Tree - Heaps and Heap Sort - Dynamic Programming - Computing a binomial coefficient – Warshall’s and Floyd’s algorithm.

#### UNIT-IV

Hours: 10

Optimal binary - search tree – Knapsack problem – Backtracking – N-Queens problem – Hamiltonian circuit problem – subset sum problem.

#### UNIT-V

Hours: 09

Branch and bound: Assignment problem – Knapsack problem – Traveling salesman problem.

#### TEXT BOOK:

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, Pearson Education Asia, 2006.(Unit -I: chapter 1,2 Unit -II : chapter 4,9 Unit III: chapter 6,8 Unit -IV: chapter 8,11 Unit -V: chapter 11 )

#### REFERENCE BOOKS:

1. T.H.Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “Introduction to Algorithms”, PHI Pvt. Ltd., 2009, Third Edition.
2. Sara Baase and Allen Van Gelder, “Computer Algorithms – Introduction to Design and Analysis”, Pearson Education Asia, 2003.

<b>2014-2015 Onwards</b>	<b>PROGRAMMING IN .NET (14P1CS03)</b>	<b>M.Sc. Computer Science</b>
<b>I Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **The ability to effectively use visual studio .NET.**
- **An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed.**
- **A working knowledge of the C# programming language.**

**Unit – I**

**Hours: 08**

Introduction the .NET Framework: .NET Framework – C#, VB.NET and the .NET Languages – CLR- .NET Class library. Learning the C# languages: C# language Basics- Variables- Data types – Variable Operations -Object based Manipulation - Objects and Namespaces.

**Unit – II**

**Hours: 09**

Web Form Fundamentals: HTML Control classes - Page class – Web Controls: Web Control classes – AutoPostBack and Web control events. Tracing, Logging and Error Handling: Exception Handling – Handling Exceptions -Throwing your own exception - Logging exceptions - Error Pages - Page Tracing.

**Unit – III**

**Hours: 10**

Validation and Rich Controls: Validation – Examples – Understanding Regular Expression – Rich Controls – State Management: View state - Custom cookies - Session state – Application state. ADO.NET Fundamentals: ADO.NET and Data Management – ADO.NET Basics.

**Unit – IV**

**Hours: 12**

ADO.NET: Direct Data Access – Creating a Connection – Disconnected data access. Data binding: Introducing Data Binding - Single Value Data Binding – Repeated value Data Binding - Data Source Controls. The Data Controls: The Grid View –The Details View-The Form View.

**Unit – V**

**Hours: 11**

XML: XML’S hidden role in .NET-.XML Explained – XML Classes – XML validation-XML display & transforms XML Data Binding – XML in ADO.NET. Getting Started with ASP.NET Ajax - Understanding the ASP.NET Ajax Architecture - Working with the XMLHttpRequest Object – JSON.

**TEXT BOOKS:**

1. Beginning ASP.NET 2.0 in C# 2005: From Novice to Professional (Beginning: From Novice to Professional). Matthew MacDonald (Author) publication: APress 2005.(**Unit -I**: Chapter 1,2&3 **Unit-II** :Chapter 5,6&7 **Unit-III** :Chapter 8,9&13 **Unit- IV** :Chapter 13,14&15 **Unit-V** :Chapter 17).
2. Joydip Kanjilal and Sriram Putrevu, “Sams Teach Yourself ASP.NET Ajax in 24 Hours”, SAMS, 2008. (**Unit-V** :Chapter 1,2,3&5).

**REFERENCE BOOKS:**

1. William Sander, “ASP. NET 3.5 A Beginner’s Guide”, 2008.
2. Pro ASP.NET 4.0 in C# 2012-Matthew Macdonald and Mario Szpuszta-Apress.
3. C# 2012 for programmers – Fifth Edition-Deitel developer series:Paul J.Deitel and Harvey M.Deitel :Pearson.
4. Murach’s ASP.NET 4.5 web programming C# 2012-Joel Murach & Anne Boehm:SPD (Shroff publishers & Distributors pvt.Ltd).
5. Ajax The Definitive Guide: 2008 First Edition –Anthony T.Holdener III –SPD (Shroff publishers & Distributors pvt.Ltd).

<b>2014-2015 Onwards</b>	<b>WIRELESS APPLICATION PROTOCOL (14P1CS04/14P1IT04)</b>	<b>M.Sc. Computer Science/ M.sc. Information Technology</b>
<b>I Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To Understand fundamental trends of technological evolution of Wireless technology.**
- **Have hands-on knowledge in developing simple and comprehensive Wireless WAP contents.**
- **Be able to plan, design, and develop WAP pages and contents.**
- **Acquire creative skills in design, layout, and interactivity of WAP pages.**

**UNIT-I**

**Hours: 13**

Introduction – Key Services for the Mobile Internet – Business Opportunities. Making the Internet “Mobile”: Challenges and Pitfalls – The Origins of WAP – WAP Architecture – Components of the WAP Standard – Network Infrastructure services Supporting WAP Clients.

**UNIT-II**

**Hours: 12**

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

**UNIT – III**

**Hours: 08**

User Interface Design: Making wireless Application easy to use: Web Site Design: Computer Terminals versus Mobile Terminals – Designing a usable WAP Site – Structured Usability Methods – User Interface Design Guidelines.

**UNIT-IV**

**Hours: 09**

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

**UNIT-V**

**Hours: 12**

Wireless Telephony Applications: Overview of the WTA Architecture – The WTA Client Framework – Design Considerations.

**TEXT BOOKS :**

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Daniel Mauney, Jari Alvinen, David Bevis, Jim Chan., “The Wireless Application Protocol – Writing Application for the mobile internet”, Pearson Education, 2010.

(UNIT-I :Chapter - 1 to 6, UNIT-II :Chapter - 7, UNIT-III :Chapter - 10, UNIT-IV: Chapter - 11&12, UNIT-V :Chapter - 13 to 15).

**REFERENCE BOOKS :**

1. Charless Arehare, Nirmal Chidambaram, and others, “Professional WAP”, Wrox Press Ltd., Shroff publ. And Dist – Pvt. Ltd., 2001.
2. Ryan Sean Younger , “WAP & WML : Designing Usable Mobile Sites”, 2011.

<b>2014-2015 Onwards</b>	<b>.NET LAB</b>	<b>M.Sc. Computer Science</b>
<b>I Semester</b>		<b>Core: Practical - I</b>
<b>Hours: 50</b>	<b>(14P1CSP01)</b>	<b>Credit : 2</b>

**Objective: To develop the following On-line Applications using ASP.NET.**

1. Personal Information System
2. Banking System
3. Shopping System
4. Air-line Reservation System
5. Recruitment System
6. Quiz program.
7. Library Management
8. Handling Application state (using session) with a simple web application
9. Mailing system
10. Query analyzer (Query textbox and Displaying records)
11. Search Engine using AJAX
12. To implement a simple web application using AJAX

<b>2014-2015 Onwards</b>	<b>ADVANCED OPERATING</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>	<b>SYSTEMS</b>	<b>Core: Theory</b>
<b>Hours: 50</b>	<b>(14P2CS05)</b>	<b>Credit : 4</b>

**Objectives:**

- **To learn the fundamentals of Operating Systems.**
- **To gain knowledge on Distributed operating system concepts that includes architecture, Algorithms for Implementing DSM.**
- **To know the components and management aspects of Real time, Mobile operating Systems.**

**UNIT-I**

**Hours: 08**

Overview: Introduction- Functions of operating systems – Design Approaches – Types of Advanced Operating Systems. Synchronization Mechanisms: Introduction – Concept of Process – Concurrent Process – The critical section Problem. Process Deadlocks: Introduction – Preliminaries – Models of Deadlocks – Models of Resources – A Graph-Theoretic Model of a System State – Necessary and Sufficient Conditions for a Deadlock.

**UNIT – II**

**Hours: 10**

Architectures of Distributed Systems: Introduction – Motivation – System Architecture Types – Distributed operating Systems – Issues in Distributed operating System – Communication Network – Communication Primitives. Distributed Shared Memory: Introduction – Architecture and Motivation – Algorithms for Implementing DSM – Memory Coherence – Coherence Protocols – Design Issues.

**UNIT – III**

**Hours: 09**

Multiprocessor System Architectures: Introduction – Motivations – Basic Multiprocessor System Architecture – Interconnection networks for Multiprocessor System – Caching – Hypercube Architecture. Multiprocessor Operating Systems: Introduction – Structures – Operating System Design Issues – Threads – Process Synchronization – Process Scheduling – Memory Management – Reliability/Fault Tolerance.

