FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)

74th Rank in India Ranking 2020 (NIRF) by MHRD

Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : COMPUTER SCIENCE

NAME OF THE PROGRAMME : M.SC

PROGRAMME CODE   : PSCS

ACADEMIC YEAR   : 2020 - 21

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18
DEPARTMENT OF COMPUTER SCIENCE
MAJOR CORE – 70 CREDITS

PROGRAMME CODE:PSCS

S.No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19PG1B1	Advanced Programming in Java	5	4	40	60	100
2.		19PG1B2	Distributed Operating Systems	4	4	40	60	100
3.		19PG1B3	Object Oriented Software Engineering	4	4	40	60	100
4.		19PG1B4	Theory of Computation	4	4	40	60	100
5.		19PG1B5	Lab I – Advanced Programming In Java	5	3	40	60	100
6.		19PG1B6	Lab II – Operating System	5	3	40	60	100
7.	II	19PG2B7	Extreme Programming – Asp.Net	4	4	40	60	100
8.		19PG2B8	Mobile Application Development Using Android Studio	4	4	40	60	100
9.		19PG2B9	Design and Analysis of Algorithms	4	4	40	60	100
10.		19PG2B10	Lab III – Extreme Programming – Asp.Net	5	3	40	60	100
11.		19PG2B11	Lab IV – Mobile Application Development using Android Studio	5	3	40	60	100
12.	III	19PG3B12	Digital Image Processing	5	5	50	50	100.
13.		19PG3B13	Data Mining and Data Warehousing	5	5	40	60	100
14.		19PG3B14	Lab V – Digital Image Processing	5	3	40	60	100
15.		19PG3B15	Lab VI– Data Mining And Data Warehousing	5	3	40	60	100
16.	IV	19PG4B16	Principles Of Internet Of Things (Self Study)	-	4	40	60	100
			TOTAL	**69**	**60**			

MAJOR ELECTIVE / EXTRA DEPARTMENTAL COURSE / INTERNSHIP/ PROJECT

S.No	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19B1EDC	Web Development	3	3	40	60	100
2.	II	19B2EDC	Web Development	3	3	40	60	100
3.		19PG2BE1	Computational Intelligence	5	5	40	60	100
4.		19PG2BE2	Neural Networks	5	5	40	60	100
5.		19PG2BE3	Software Testing	5	5	40	60	100
6.		19PG2BE4	Embedded Systems	5	5	40	60	100
7.	III	19PG3BE5	Python Programming	5	5	40	60	100
8.		19PG3BE6	Cryptography And Network Security	5	5	40	60	100
9.		19PG3BE7	Distributed Database Management System	5	5	40	60	100
10.		19PG3BE8	Compiler Design	5	5	40	60	100
11.		19PG3BE9	Cloud Computing	5	5	40	60	100
12.		19PG3BE10	Advanced Computer Graphics & Animation	5	5	40	60	100
13.		19PG3BE11	Big Data Analytics	5	5	40	60	100
14.		19PG3BE12	Deep Learning	5	5	40	60	100
15.		19PG3BSI	Summer Internship/ Training/ Online Certification	-	3	40	60	100
16.	IV	19PG4BPR	Project	-	6	40	60	100
			TOTAL	21	30			

OFF-CLASS PROGRAMMES

ADD-ON COURSES

COURSES	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
SOFT SKILLS	40	3	I	40	60	100
CONTENT MANAGEMENT SYSTEM (Offered by Dept. Of Computer Science)	40	4	II	40	60	100
COMPREHENSIVE VIVA (Question bank to be prepared for all the papers by the respective course teachers)	-	2	IV	-	-	100
READING CULTURE	15/ Semester	1	I-IV	-	-	-
TOTAL		10				

I M.Sc. Computer Science
SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG1B1	Advanced Programming in Java	Lecture	5	4

COURSE DESCRIPTION

Advanced Programming in Java consists of Networking concepts, GUI Programming with Swing and Swing Menus, JDBC and JSP.

COURSE OBJECTIVES

- To understand the Networking concept using TCP/IP and RMI.
- To design and develop java program using Swings Components.
- To implement Server Side Program with Servlets.
- To understand   and develop java program using JSP.

UNIT I: NETWORKING   **(12 Hrs)**
Networking: Networking Basics – The Networking Classes and Interfaces – Inet Address – Inet4Address and Inet6Address - TCP/IP Client Sockets – URL – URL Connection – HttpURLConnection – The URI Class – Cookies – TCP/IP Server Sockets – Datagrams. Regular Expressions and other Packages: The Core Java API Packages - Regular Expression Processing – Reflection – RMI.