**UNIT – IV**

**Hours: 08**

Linux Operating systems: Introduction – History of UNIX and Linux – System Features – Software Features – Differences between Linux and Other Operating System – hardware requirements - sources of Linux Information. Linux Startup and Setup: User accounts – Accessing the Linux system – Unix Commands

**UNIT – V**

**Hours: 15**

Linux File Structure: Linux file types – File structures – managing Files - Managing Directories – File and Directory operation. File Management Operation: File and Directory permissions – Jobs – System Administration – Shells in Linux. Shell operations: Command Line – Standard Input/output- Redirection – Pipes – Shell Scripts – Shell Variables - Arithmetic Shell Operations – Control Structures.



**TEXT BOOKS:**

1. "Advanced Concepts in Operating Systems", Mukesh Singhal, Niranjana G. Shivarathri, 2011.
2. Richard Petersen, The Complete Reference – Linux , TMH sixth edition 2011..

**REFERENCE BOOKS:**

1. Operating System in depth: Design & Programming, Thomas.W, Doeppner, First Edition 2010.
2. The Linux Programming Interface: A Linux and Unix System Programming handbook, Michal Kerisk, First Edition, 2010.

<b>2014-2015 Onwards</b>	<b>ADVANCED JAVA PROGRAMMING (14P2CS06)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To Create network based applications, Java Database Connectivity ,Implement Server side programming.**
- **To Develop EJB Architecture, Hibernate Query Language.**

**Unit – I:**

**Hours: 08**

AWT: Using AWT Controls, Layout Managers and Menus. SWING: A Tour of SWING – Event Handling-Java Database Connectivity (JDBC).

**Unit – II:**

**Hours: 09**

Java Servlets: Life cycle of Servlet - constituents of javax.servlet.package- Constituents of javax.servlet.http.package-Cookies- Session Tracking. Java Server Pages: Introducing Java Server Pages-Basic Elements–Actions Elements-Implicit Objects.

**Unit – III:**

**Hours: 11**

Remote method Invocation: Remote Interface-java.rmi.server package-The Naming Class - RMI Security Manager Class -RMI Exceptions - Steps involved in creating RMI Client and Server Classes. Java Bean: Advantages of Java Bean –Application Builder Tools-JAR files- Introspection - Developing a Simple Java Bean using JDK- Persistence – Customizers - Java Mail.

**Unit – IV:**

**Hours: 10**

Understanding EJB: EJB Architecture-Session Bean-Developing Session Beans-Entity Beans - Bean managed persistence in Entity Beans. Understanding Struts: Introduction-MVC Framework- Struts Control flow - Building Model Components - Building View Components – Building Control Components.

**Unit – V:**

**Hours: 12**

Hibernate: Features of Hibernate-Hibernate Architecture – Understanding Hibernate O/R Mapping - Hibernate Query Language. Spring: Introduction to the Spring Framework - Features of the Spring-Spring Architecture-Spring AOP-Testing-Data Access using JDBC.

**TEXT BOOKS :**

1. Herbert Schildt, "The complete Reference-Java2", fifth Edition 2002 TMH (Unit-I : Chapters 20, 22 & 26, Unit -III: Chapter 25)
2. Java server programming (J2ee 1.4)-2007 platinum Edition. Kogent solution Inc. (Unit-IV : Chapters 9 & 18, Unit-V : Chapters 20 & 21)
3. Dr C.Muthu "programming with Java", Vijay Nicole Imprints Private Ltd 2008 (Unit-I : Chapter 18, Unit-II : Chapter 19, Unit-III : Chapter 20)
4. Java server pages in easy steps -Mike Mcgrath-2002-dreamtech-New Delhi. (Unit-II Chapters 1, 2, 3 & 5)

**REFERENCE BOOKS :**

1. Enterprise JavaBeans-Developing component based distributed Applications-Pearson Education, 2004.
2. Deitel H.M. & Deitel P.J, "Java How to Program", Prentice-Hall of India, 10<sup>th</sup> Edition , 2014.
3. Cay.S Horstmann, Gray Cornel, "Core Java 2 - Vol.II- Advanced features", Pearson Education, 8<sup>th</sup> Edition 2008.

<b>2014-2015 Onwards</b>	<b>ADVANCED DATABASE MANAGEMENT SYSTEMS (14P2CS07)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- To learn about Extended Entity Relationship Model, Distributed Database Management Systems.
- To develop the Object Oriented Databases, Server Side Extensions, Geographic Information Systems.

**UNIT – I**

**Hour: 8**

Advanced Data Modeling: Extended Entity Relationship Model, Entity Clustering, Entity Integrity, Design Cases. - Advanced SQL: Relational Set Operators, SQL Join Operators, Sub queries and Correlated Queries, SQL Functions, Views, Procedural SQL, Embedded SQL - Database design: SDLC, DBLC.

**UNIT - II**

**Hour: 9**

Advanced Database concepts: Transaction Management and Concurrency Control - Database Performance Tuning and Query optimization - Distributed Database Management Systems.

**UNIT - III**

**Hour: 12**

Object Oriented Databases – Introduction – Evolution of Object Oriented Concepts- Object Oriented Concepts – Characteristics of an Object Oriented Data Models – OODM and Previous Models - OODBMS – How Object Orientation affects Database Design – Advantages and Disadvantages of OODBMS. Databases in Electronic Commerce.

**UNIT -IV**

**Hour: 11**

Web Databases: Internet Technologies and Databases - Uses of Internet Databases - Web to Database Middleware - Server Side Extensions - The Web Browser - Internet Database Systems: Special Considerations - Database Administration.

**UNIT - V**

**Hour: 10**

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

**TEXT BOOKS:**

1. Peter Rob and Carlos Coronel, “Database Systems – Design, Implementation and Management”, Cengage Learning, 7th Edition, 2007. (Unit- I : Chapter6, 8 &9, Unit-II : Chapter 10,11&12).
2. Peter Rob and Carlos Coronel, “Database Systems – Design, Implementation and Management”, Thompson Learning, Course Technology, 5th Edition, 2003. (Unit – III :Chapter11&14, Unit –IV : Chapter15.1, 15.2, 15.3,15.4,15.6&16).
3. Ramez Elmasri, Shamkant B.Navathe, “Fundamentals of Database Systems” 5/E,Pearson Education, (Unit-V : Chapter 24&30).

**REFERENCE BOOKS:**

1. Thomas M. Connolly, Carolyn E. Begg, “Database Systems - A Practical Approach to Design , Implementation , and Management”, 5<sup>th</sup> Edition , Pearson Education, 2009.
2. C.S.R.Prabhu, “Object Oriented Database Systems: Approaches & Architecture”, PHI, 3<sup>rd</sup> Edition , 2010.
3. M.Tamer Ozsü , Patrick Ualduriel, “Principles of Distributed Database Systems”, 3<sup>rd</sup> Edition, Pearson Education, 2007.

<b>2014-2015 Onwards</b>	<b>PC HARDWARE AND TROUBLE SHOOTING (14P2CS08)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To understand history of computers, Identifying and Installing Zip Drives, Installing CD Media Drives, Installing and Configuring LAN.**

**UNIT – I:**

**Hours: 11**

Your PC Revealed: History of Computers – Safeguarding PC – Components of PC. CPUs: Functions – Identifying Right CPU – Installing and Upgrading CPUs. RAM: Types of RAM – RAM Packages – Adding and Upgrading RAM. Motherboards and BIOS: Features – Types – Installing Motherboard. System BIOS.

**UNIT – II**

**Hours: 11**

Expansion Bus: Expansion Busses – Internal Buses – Installing a plug and Play Expansion Card – External Expansion Buses. Power Supplies and Cases: Case Form and Function – Power Supply – Cooling. Removable Media: Floppy Drives – Identifying and Installing Zip Drives – Modern Tape Drive Technologies – Tape Backup Strategies.

**UNIT – III**

**Hours: 09**

Hard Drives: How to store data – Installing hard drive – Configuring hard drive – Hard drive Maintenance and Troubleshooting. CD Media: CD Media Technologies – Installing CD Media Drives – Using CD Media – CD Media Troubleshooting.

**UNIT – IV**

**Hours: 09**

SCSI: SCSI Components – Different flavors of SCSI – Installing SCSI Devices – SCSI Troubleshooting. Video: Selecting Right Monitor – Selecting Right Video Card – Installing and Configuring Video Software – Maintenance and Troubleshooting. Input Devices: Installing Keyboard – Installing and Configuring Mouse – Identifying Less Common Input Devices.

**UNIT – V**

**Hours: 10**

Sound: How Sound works in a PC – Purchasing Right Sound Card – Installing Sound Card – Troubleshooting Sound. Printers: Identifying Printer Technologies – Installing Printer – Performing Basic Printer Maintenance – Recognizing and Fixing Basic Printing Problems. Networks: Installing and Configuring Dial-Up Network – Installing and Configuring LAN – Troubleshooting Basic Network Problems.

**TEXT BOOK:**

1. Mike Meyers, “Introduction to PC Hardware and Trouble shooting”, Tata McGraw-Hill, New Delhi, 2003.(Unit-I : Chapter 1,2,3&4, Unit-II: Chapter5,6&7, Unit –III : Chapter 8&9, Unit-IV : Chapter 10,11 & 12, Unit-V: Chapter 13,14&15).

**REFERENCE BOOKS:**

1. Craig Zacker & John Rourke, “The complete reference:PC hardware”, Tata McGraw-Hill, NewDelhi, Second Edition 2007. B.Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”, Tata McGraw-Hill, New Delhi, Second Edition 2007.

<b>2014-2015 Onwards</b>	<b>OPERATING SYSTEM LAB (LINUX)</b>  <b>(14P2CSP02)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Core: Practical – II</b>
<b>Hours: 50</b>		<b>Credit : 2</b>

**Objective:**

- **To develop the programs in script based Linux.**

1. Write the shell script to check the status of file using test command.
2. Write the shell script to find the grade of student's marks.
3. Write a menu driven shell program to perform the following.
  - i) Enter the sentence in file
  - ii) Search a whole worded in an existing file.
  - iii) Quit.
4. Write a shell script to perform case conversion.
5. Write a shell script to find the sum of digits.
6. Write a shell script to find the biggest of three numbers using command line arguments.  
Check for sufficient number of command line arguments.
7. Write a shell script to copy, delete and renaming a file.

**C-Linux**

1. Implementation of system calls – Open, read and close.  
Create, write, lseek, stat, fstat.
2. Implementation of fork & exec.
3. Interprocess communication using messages, pipes and queues.

<b>2014-2015 Onwards</b>	<b>ADVANCED JAVA PROGRAMMING LAB (14P2CSP03)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Core: Practical - III</b>
<b>Hours: 50</b>		<b>Credit : 2</b>

**Objective:**

- **To develop the online program using JAVA.**
1. To Develop Student Information using AWT.
  2. To Prepare Electricity Bill Using Swing.
  3. To implement Library information using JDBC.
  4. To maintain Employee information using servlets.
  5. To implement session and cookies concepts using servlets
  6. To develop Online Job Registration using JSP.
  7. Create a simple application using JSP and Java Beans
  8. To develop Arithmetic Operation Using RMI.
  9. To create Simple Session Bean.
  10. To Implement Banking Operations using Entity Bean.
  11. To develop Simple Web Application using Struts.
  12. To implement Simple Hibernate program.



<b>2014-2015 Onwards</b>	<b>CLIENT / SERVER TECHNOLOGY (14P1CSE01)</b>	<b>M.Sc. Computer Science</b>
<b>I Semester</b>		<b>Elective : Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To understand Hardware Trends, Client Component, Server Hardware, Overview of Networking, Development and Deployment, Network Management Environment- Network, Development Methodology.**

**UNIT-I**

**Hours: 09**

Introduction to Client Server Computing-Benefits of Client Server Computing-Hardware Trends-Components of Client Server Applications-Categories of Client Server Applications-Dispelling the Myths-Obstacles-Upfront and Hidden-Open Systems and Standards-Setting Organization-Factors for Success.

**UNIT-II**

**Hours: 10**

Client Hardware and Software-Client Components-Client Operating System-GUI-X Window Vs Windowing-Database Access-Application Logic-Client Server Products-Requirements-GUI Design Standards-Open GUI Standards.

**UNIT-III**

**Hours: 13**

Server Hardware-Benchmarks-Categories of Server-Features of Server Machines-Classes of Server Machines-Server Environment-Eight layers of Software-Network Management Environment-Network Computing Environment-Server Requirements-Platform Independence-Transaction Processing-Connectivity-Intelligent Database-Stored Procedures-Triggers-Load Leveling-Optimizer-Testing and Diagnostic Tools-Reliability-Backup and Recovery Mechanisms- Server Data Managements and Access Tools.

**UNIT-IV**

**Hours: 08**

Overview of Networking-Layers,Interfaces and protocols-Standard Architectures-Network Characteristics-Network Management Standards-LAN Hardware and Software-LAN Hardware-Network Operating System.

**UNIT-V**

**Hours: 10**

Development and Deployment-Development Methodology-Convert Existing Screen Interfaces-Application Development Tools-Managing the Production Environment-Production Requirements-Future Trends.

**TEXT BOOK:**

1. Dawna Travis Dewire, "Client/Server computing, 11<sup>th</sup> Reprint 2009, Tata McGraw Hill.  
(Unit-I:Chapter 1,2,3&4, Unit-II: Chapter 5,6&7,Unit-III :Chapter 8,9,10,11&12) Unit – IV:Chapter 15 &16, Unit –V:Chapter 17,18 &19)

**REFERENCE BOOKS:**

1. Jafferey D. Schank, "Novell's guide to Client/Server Application and Architecture", 2005 Edition, BPB Publications.

<b>2014-2015 Onwards</b>	<b>SOFTWARE PROJECT MANAGEMENT AND QUALITY ASSURANCE (14P1CSE02/14P1ITE02)</b>	<b>M.Sc. Computer Science / M.Sc. Information Technology</b>
<b>I Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To Understand Product Life Cycle, Project Life Cycle, Software Configuration, Definitions and Terminology, Project Initiation, Quality Management, Project Management.**

**UNIT-I**

**Hours: 09**

Introduction – Product Life cycle – Project life cycle models - Water fall model – Prototyping model – RAD model – Spiral Model – Process Models –The ISO-9001Model-The Capability Maturity Model- Metrics.

**UNIT -II**

**Hours: 10**

Software Configuration Management – Definitions and terminology – The processes and activities – Configuration Audit – Metrics –Tools andAutomation- Software Quality Assurance – Define Quality – Quality Control and Assurance – SQA Analysts Functions - QA Tools – Organizational Structures – Profile of a successful SQA-Measures of SQA success.

**UNIT-III**

**Hours: 09**

Project Initiation – Project Planning and Tracking – What, Cost, When and How – Organizational Processes – Assigning Resources – Activities to specific to Project Tracking – Project Closure – When and How.

**UNIT – IV**

**Hours: 11**

Quality Management-Software Quality,Software Quality Dilemma-Achieving Software Quality-Software Testing Strategies-Strategic Approach-Test Strategies for Conventional Software and Object Oriented Software.

**UNIT - V**

**Hours: 11**

Project Management -The People,The Product,The Process - Project Scheduling - Risk Management –Maintenance and Reengineering - Business Process Reengineering – Software Re Engineering – Reverse Engineering – Restructuring - Forward Engineering.

**TEXT BOOKS**

1. Gopaldaswamy Ramesh, “Managing Globle Software Projects” Tata McGraw Hill.Publishing Company Ltd, New Delhi, 2002. (Unit-I :Chapter 1,2,3,4&5, Unit-II: Chapter 6,7, Unit-III: Chapter 10,11 & 12)
2. Pressman, Roger, “Software Engineering ”, A Practitioner's approach, 7<sup>th</sup> edition, Tata Mc- Graw Hill, 2006. 6<sup>th</sup> Edition (Unit-IV: Chapter 25,26, Unit-V: 21,31)

**REFERENCE BOOKS:**

1. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", MassMarket, 2004.
2. Bob Hughes and Mike Cotterell “Software Project Management” 2<sup>nd</sup> edition, TataMcGraw Hill Publishing Company Ltd., New Delhi, 2002.
3. Software Project Management, Ashfaque Ahmed 2013.

<b>2014-2015 Onwards</b>	<b>ADVANCED NETWORKS</b>  <b>(14P1CSE03)</b>	<b>M.Sc. Computer Science</b>
<b>I Semester</b>		<b>Elective : Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To Understand Advanced Networks through in ISDN,ISDN data link layer, frame relay protocols, ISDN network layer, frame relay congestion control, ATM layer.**

**UNIT-I**

**Hours: 10**

ISDN Overview: The Integrated Digital Network – A Conceptual Overview of ISDN – ISDN Standards – ISDN Interfaces and Functions: Transmission Structure – User-Network Interface Configuration – ISDN Protocol Architecture – ISDN Connections – Addressing – Inter Networking. ISDN Physical Layer: Basic User-Network Interface – Primary Rate user-Network Interface - U Interface.