UNIT II: SWINGS   **(12 Hrs)**
GUI Programming with Swing: Introducing Swing – Two key swing features – The MVG Connection – Components and Containers – Swing Packages – Event Handling – Swing Applet – Painting in Swing.
Exploring Swing: JLabel and ImageIcon – JTextField – The Swing Buttons – JTabbedPane – JScrollPane – JList – JComboBox – Trees – JTable.

UNIT III: SWING MENUS   **(12 Hrs)**
Swing Menus: Menu Basics – Overview of JMenuBar, JMenu, and JMenuItem – Create a Main Menu – Add Mnemonics and Accelerators to Menu Items – Add Images and Tooltips to Menu Items – Use JRadioButtonMenuItem and JCheckBoxMenuItem – Create a Popup Menu – Create a Toolbar – Use Actions – Entire MenuDemo Program Together.

UNIT IV: JDBC   (12 Hrs)

JDBC- Java Database Connectivity: Introducing JDBC Driver Types - Creating Your First First JDBC Program – Performing Batch Updates – Using Save points - Configuring the JDBC-ODBC Bridge- Explaining Database Connection pools and data sources-Revisiting DBProcessor-Using the RowSet Interface. Servlets: The Life Cycle of a Servlet – Servlet Development Options – Using Tomcat – Simple Servlet – The Servlet API – The javax.servlet Package – Reading Servlet Parameters – The javax.servlet.http Package – Handling HTTP Requests and Responses – Using Cookies – Session Tracking.

UNIT V: JSP   (12 Hrs)

JSP: Introducing JSP – Examining MVC and JSP - JSP Scripting Elements and Directives –Working with Variable Scopes – Error pages – Using java Beans – Designing an online Store with JSP – Simple programs using JSP.   Using JSP Tag Extensions– Use of Tag Extensions - Explaining custom tag concepts – Explaining taglib mapping – Understanding Tag Handlers – Exploring Dynamic Attributes.

SELF STUDY:

UNIT II: The MVG Connection – Components and Containers

UNIT III: Create a Popup Menu – Create a Toolbar

UNIT IV: Servlet Development Options – Using Tomcat – Simple Servlet

UNIT V: Using JSP Tag Extensions– Use of Tag Extensions - Explaining custom tag concepts

TEXT BOOKS

1. ***Java The Complete Reference,*** Herbert Schildt 9th Edition, Mc Graw Hill Education, 2016.
   Chapters: 22, 30, 31, 32, 33,38
2. ***James McGovern***, Rahim Adatia and others, ***J2EE 1.4 Bible,*** 1st Edition, Wiley India (P) Ltd, (2008).   Chapters: 6,7,18

REFERENCES:

1. ***Java How to program,*** Paul Deitel& Harvey Deitel, 10th Edition, Pearson Publications, 2014.
2. ***Java in a Nutshell,*** David Flnagan, 5th Edition, O'Reilly Media Inc., 2014.
3. ***J2EE : The Complete Reference,*** Jim Keogh, Tata McGraw-Hill Publishing Company Limited , New Delhi, 1st Edition, 18th Reprint 2008.
4. ***Thinking in Java,*** Harry H.Chaudhary, Bruce Eckel, 4th Edition, Prentice Hall Publications, 2006.
5. ***Java2 (JDK 5 edition) Programming Black Book,*** Steven Holzner et al., Dreamtech Press, New Delhi 2006.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Describe client/server applications, TCP/IP socket programming and distributed applications using RMI.
CO 2	Analyze and design Window based applications using Swing Objects.
CO 3	Develop and design Java programs using Swing components
CO 4	Discuss the various JDBC drivers and demonstrate J2EE application using JDBC connection and server side programs with Servlets.
CO 5	Write component-based Java programs using. JavaBeans.

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SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG1B2	Distributed Operating Systems	Lecture	4	4

COURSE DESCRIPTION

To understand the concept of design and implementation in the context of distributed operating systems.

COURSE OBJECTIVES

- To apply the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems.
- To recognize the inherent difficulties that arise due to distribution of computing resources.

UNIT I : INTRODUCTION   (12 Hrs)

Fundamentals – Distributed computing systems – Evolution of distributed computing systems – Distributed computing system models – Popularity of distributed computing systems – Distributed operating system – issues in designing a distributed operating system – Introduction to distributed computing environment(DCE).