**UNIT-II**

**Hours: 10**

ISDN Data Link Layer: LAPD – Terminal Adaptation – Bearer Channel Data Link Control Using I.465 / V.120,207. – ISDN Network Layer: Overview – Basic Call Control – Control of Supplementary Services - ISDN Services: Service Capabilities – Bearer Services and Teleservices – Basic and Supplementary Services.

**UNIT – III**

**Hours: 12**

Frame Relay Protocols & Services: Frame –Mode Protocol Architecture – Frame Mode Call Control – LAPF – Frame Relay Congestion Control: Congestion in Frame Relay Network- Approaches to Congestion Control – Traffic Rate Management – Explicit & Implicit Congestion Control – Broad Band ISDN –Architecture: Requirements – Architecture . Broad Band ISDN Protocol: B-ISDN Protocol Reference Model – B- ISDN Physical Layer – SONET / SDH.

**UNIT – IV**

**Hours: 09**

ATM Layer: Introduction – ATM Cell header Structure at UNI - ATM Cell header Structure NNI – ATM Layer Functions – ATM Adaptation Layer : ATM Traffic & Service Parameterization – ATM Traffic Management – ATM Switching.

**UNIT – V**

**Hours: 09**

ATM Addressing: ATM End System Addressing (AESA) Format – ATM Group Addressing – Acquiring ATM Address – ATM Name System. – ATM Signaling –ATM Routing – ATM Network Management – ATM Security.

**TEXT BOOKS :**

1. William Stallings, “ISDN and Broad Band ISDN with Frame Relay and ATM “ , Pearson Education , Fourth Edition, Second Impression -2009.(Unit-I:Chapter-5,6&7, Unit-II:Chapter-8,9&10, Unit-III:Chapter-12,13,14&15)
2. Sumit Kasera, ”ATM Networks Concepts & Protocols”, Tata MC Graw Hill, Second Edition, Eighth Reprint–2008.(Unit-IV:Chapter-5,6,7,8 & 9, Unit-V:Chapter-10,11,12,14 &15)

**REFERENCE BOOKS :**

1. John M.Griffiths,"ISDN Explained",4<sup>th</sup> Edition, March 2005,Willey & Sons.
2. Walter,J., Gooralski,J., "Introduction to ATM networking ",2003 ,Tata MC Graw-Hill.
3. William Stallings, Data and Computer Communications, 10<sup>th</sup> Edition, 2013.

<b>2014-2015 Onwards</b>	<b>EMBEDDED SYSTEMS</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Elective : Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To Understand Embedded Systems, Processor and memory organization, Software engineering practices, RTOS, EDLC.**

**UNIT – I**

**Hours: 10**

Introduction to Embedded Systems-Categories of embedded Systems-specialties of embedded systems- requirements of embedded systems –challenges and issues in embedded software development – recent trends in embedded systems-Architecture of embedded systems: Hardware architecture – software architecture-application software – Communication software –Embedded systems on a Chip (SoC) and the use of VLSI designed circuits.

**UNIT – II**

**Hours: 09**

Processor and memory organization-Devices and buses for Device Networks-Device drivers and Interrupt servicing mechanism.-program modeling concepts in single and multiprocessor systems software-development process.

**UNIT – III**

**Hours: 11**

Software Engineering Practices in the Embedded software development process- Inter-process communication and synchronization of process, tasks and threads- Hardware-software co-design in an embedded system.

**UNIT – IV**

**Hours: 11**

Hardware software co-design and program modeling-Embedded hardware design and development-embedded firmware design and development-Real-time operating system (RTOS) based embedded system design-

**Hours: 09**

**UNIT V**

Introduction to embedded system design with vx works and MicroC/OS-II RTOS- Integration and Testing of embedded hardware and firmware-embedded system development environment-embedded product development life cycle(EDLC)

**TEXT BOOKS:**

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw- Hill, Twelfth Reprint 2007. (Unit- I: Chapter 1, Unit –II: Chapter 2,3,4 &6, Unit- III: Chapter 7,8 &12)
2. Introduction to Embedded systems – SHIBU K V TATA McGraw- Hill 2009(Unit – IV: Chapter - 8,9&10, Unit-V: Chapter 11,12,13 & 15)

**REFERENCE BOOKS:**

1. Embedded system design, ARNOLD S.BERGER ,south Asian edition –2005
2. Embedded system design ,Frank Vahid/Tony givargis-reprint-2009

<b>2014-2015 Onwards</b>	<b>OBJECT ORIENTED ANALYSIS AND DESIGN (14P2CSE05)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Elective : Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To learn the concept of the Evolution of the Object Model .**
- **To get acquainted with UML Diagrams.**
- **To understand Interaction Overview Diagrams.**

**UNIT-I**

**Hours : 10**

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of the Object – Relationships among Objects-The Nature of a Class – Relationships among Classes – The Interplay of Classes and Objects – On Building Quality Classes and Objects.

**UNIT-II**

**Hours : 10**

Classification: The Importance of Proper Classification – Identifying Classes and Objects – Key Abstractions and Mechanisms. The Notation: Elements of the Notation – Class Diagrams – State Transitions Diagrams – Object Diagrams – Interaction Diagrams – Module Diagrams – Process Diagrams – Applying the Notation.

**UNIT – III**

**Hours : 12**

The Process: First Principal – The Micro Development Process - The Macro Development Process – Pragmatics: Managements and Planning – Staffing – Release Managements – Reuse – Quality Assurance and Metrics – Documentation – Tools – Special Topics – The Benefits and Risks of Objects – Oriented Developments.

**UNIT – IV**

**Hours: 09**

UML: Introduction- Development Process- Class Diagrams: The Essentials-Sequence Diagrams. Class Diagrams: Advanced Concepts.

**UNIT – V**

**Hours: 09**

Object Diagrams-Package Diagrams – Deployment diagrams-Use Cases-State Machine Diagrams – Activity Diagrams-Communication Diagrams-Composite structures-Component Diagrams-Collaborations- Interaction Overview Diagrams- Timing Diagrams.

**TEXT BOOKS:**

1. Grady Booch, ” Object-Oriented Analysis and Design”, Pearson Education, 2<sup>nd</sup> Edition, Third Impression 2008. (Unit-I:Chapter-2&3 Unit-II : Chapter-4 & 5, Unit-III:Chapter-6 &7)
2. Martin Fowler & Co ,” UML Distilled “,” Pearson Education, 3<sup>rd</sup> Ed.- 2010. Unit-IV:Chapter-1,2,3,4 & 5, Unit-V:Chapter-6 to 17)

**REFERENCE BOOKS:**

1. Object Oriented Modeling and Design By James Rumabaugh , Michael Blaha, Prentice Hall - 2006.
2. Ali Brahmi , ”Object Oriented System Development “ TMH Intl Edition -2007.

<b>2014-2015 Onwards</b>	<b>ARTIFICIAL INTELLIGENCE &amp; EXPERT SYSTEMS (14P2CSE06)</b>	<b>M.Sc. Computer Science</b>
<b>II Semester</b>		<b>Elective : Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

- **Our goal is to learn about computer systems that heuristic search techniques, in Computable Functions and Predicates .Topics include Symbolic Reasoning under Uncertainty, Representing and using Domain Knowledge.**

**UNIT I**

**Hours: 10**

Introduction - The AI problems – AI techniques – problems, problems space & search – Defining the problem as a state Search – Production systems – problem characteristics – heuristic search techniques – Generate & test – Hill climbing – Best first search- Problem reduction-Constraint Satisfaction-mean-end Analysis.

**UNIT II**

**Hours: 14**

Using Predicate Logic: Representing Simple Facts in Logic-Representing Instance and ISA Relationships-Computable Functions and Predicates-Resolution-Netural Deduction. Game playing : Overview-The Mini–max Search procedure – Adding Alpha – Beta cutoffs – Additional refinements –Interactive deepening.

**UNIT III**

**Hours: 13**

Representing knowledge using Rules – Procedural verses declarative knowledge- logic programming – forward versus backward reasoning –matching – control knowledge. Symbolic Reasoning under Uncertainty-Statistical Reasoning.

**UNIT IV**

**Hours: 06**

Introduction to Expert Systems- Representing and using Domain Knowledge- xpert System Shells-Explanation-Knowledge Acquisition.

**UNIT V**

**Hours: 07**

Weak slot –and-filler structures: semantic nets- frames. Strong slot and filler structures- conceptual dependency- scripts- CYC.

**TEXT BOOKS:**

1. Elaine Rich, Kevin Knight and Shivashankar B. Nair – Artificial Intelligence - Tata McGraw Hill, NewDelhi – Third Edition, 2010. Unit–I :Chapter-1,2&3, Unit–II:Chapter-5&12, Unit–III:Chapter-6,7&8).
2. Donald A.Waterman – A Guide to Expert Systems Tata McGraw Hill – Second Edition, 1991. (Unit – IV & V).

**REFERENCE BOOK:**

1. Stuart Russell & Peter Norving - Artificial Intelligence - A Modern Approach – Third Edition, 2009.

<b>2014-2015 Onwards</b>	<b>OPEN SOURCE TECHNOLOGIES (14P3CS09 / 14P3IT09)</b>	<b>M.Sc. Computer Science / Information Technology</b>
<b>III Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

- To enable the students to learn the concepts of XML, SOAP basics, PHP and MYSQL.

**UNIT-I**

**Hours: 10**

Introduction: What is XML? – Origin Of the XML Standards - Where XML Can Be Used, And What U Can Use it For- Well-Formed XML: Parsing XML – Attributes - Comments –Empty Elements - XML Declaration - Processing Instructions – Illegal PCDATA Characters - Errors in XML. Validation: Document Type Definitions.

**UNIT- II**

**Hours: 10**

Programming: The XML Document Object Model (DOM) - Purpose of the XML DOM – The Document Object Model at the W3C - Two Ways to view DOM Nodes - Tools to Run the Examples - The Node Object - The Document Interface. Simple API for XML (SAX): What is SAX and Why Was It Invented? - Receiving SAX Events - Good SAX and Bad SAX. SOAP and WSDL.

**UNIT – III**

**Hours: 11**

Introduction to PHP - Programming with PHP- Introduction to MySQL – Introduction to SQL.

**UNIT- IV**

**Hours: 10**

Advance SQL and MySQL - Error Handling and Debugging – Using PHP with MySQL.

**UNIT-V**

**Hours: 09**

Cookies and Sessions – Security Methods - Perl-Compatible Regular Expression.

**TEXT BOOKS**

1. David Hunter, Jeff Rafter, Joe Fawcett, Eric Van der Vlist ,Danny Ayers, John Duckett, Andrew Watt, Linda McKinnon “Beginning XML 4<sup>th</sup> Edition”, -Wiley India Pvt. Limited - 2008. Unit I- Chapters 1,2,4. Unit II –Chapter 11, 12, 15.

2. Lary Ullman , “PHP6 AND MySQL5 For Dynamic Web Sites” -, Pearson Education – 2008. Unit III - Chapter 1, 2, 4. Unit IV- Chapters 6,7,8. Unit V, Chapters 11,12,13.

**REFERENCE BOOKS**

1. Chris Bates “Web Programming, Building Internet Applications”, 2nd Edition, WILEY Dreamtech.

2. Michael j. “Young Step by Step XML?” PHI, New Delhi, 2014.



<b>2014-2015 Onwards</b>	<b>SOFT COMPUTING (14P3CS10)</b>	<b>M.Sc. Computer Science</b>
<b>III Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To familiarize with soft computing concepts.**
- **To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based on human experience.**
- **To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.**

**UNIT-I**

**Hours: 09**

**Fundamentals of Neural Networks:** Basic Concepts of Neural Network-Model of an Artificial Neuron - Neural Network Architectures - Characteristics of Neural Networks - Learning Methods - Taxonomy of Neural Network Architectures - History of Neural Network Research - Early Neural Network Architectures - Some Applications Domain.

**UNIT-II**

**Hours: 12**

**Backpropagation Networks:** Architecture of Backpropagation Network - Backpropagation Learning – Illustrations – Applications - Effect of Tuning Parameters of the Backpropagation Neural Network - Selection of various Parameters in Backpropagation Neural Network - Variations of Standard Backpropagation Algorithms.

**UNIT-III**

**Hours: 09**

**Adaptive Resonance Theory (ART):** Introduction - Classical ART networks - Simplified ART Architecture - ART1 - Architecture of ART1 - Special Features of ART1 Models - ART1 Algorithm - ART2 - Architecture of ART2 - ART2 Algorithm -Applications.

**UNIT-IV**

**Hours: 10**

**Fuzzy Set Theory:** Fuzzy Sets - Fuzzy Relations. **Fuzzy Systems:** Fuzzy Logic - Fuzzy Rule based system - Defuzzification Methods - Applications. **Fuzzy Backpropagation Networks:** LR-type Fuzzy Numbers - Fuzzy Neuron - Fuzzy Backpropagation Architecture.

**UNIT-V**

**Hours: 10**

**Fundamentals of Genetic algorithms:** Basic Concepts - Creation of Offsprings – Encoding - Reproduction. **Genetic Modeling:** Cross Over - Inversion and Deletion - Mutation Operator - Bit Wise Operators.

**TEXT BOOK:**

1. Rajasekaran. S and Vijayalakshmi Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, New Delhi-2012.

Unit I-Chapters: 2.1, 2.3-2.10, Unit-II-Chapters: 3.1-3.7, Unit-III- Chapters: 5.1-5.4, Unit-IV- Chapters: 6.3, 6.5, 7.3-7.6, 12.1-12.3, Unit-V: Chapters: 8.2,8.3,8.5,8.7,9.2,9.3,9.4,9.5.

<b>2014-2015 Onwards</b>	<b>NETWORK SECURITY (14P3CS11)</b>	<b>M.Sc. Computer Science</b>
<b>III Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

**To study technologies and research problems in the Internet, wireless ad hoc and sensor networks, with concentration in security related issues.**

**UNIT – I**

**Hours: 09**

Introduction: Security Trends-The OSI Security Architecture - Security Attacks - Security Services- Security Mechanisms- Model for Internetwork Security - Internet Standards and the Internet Society. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles - Symmetric Block Encryption Algorithms - Stream Ciphers and RC4 - Cipher Block Modes of Operations - Location of Encryption Devices-Key Distribution.

**UNIT - II**

**Hours: 10**

Public Key Cryptography and Message Authentication: Approaches to Message Authentication – Secure Hash Functions and HMAC - Public Key Cryptography Principles - Public Key Cryptography Algorithms - Digital Signatures - Kerberos - X.509 Authentication service - Public Key Infrastructures.

**UNIT - III**

**Hours: 11**

Electronic mail Security: Pretty Good Privacy(PGP) - S/MIME. IP Security: IP Security Overview – IP Security Architecture - Authentication Header - Encapsulating Security Payload - Combining security Associations - Key Management.

**UNIT - IV**

**Hours: 09**

Web Security: Web Security Considerations- Security Sockets Layer (SSL) and Transport Layer Security (TLS) - Secure Electronic Transaction. Network Management Security: Basic Concepts of SNMP - SNMPV1 Community facility - SNMPV3.

**UNIT-V**

**Hours: 11**

Intruders: Intruders – Intrusion Detection – Password Management - Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks. Firewalls: Firewall Design Principles – Trusted Systems – Common Criteria for IT Security Evaluation.

**TEXT BOOK**

William Stallings, “Network Security Essentials – Applications and Standards”, 3<sup>rd</sup> Edition, Pearson Education, 2009 Edition.

Unit I : Chapter 1 & 2 , Unit II : Chapter 3 & 4, Unit III : Chapter 5 & 6,

Unit IV : Chapter 7 & 8, Unit-V (Chapter 9, 10 & 11)

**REFERENCE BOOKS**

1. V.K.Pachhare , “Cryptography and Information Security” , PHI 2013.

2. William Stallings, “Cryptography and Network Security”, Pearson Education - 2008.

3. Behrouz A Forouzan, Sophia Chung Fegan, “Data Communications and Networking”, TMH-2013.

<b>2014-2015 Onwards</b>	<b>OPEN SOURCE TECHNOLOGIES LAB (14P3CSP04/14P3ITP04)</b>	<b>M.Sc. Computer Science/Information Technology</b>
<b>III Semester</b>		<b>Core: Practical-IV</b>
<b>Hours: 50</b>		<b>Credit : 2</b>

**Objective:**

- **To develop the program in XML-DOM and PHP & MySQL through open source technology.**

**I. Develop the following online Programs using XML.**

1. To prepare CD Catalogs data as .xml file and view that data through xmlDoc object.
2. Write a program for xml validations.
3. Develop a book store data as .xml file and view that data through XML-DOM (loadXMLDoc() or loadXMLString())functions.
4. Write a simple program using SAX Events.