UNIT II : MESSAGE PASSING   (12 Hrs)

Message Passing – Introduction – Desirable features of a good message-passing system – Issues in IPC by message passing – Synchronization – Buffering – Multidatagram messages   – Remote Procedure Calls – Introduction – The RPC model – Transparency of RPC – Implementing RPC mechanism.

UNIT III : DISTRIBUTED SHARED MEMORY   (12 Hrs)

Distributed Shared Memory – Introduction – General architecture of DSM systems – Design and implementation issues of DSM – Synchronization – Introduction – Clock synchronization – Election Algorithms. Resource Management – Introduction – Desirable features of a good global scheduling algorithm – load sharing approach.

UNIT IV : PROCESS MANAGEMENT   (12 Hrs)

Process Management – Introduction – Process migration - Distributed File Systems – Introduction – Desirable features of a good distributed file system – File models– File-Accessing models – File-Sharing semantics – File-Caching schemes – File replication – Fault tolerance.

UNIT V :LINUX   (12 Hrs)

The Linux Shell and File Structure: The Shell – The Command Line – History – Filename Expansion – Standard Input/Output and Redirection – Pipes – Ending Processes – The shell scripts and Programming –Shell Variables – Shell Scripts – Environment Variables and Subshells – Control Structures – TCSH/C Shell Control structures.

SELF STUDY:

UNIT 1: Fundamentals – Distributed computing systems – Evolution of distributed computing systems – Distributed computing system models.

UNIT 5: The Linux Shell and File Structure: The Shell – The Command Line – History – Filename Expansion – Standard Input/Output and Redirection – Pipes – Ending Processes.

TEXT BOOKS

1. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, Prentice Hall of India Private Limited, 2012.

   Chapters: 1, 3.1 – 3.6, 4.1 – 4.4, 5.1 – 5.3, 6.1, 6.2, 6.6, 7.1, 7.2, 7.5, 8.1 – 8.2, 9.1 –   9.8

2. Linux: The Complete Reference, Richard Petersen, McGraw Hill Education (India) Private Limited, 6th Edition, 2011.

   Chapters: 3 (pg.35 – 55), 4

REFERENCES:
   1. *Operating Systems,* Stuart Madnick, John Donovan, McGraw Hill Education, 2012.
   2. *Distributed Operating Systems*, Andrew S. Tanenbaum, Pearson Education, New Delhi, 2013.
   3. *Beginning Linux Programming,* Neil Matthew, Richard Stones, Wiley India Pvt. Ltd, 2014

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Discuss the core concepts of distributed systems.
CO 2	Analyze various message passing mechanisms with its model.
CO 3	Identify the inherent difficulties that arise due to distribution of computing resources.
CO 4	Explain migration with the process management policies.
CO 5	Explain the basic concepts, design and structure of the LINUX operating system.

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SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG1B3	Object Oriented Software Engineering	Lecture	4	4

COURSE DESCRIPTION

Object Oriented software Engineering provides object oriented programming techniques. And explains various object oriented development cycles with appropriate testing methods. And gives how to design and construct modular, reusable, extensible and portable object-oriented software.

COURSE OBJECTIVES

- To understand a systematic discipline, quantifiable approach to the design development operation and maintenance of software using object oriented concept.
- To understand and apply different Object Oriented development models

UNIT I : INTRODUCTION   (12 Hrs)

Generic view of Process **–** Software Engineering – A layered technology – A process framework – The capability Maturity Model Integration (CMMI) – Process patterns – Process Assessment – Personal and Team Process Models – Process Technology – Product and Process – Specialized Process Models – The Unified Process –Agility –Agile Process – Agile Process Models.

UNIT II : SYSTEM MODELING REQUIREMENTS   (12 Hrs)

System Engineering **-** Computer Based Systems - SystemModelling Requirements Engineering – A bridge to design and construction – Requirements engineering tasks, developing Use-Cases Building the analysis model – Requirement Analysis – Analysis modelling approaches – Data modelling concepts – Object- Oriented Analysis – Class based modelling

UNIT III : DESIGN ENGINEERING   (12 Hrs)

Design Engineering – Design within the context of Software Engineering – Design Process and Design Quality Creating an Architectural Design – Software

Architecture – Data design Modeling Component level design –Component-Designing Class-Based Components

UNIT IV : USER INTERFACE DESIGN   (12 Hrs)

Performing User Interface Design – The Golden Rules – User Interface analysis and Design Testing Strategies – A strategic approach to software testing – test strategies for Object-Oriented Software Testing Tactics – Object Oriented Testing Methods

UNIT V :   (12 Hrs)

Introducing the UML- Classes – Class Diagrams- Use cases- Use case diagrams-Case Study