**II. Develop the following online applications using PHP & MySQL.**

5. Students Feedbacks System.
6. Job Registrations.
7. Library Management System.
8. Banking Transaction System.
9. Simple Shopping Application.
10. Getting Web Data using Cookies Object.
11. Webpage Kit Counters using Session.
12. Airline Reservation System.

<b>2014-2015 Onwards</b>	<b>DISTRIBUTED COMPUTING (14P4CS12)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To study software components of distributed computing systems.**
- **The communication and interconnection architecture of multiple computer systems is introduced.**
- **The design issues of distributed computing systems are discussed.**
- **To emphasizes developing applications on various distributed computing platforms or environments.**

**UNIT-I**

**Hours: 10**

Introduction: Definition Of distributed system- goals - Types of Distributed Systems Architectures: Architectural Styles - System Architectures - Architectures Vs Middleware – Self-Management in Distributed Systems. Processes: Threads – Virtualization - Clients Servers - Code Migration.

**UNIT-II**

**Hours: 11**

Communication: Fundamentals - Remote Procedure Call – Message-Oriented Communication – Stream-Oriented Communications - Multicast Communication. Naming: Names, Identifiers and Addresses - Flat Naming - Structured Naming –Attribute-Based Naming.

**UNIT-III**

**Hours: 09**

Synchronization: Clock Synchronization - Logical Clocks - Mutual Exclusion -Global Positioning of Nodes - Election Algorithms. Consistency and Replication: Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models-Replica Management - Consistency Protocols.

**UNIT-IV**

**Hours: 10**

Fault Tolerance: Introduction to Fault Tolerance - Process Resilience - Reliable Client-Server Communication - Reliable Group Communication - Distributed Commit- Recovery. Security: Introduction to Security - Secure Channels - Access Control -Security Management.

**UNIT-V**

**Hours: 10**

Distributed Object-Based Systems: Architecture – Processes – Communication –Naming – Synchronization - Consistency and Replication – Fault Tolerance -Security. Distributed file system: Architecture –Processes-communication-Naming-Synchronization-Consistency and Replication - Fault Tolerance – Security – Distributed Web-Based Systems.

**TEXT BOOK:**

1. Andrew S.Tanenbaum, Maarten Van Steen, “Distributed Systems” Principles and Paradigms. Second Edition, PHI Publications, New Delhi -2008.

Unit-I (Chapters -1,2,&3) , Unit-II (Chapters- 4 & 5), Unit-III (Chapters-6 & 7), Unit-IV (Chapters-8 & 9), Unit-V (Chapter-(10, 11 &12)

**REFERENCE BOOKS:**

1. Birman, Kenneth P, “Reliable Distributed Systems - Technologies, Web Services, and Applications”, Springer Publications, 2011 Edition.
2. G.coulouris, Jean Dollimore & Tim Kindberg,Distributed Systems: Concepts and Design (4<sup>th</sup> Edition) , Addison Wesley Publications, 2011 Edition.

<b>2014-2015 Onwards</b>	<b>DATA MINING AND WAREHOUSING (14P4CS13)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.**
- **To introduce the concept of data warehousing with special emphasis on architecture and design.**

**UNIT I**

**Hours: 11**

Introduction: Data Mining – Data Mining Functionalities – Kinds of Patterns can be Mined – Classification – Data Mining Task Primitives - Major Issues. Data pre-processing: Descriptive Data Summarization - Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and concept Hierarchy Generation.

**UNIT II**

**Hours: 08**

Data warehouse and OLAP Technology: Data Warehouse – A Multidimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation – From data warehouse to data mining.

**UNIT III**

**Hours: 12**

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts – Efficient and Scalable Frequent Itemset Mining Methods - Mining various kinds of Association Rules– From Association Mining to Correlation Analysis –. Constraint Based Association Mining. Classification and prediction: Issues regarding classification and prediction – Decision Tree Induction – Bayesian classification – Rule Based Classification - Classification by Back propagation – Prediction.

**UNIT IV**

**Hours: 10**

Cluster Analysis: Types of Data in Cluster Analysis - A categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods – Density Based Methods - Grid Based Methods - Model Based Clustering Methods – Outlier Analysis - Mining Time-Series Data – Mining Sequence Patterns in Biological Data.

**UNIT V**

**Hours: 09**

Spatial Data Mining - Multimedia Data Mining – Text Mining -Mining the World Wide Web. Applications and Trends in Data Mining: Applications – Data Mining System Products and Research Prototypes – Additional Themes on Data Mining – Social Impacts of Data Mining – Trends in Data mining.

**TEXT BOOK**

1. Jiwei Han, Michelen Kamber, “Data Mining Concepts and Techniques”,Morgan Kaufmann Publishers an Imprint of Elsevier, 2008.

(Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter5, 6, Unit IV: Chapter 7,8 Unit V: Chapter 10,11 )

**REFERENCE BOOKS**

- 1.Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2014.
- 2.Arun K.Pujari, “Data Mining Techniques”, Universities Press (India) Limited, 2014.
- 3.Pang-NingTan,Michael Steinbach,Vipin Kumar, Introduction to Data Mining, Pearson, 2014.

<b>2014-2015 Onwards</b>	<b>MOBILE COMPUTING (14P3CSE07 / 14P3ITE07)</b>	<b>M.Sc. Computer Science / M.Sc. Information Technology</b>
<b>III Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To demonstrate their understanding of the field of mobile computing.**
- **To learn about mobile IP, and mobile TCP and understanding of ad hoc networks and wireless sensor networks.**

**UNIT – I**

**Hours: 08**

Introduction - Introduction to Telephone Systems - Mobile communication: Need for mobile communication - Requirements of mobile communication – History of mobile communication - Introduction to Cellular Mobile Communication.

**UNIT – II**

**Hours: 10**

Mobile Communication Standards - Mobility Management: Handoff Techniques – Handoff Detection and Assignment – Types of Handoffs – Radio Link Transfer – Roaming Management - Frequency Management - Cordless Mobile Communication Systems.

**UNIT –III**

**Hours: 11**

Mobile Computing: History of data Networks - Classification of Mobile data networks - CDPD System. Satellites in Mobile Communication - Global Mobile Communication – Mobile Internet - Wireless Network Security - Wireless Local Loop Architecture - Wireless Application Protocol.

**UNIT-IV**

**Hours: 12**

WCDMA Technology and Fibre Optic Microcellular Mobile Communication – Ad Hoc Network and Bluetooth Technology - Intelligence Mobile Communication System - Fourth Generation Mobile Communication Systems.

**UNIT –V**

**Hours: 09**

Mobile network layer: Mobile IP – Dynamic host configuration protocol – Mobile Ad-Hoc networks. Mobile transport layer: Traditional TCP – Classical TCP Improvement – TCP over 2.5/3G Wireless networks – Performance enhancing proxies – Support for Mobility: File Systems – World Wide Web.

**TEXT BOOKS**

1. T.G. Palanivelu & R.Nakkeeran, “Wireless and Mobile Communication”, PHI Learning Private Limited , 2013.

(Unit-I: Chapters–1,2,3,4. Unit-II: Chapters–5,6,7,8. Unit-III: Chapters– 9,10,11,14,15,16,17. Unit-IV: Chapter– 18,19,20,21.)

2. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition , 2012.

(Unit-V : Chapters-8,9 &10)

**REFERENCE BOOKS**

1. William Stallings, “Wireless Communications and Networks”, Pearson Education, 2015.

2. Asoke K Talukder, “<http://www.amazon.com/Mobile-Computing-Applications-McGraw-Hill-Communications/dp/0071477330> Mobile Computing: Technology, Applications, and Service Creation”, Tata McGraw-Hill Communications Engineering,2012.

<b>2014-2015 Onwards</b>	<b>COMPILER DESIGN (14P3CSE08)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

**To understand, design and implement a lexical analyzer, design and implement a parser, design code generation schemes, optimization of codes and runtime environment.**

**Unit I : Introduction**

**Hours: 10**

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

**Unit II: Basic Data Structures**

**Hours: 10**

Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser

**Unit III: Advanced Data Structures**

**Hours: 10**

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls

**Unit IV: Sorting & Searching Techniques**

**Hours: 10**

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimization

**Unit V: Files**

**Hours: 10**

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing

**Text Book(s)**

1. Alfred Aho, Ravi Sethi, Jeffy D.Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia, 2011.

**References**

1. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
2. Kenneth C. Loudon, « Compiler Construction : Principles and Practices », Thompson Learning, 2003.

<b>2014-2015 Onwards</b>	<b>MULTIMEDIA AND VIRTUAL REALITY (14P3CSE09)</b>	<b>M.Sc. Computer Science</b>
<b>III Semester</b>		<b>Core: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objective:**

- **To learn about multimedia skills , 3D modeling and animation tools ,VR hardware & software .**

**UNIT-I** **Hours: 08**

Introduction – what is multimedia – making multimedia – multimedia skills – Text.

**UNIT - II** **Hours: 10**

Sound : Digital Audio-MIDI-Music CDs. Images: Making Still Images-Color-Image File Formats. Animation-Video.

**UNIT – III** **Hours: 09**

Hardware: Macintosh versus Windows-Networking-Connections-Memory and Storage devices-Input devices- Output Hardware- Communication Devices.

**UNIT – IV** **Hours: 08**

Basic Software Tools: Text Editing and Word Processing Tools – OCR Software – Painting and Drawing Tools. 3D Modeling and Animation Tools – Image Editing Tools – Animation, Video and Digital Movie Tools – Multimedia Authoring Tools.

**UNIT – V** **Hours: 15**

Virtual Reality: Introduction – A Generic VR System: Virtual Environment –VR Technology- Modes Of Interaction-VR Hardware: Sensor Hardware, Head Coupled Displays – Acoustic Hardware- Integrated VR – VR Software: Modeling Virtual Worlds- Physical Simulations – VR Applications.

**TEXT BOOKS:**

1. Tay Vaughan , “ Multimedia making it work” , 2014, TMH.(Unit-I :Chapter-1,2,3& 4, Unit-II :Chapter-5,6,7& 8, Unit-III :Chapter-9,Unit-IV :Chapter-10 & 11)
2. John Vince, “Virtual Reality Systems”, Addison Wesley, 4<sup>th</sup> Edition 2014. (Unit- V)

**REFERENCE BOOKS:**

1. Free T. Hofstetter, “Multimedia LITERACY”, TMH, 1995.
2. Simoin j.,Gibbs, Dionysios C and Tschiriziz “ Multimedia Programming” , Addison Wesley,2010.
3. John F.Koegel Buford, “ Mutimedia Systems”, Addison Wesley, 2014.
- 4.Ralf steinmetz and klaranahrstedt, “Multimedia : Computing, communications Applications” 2013.



<b>2014-2015 Onwards</b>	<b>CLOUD COMPUTING (14P4CSE10)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- This course covers a series of current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, Software as a Service.
- The course is also highly project oriented, involving hand-on exploration of existing technologies as well as development of new technologies.

**UNIT – I**

**Hours: 10**

Cloud Computing Basics: Cloud Computing Overview-Applications-Intranets and the Cloud. Your Organization and Cloud Computing: When you can use Cloud computing-Benefits-Limitations-Security Concerns.

**UNIT – II**

**Hours: 10**

Cloud Computing Technology: Cloud Hardware and Infrastructure-Clients-Security-Network-Services. Accessing the Cloud: Platforms-Web Applications-Web API's-Web Browsers.

**UNIT – III**

**Hours: 10**

Cloud Storage: Overview- Cloud Storage Providers. Standards: Applications-Client-Infrastructure-Service.

**UNIT – IV**

**Hours: 10**

Software as a Service: Overview-Driving forces-Company offerings-Industries. Software plus Services: Overview-Mobile Device Integration-Providers-Microsoft Online.

**UNIT – V**

**Hours: 10**

Local Clouds and Thin Clients: Virtualization in Your Organization-Server Solutions-Thin Clients. Migrating to the Cloud: Cloud Services for Individuals-Enterprise-Class Cloud Offerings-Migration.

**TEXT BOOKS:**

1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, “Cloud Computing –A Practical Approach”, Tata McGraw Hill Education Pvt. Ltd, 2010. ( UNIT-I (Chapter 1,2) UNIT-II(Chapter 5,6) UNIT-III(Chapter 7,8) UNIT-IV(Chapter 9,10) UNIT-V(Chapter 12,13).

**REFERENCE BOOKS:**

1. Michael Miller,” Cloud Computing: Web based Applications that change the way you work and Collaborate online”, Que Publishing, August 2010.
2. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for on demand computing, Applications and Data Centers in the Cloud with SLAs”,Emereo Pvt. Ltd, July 2011.

<b>2014-2015 Onwards</b>	<b>ARTIFICIAL NEURAL NETWORKS (14P4CSE11)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

**Objectives:**

- **To study basics of artificial Neural Network.**
- **To study applications of ANN.**
- **To study different pattern recognition task using ANN.**

**UNIT-I**

**Hours: 10**

Basics of Artificial Neural Networks: Characteristics of Neural Networks – Historical Development of Neural Network Principles – Artificial Neural Networks : Terminology – Models of Neuron – Topology – Basic Learning.

**UNIT-II**

**Hours: 10**

Activation and Synaptic Dynamics: Introduction – Activation Dynamic Models – Synaptic Dynamic Model – Learning Models – Learning Methods.

**UNIT-III**

**Hours: 10**

Functional units of ANN for Pattern Recognition tasks: Pattern Recognition Problem – Basic Functional Units – Pattern Recognition Tasks by the Functional Units – Feed Forward Neural Networks : Introduction – Analysis of Pattern Association Networks – Analysis of Pattern Classification Networks – Analysis of Pattern Mapping Networks.

**UNIT-IV**

**Hours: 10**

Feedback Neural Networks: Introduction – Analysis of Linear Auto Associative FF Networks – Analysis of Pattern Storage Networks. Competitive Learning Neural Networks: Introduction – Components of a Competitive Learning Network – Analysis of Feedback Layer for Different Output Functions– Analysis of Pattern Clustering Networks – Analysis of Feed Mapping Network.

**UNIT-V**

**Hours: 10**

Applications of Neural Systems: Applications of Neural Algorithms and Systems character Recognition – Expert Systems Applications – Neural Network Control Applications, Spatio – Temporal Pattern Recognition –Neocognitron and other Applications.

**TEXT BOOKS:**

1. For Units I to IV: “Artificial Neural Networks”, B.Yegnanarayanan, Eastern Economy Edition – Chapter 1, 2.
2. For Unit – V: “Introduction to Artificial Neural Systems” Jacek M. Zurada (1994) Jaico Publishing House.

**REFERENCE BOOKS:**

1. “Artificial Neural Networks”, Robert J.Schalkoff, Mc-Graw-Hill International Edition.
2. “Introduction to the theory of Neural Computation”, - J.Hertz, A.Krogh. and R.G. Palmer, Addison – Wesley 1991.
3. “Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Application”, S.Rajasekaran and G.A.Vijayalakshmi Pai PHI Learning Private Limited, 2011.
4. “Fundamentals of Neural Networks, Architectures, Algorithms and Applications”, Laurene Fausett, Pearson Edition, 2012.

<b>2014-2015 Onwards</b>	<b>DIGITAL IMAGE PROCESSING (11P4CSE12)</b>	<b>M.Sc. Computer Science</b>
<b>IV Semester</b>		<b>Elective: Theory</b>
<b>Hours: 50</b>		<b>Credit : 4</b>

### Objectives:

- **Develop an overview of the field of image processing.**
- **Understand the Enhancement using Arithmetic/Logic Operations.**
- **To learn about image processing JPEG and MPEG Image Compression.**

### UNIT – I

**Hours: 09**

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

### UNIT – II

**Hours: 10**

Image Enhancement in the Spatial Domain: Background. Some Basic Gray Level Transformations - Histogram Processing- Enhancement Using Arithmetic/Logic Operations- Basics of Spatial Filtering- Smoothing Spatial Filters. Image Enhancement in the Frequency: Background - Introduction to the Fourier Transform and the Frequency Domain- Smoothing Frequency-Domain Filters- Sharpening Frequency Domain Filters- Homomorphic Filtering- Implementation.

### UNIT – III

**Hours: 11**

Image Restoration: A Model of the Image Degradation / Restoration Process- Noise Models- Restoration in the Presence of Noise Only–Spatial Filtering - Estimating the Degradation Function- Inverse Filtering- Minimum Mean Square Error (Wiener) Filtering. Color Image Processing: Color Fundamentals- Color Models- Pseudocolor Image Processing- Basics of Full-Color Image Processing- Color Transformations- Smoothing and Sharpening- Image Segmentation Based on Color - Noise in Color Images- Color Image Compression.

### UNIT –IV

**Hours: 10**

Object Recognition: Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Syntactic Pattern Recognition – Optimization Techniques - Fuzzy Systems – Mathematical Morphology – Basic Morphological Concepts – Binary Dilation and Erosion.