SELF STUDY: UNIT V

TEXT BOOKS
1**. *Software Engineering - A Practitioner's Approach***, Roger S. Pressman, 6th Edition, McGraw Hill HigherEducation, 2014.
Chapters: 2, 3.5, 3.6, 4.1 – 4.3, 6.1, 6.5, 7.1, 7.2, 7.5, 8.1 – 8.4, 8.7, 9.1, 9.2, 10.1, 10.2, 11.1, 11.2, 12.1, 12.2, 13.1, 13.4, 14.7
*2. **The Unified Modeling Language User Guide***, Grady Booch, James Rumbaugh and Ivar Jacobson, Pearson Education, 2007.
Chapters: 2, 4, 8, 16, 17

REFERENCES:
1. ***Object Oriented Software Engineering***, Ivar Jacobson, Magnus Christerson, Patrik Jonsson, Gunnar Overgaard, Pearson Education, Seventh Reprint, 2009.
2. ***Object Oriented Software Engineering***, Yogesh Singh and Ruchika Malhotra, PHI Learning Pvt Ltd, 2012.
3. ***Applying UML and Patterns***, Craig Larman, Third Edition, Pearson publication, 2012.
4. ***Object-Oriented Software Engineering***, Stephen R Schach, First Edition, CTI Reviews, 2014.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Differentiate traditional and object oriented software engineering
CO 2	Explain various SDLC methods of OOSE
CO 3	Describe techniques used in OOSE
CO 4	Explain OOSE testing methods
CO 5	Analyze and choose necessary method for a particular project

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SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG1B4	Theory Of Computation	**Lecture**	4	4

COURSE DESCRIPTION

To introduce the concept of automata theory, the theory of formal languages and grammars to understand the properties of physical machines

COURSE OBJECTIVES

- To introduce the mathematical foundation of computation including automata theory, the theory of formal languages and grammars.
- To develop ability to understand and conduct mathematical proofs for computation and algorithms.

SYLLABUS

UNIT I: SET THEORY   (12 Hrs)

Introduction – Sets and Elements - Universal Set and Empty Set – Subsets – Venn Diagrams –Set Operations – Algebra of sets and duality – Finite, Infinite Sets and Counting Principle-The Inclusion – Exclusion Principle – Classes of Sets, Power Sets, Partitions, Mathematical Induction – Multisets.

UNIT II : RELATIONS   (12 Hrs)

Introduction – Product Sets – Relations – Pictorial Representations of Relations – Composition of Relations - Types of Relations – Closure Properties – Equivalence Relations – Partial Ordering Relations – n-Ary Relations – Relational Model for Databases.

UNIT III : FINITE AUTOMATA & REGULAR EXPRESSIONS   (12 Hrs)

Finite state systems-Basic definitions-Non-deterministic Finite Automata (NFA) – Finite Automata with output-The pumping lemma for regular set-Closure properties of regular set.

UNIT IV :CONTEXT-FREE GRAMMARS & PUSHDOWN AUTOMATA   (12 Hrs)

Context-Free Grammars**:** Motivation and introduction- Context-Free grammars-Derivation trees - Chomsky Normal Form – Greibach Normal Form. Pushdown Automata **:**Informal description – Definitions .

UNIT V : TURING MACHINES   (12 Hrs)

Introduction-The Turing Machine Model-Computable Languages and functions-Techniques for Turing machines Constructions.

SELF STUDY :
UNIT -1 : Universal Set and Empty Set – Subsets – Venn Diagrams –Set Operations
UNIT II : Pictorial Representations of Relations, n-Ary Relations – Relational Model for Databases
UNIT III :Closure properties of regular set
UNIT IV : Pushdown Automata **:** Informal description – Definitions
UNIT V: Computable Languages and functions

TEXT BOOKS

1. ***Discrete Mathematics,*** Seymour Lipschuts, Marc Lars Lipson, Varsha H. Patil, Tata McGraw – Hill Publishing Company Limited, 2nd edition, 2008. Chapters: 1, 2
2. ***Introduction to Automata Theory, Languages and Computations ,***J.E. Hopcroft, R. Motwani and J.D. Ullman, NarosaPublishin House, Reprint 2002. Chapters: 2.1 -2.3, 2.7, 3.1, 3.2 , 4.1 – 4.3, 4.5, 4.6, 5.1, 5.2, 7.1, 7.2, 7.4