### UNIT –V

**Hours: 10**

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

### TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, Prentice Hall, Third Edition, 2008. (Unit I to III : Chapter-1,2,3,4,5&6)
2. Sonka, Hlavac, Boyle, “Digital Image Processing and Computer Vision”, Cengage Learning, Fourth Indian Reprint 2011. (Unit-IV:Chapters: 9&13,Unit-V:Chapters: 14&15)

### REFERENCE BOOKS

1. Anil.K.Jain, “Fundamentals of Digital Image Processing ”, Prentice Hall, 1989.
2. Chanda & Majumdar, “Digital Image Processing and Analysis”, Prentice Hall 3<sup>rd</sup> Edition.

<b>2014-2015 Onwards</b>	<b>INTRODUCTION TO INFORMATION TECHNOLOGY (14P3CSED01)</b>	<b>Computer Science</b>
<b>III Semester</b>		<b>EDC (Offered to Other Department Students)</b>
<b>Hours: 40</b>		<b>Credit : 4</b>

Objectives:

- **To introduce the Fundamentals components of computer.**
- **To introduce the basics of WAN access alternatives. Internet architectural components, Network security strategies.**

#### **UNIT - I**

**Hours: 09**

Information Technology: Defining information technology-Information technology in society-The state of IT Careers. Understanding the digital domain: emergence of the digital age-the difference between analog and digital representations of information-manipulating bits-Advantages of digital technology.

#### **UNIT - II**

**Hours: 08**

Fundamentals of computers: Computer Hardware: Fundamentals components of computer-Inside typical computer-Types of computers and their applications-Storage technologies. Software: What is software?-Programming languages-Types of software-The software development process.

#### **UNIT - III**

**Hours: 08**

Transmission of information: Fundamentals of communication: Electrical signaling-Radio wave communication- Light wave communication-Attenuation-Bandwidth-Multiplexing-Copper transmission media. Wireless communications: Applications of radio frequency-Satellite systems.

#### **UNIT - IV**

**Hours: 07**

Introduction to Computer Networking: Local area network: Defining LANs-LAN design characteristics-The evolution of LAN types. Wide area networks: WAN background-WAN alternatives-WAN access alternatives.

#### **UNIT - V**

**Hours: 08**

Communication Protocols: The need for protocols-Protocols suites. Internet Architecture: Internet architectural components-Internet application. Network security: Understanding the threats-Network security strategies.

#### **TEXT BOOK**

1. Introduction to Information Technology Pelin Aksoy, Laura DeNardis, Course Technology Cengage Learning India 2012.  
(Unit-I:Chapter 1, Unit-II: Chapter 4&5, Unit-III: Chapter 8 & 10, Unit-IV: Chapter 11 & 12, Unit-V:Chapter 13,14 &15)

#### **REFERENCE BOOKS**

1. Introduction to information technology-V.Rajaraman-PHI Learning private Limited- New Delhi -2009.  
2. Information Technology and Strategic management –Dr.s.skhandare & Dr.A.M.sheikh – S.Chand publishing first edition-2010.

<b>2014-2015 Onwards</b>	<b>E-COMMERCE (14P3CSED01)</b>	<b>Computer Science</b>
<b>III Semester</b>		<b>EDC (Offered to Other Department Students)</b>
<b>Hours: 40</b>		<b>Credit : 4</b>

**Objective:**

- **To understand the E-Commerce, Advantages and disadvantages, Enhanced features of WAP 2.0, Issues of Electronic Payment Technology.**

**UNIT- I**

**Hours: 09**

Introduction to E-Commerce: Introduction - What is an E-Commerce - Electronic Business - Categories of E-Commerce Applications – Global trading environment and adoption of E-Commerce – Comparison between traditional and Electronic Commerce – Advantages and disadvantages of E-Commerce. Business models of E-Commerce: Introduction – Business models of E-Commerce – B2B -Difference between B2C and B2B E-Commerce – C2C/P2P – C2B – B2G – E-Procurement.

**UNIT-II**

**Hours: 08**

B2B e-Commerce and EDI: Introduction – Need for B2B e-Commerce – EDI – Paperless Transactions – EDI standards – Data standards used in EDI – EFT – E-marketing – Traditional web promotion – Ad networks – Web counter – XML & its applications. Business applications of E-Commerce: Introduction – Trade cycle – Supply Chain – Competitive advantage – E-Commerce application in Manufacturing, Wholesale, Retail and Service sector.

**UNIT-III**

**Hours: 07**

Mobile Commerce: Introduction – Applications of mobile commerce – Advantages of M-Commerce – WAP – WAP Browser – Enhanced features of WAP 2.0 – Underlying technologies of M-Commerce – Overview of WML – Architectures of Mobile Commerce.

**UNIT-IV**

**Hours: 08**

Electronic Payment System (EPS): Introduction – Online Banking – Types of EPS – EPS – Risks associated with Electronic Payments – Risk Management Options for E-Payment System – Security Requirement of EPS – Cryptography – SSL – SET – Payment Gateway – Issues of Electronic Payment Technology.

**UNIT-V**

**Hours: 08**

Legal and Ethical Issues – Cyber Law – Current Trends in Electronics World: Electronic Waste – Electronic Surveillance – Electronic Governance – Electronic CARE.

**TEXT BOOK**

1. DR.U.S Pandey, Rahul Srivatava and Sarabh Shukla , “E-Commerce and its Applications”, S.CHAND & Company, NewDelhi. Reprint 2008.  
(Unit-I : Chapter 1 & 2. Unit-II: Chapter 3 & 4. Unit-III: Chapter 5.Unit-IV: Chapter 7.Unit-V: Chapter 9, 10 & 13.)

**REFERENCE BOOKS**

1. P.T.Joseph, S.J., “E-Commerce An Indian Perspective”, PHI, 2010.  
2. Gary.P.Schneider, “Ecommerce Strategy, Technology and Implementation”, Cengage Learning, 2011.

<b>2014-2015 Onwards</b>	<b>INTERNET AND WEB DESIGN</b>	<b>Computer Science</b>
<b>III Semester</b>		<b>EDC(Offered to Other Department Students)</b>
<b>Hours: 40</b>		<b>Credit : 4</b>
	<b>(14P3CSED03)</b>	

**Objective:**

- **To develop the Internet Applications and Application Protocols ,Visualize the basic concept of HTML,Recognize the elements of HTML, Evaluating Examples of Page templates.**

**UNIT- I**

**Hours: 07**

Introduction – What is Internet – History of Internet – Internet Services and Accessibility – Uses of the Internet – Protocols – Web Concepts - Internet Protocols – Host Names – Internet Applications and Application Protocols – E-Mail protocols – SMTP – POP – IMAP.

**UNIT-II**

**Hours: 08**

Web Design Environment – Current State of HTML – Moving from HTML to XHTML – Using good Coding Practices – HTML - SGML – Outline of an HTML Document – Head Section - Body Section – HTML Forms.

**UNIT-III**

**Hours: 08**

Browser Compatibility Issues – Considering Connections – Speed Differences – Designing for Multiple Screen Resolutions – Operating System Issues. Web site Design Principles: Design for the Computer Medium – Create a Unified Site Design – Design for the User – Design for Location – Design for Accessibility – Design for the Screen.

**UNIT-IV**

**Hours: 08**

Planning the Site : Create the Site Specification – Identify the Content Goal – Analyze your Audience –Build a Website Development Team – Create Conventions for File Names and URLs – Create a site Story Board – Publish your Website – Test Your Website – Refine and Update your Content – Attract notice to your Website. Planning Site Navigation – Create Usable Navigation – Building Text Based Navigation – Adding Contextual Linking.

**UNIT-V**

**Hours: 09**

Working with Tables: Table Basics – Using Table Elements – Formatting Tables – Table pointers for Well-designed tables – Creating a Page Template – Evaluating Examples of Page templates – Two Column Templates.

**TEXT BOOKS**

1. Web Technology – N.P.Gopalan, J.Akilandeswari, 2009, PHI Learning Private Limited, NewDelhi. (Unit-I: Chapter 1, 2 , Unit-II: Chapter 1)
2. Textbook of Web Design – Joel Sklar, 2009, Cengage Learning India Private Limited,NewDelhi. (Unit-II- Chapter 4, Unit-III: Chapter 1,2 Unit-IV: Chapter 3 & 4 Unit-V: Chapter 5)

**REFERENCE BOOK**

- 1.Microsoft Step by Step – HTML and XHTML” – Faithe Wempen, PHI, 2006.