REFERENCES:
1. ***Theory of Computation****,GeorgeTourlakis,A John Wiley &Sons,Inc,Publication 2009*
2. ***Concise Guide Of Computation Theory,*** *Akira Maruola ,Springer Publication 2011*
3. ***An Introduction to the Theory of Computer Science,****Michaelsipser 3rd Edition,2012.*
4. ***Mathematical Theory Of Computation ,****Zohar Manna ,2012*

COURSE OUTCOMES

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Demonstrate an in-depth understanding of theories, concept and techniques in automata and their link to computation.
CO 2	Develop abstract machines that demonstrate the properties of physical machines and be able to specify the possible inputs, processes and outputs of these machines.
CO 3	Analyze the computational strengths and weaknesses of these machines
CO 4	Explain Context-Free Grammar.
CO 5	Apply automata concepts and techniques in designing systems that address real world problems.

I M.Sc. Computer Science
SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG1B5	LAB I - Advanced Programming in Java	Practical	5	3

COURSE DESCRIPTION

Advanced Programming in Java consists of Networking concepts, GUI Programming with Swing and Swing Menus, JDBC and JSP.

COURSE OBJECTIVES

- To develop java program using TCP/IP and RMI.
- To design and develop java program using Swings Components.
- To implement Server Side Program with Servlets.
- To develop java program using JSP.

Programs are written using the following concepts

1. NETWORKS- TCP/IP
2. REGULAR EXPRESSION
3. RMI
4. GUI Programming with Swing and Swing Components
5. Java Database Connectivity
6. SERVLET
7. JSP

COURSE OUTCOMES

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Implementation of java applications that illustrate professionally acceptable coding and performance standards.
CO 2	Develop distributed applications using RMI.
CO 3	Design and developevent-driven programming and graphical user interfaces using Swing-based GUI.
CO 4	Design and develop Java programs using JDBC connection for data access and also Develop server side programs with Servlets.
CO 5	Design and develop component-based Java programs using JavaBeans.

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SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEE K	CREDITS
PSCS	19PG1B 6	LAB II – OPERATING SYSTEM	Practical	5	3

COURSE DESCRIPTION
In this lab students are able to describe and use the fundamental LINUX system tools and utilities.

COURSE OBJECTIVES
- To introduce the students to LINUX kernel programming
- To make the students aware of the features and capabilities of Linux so that they can utilize its improved functionalities
- To develop new Linux based software and can also contribute to the development of the operating system itself.

Programs are written using the following concepts:

Shell Script using Linux:

- To demonstrate various Shell commands like cat, grep, ls, more, ps, chmod, finger, ftp, etc.,

- Shell script to perform simple mathematical operations

- Shell script to perform string operations

- Shell script program to manipulate files

- Shell script to illustrate various system configurations

- Creating user accounts, switching user accounts, setting umask

- Linux general purpose utilities

- Shell script to customize user environment

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Utilize basic LINUX Utilities.
CO 2	Write different LINUX shell scripts and execute various shell programs.
CO 3	Apply LINUX system calls.
CO 4	Compute various file permissions and have a basic understanding of system security.
CO 5	Demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment.

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SEMESTER –I

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19B1EDC	WEB DEVELOPMENT	Lecture	3	3

COURSE DESCRIPTION

This Course introduces basic web design using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). And this course provides knowledge to plan and design effective web pages with different text formatting and images to create website.

COURSE OBJECTIVES

- To enhance the knowledge of the students in effective webpage designing.
- To provide skills to sharply focus on needed information to be presented in a website.
- To improve the quality of the students by giving strong base in fundamental and advanced concepts.
- To give courage to face the real-world scenarios as it is practical oriented
- To inculcate the ability to explain, analyze, identify and define the technology required to build and implement a web site.

UNIT I: OVERVIEW OF HTML (**9 Hrs**)

Fundamentals of HTML - Root Elements-Metadata Elements- Section Elements-Heading Elements-Flow Elements- Phrasing Elements- Embedded Elements-Interactive Elements –Working with Headings-Character Entities – Horizontal Rules – Line Breaks – Paragraph – Citations – Quotations – Definitions - Comments.

UNIT II: WORKING WITH TEXT (**9 Hrs**)

Working with Text - Formatting Text with HTML Elements – Physical styles – Logical styles – Defining the MARK Element- Defining the STRONG Element-Defining the CODE Element- Defining the SMALL Element.

UNIT III: ORGANIZING TEXT (**9 Hrs**)

Organizing Text in HTML -Arranging text – Allowing Word Breaks- Defining the preformatted Text - DIV Element and SPAN Element – Formatting Text in Tables - Creating Ruby (Captioned) Text – Displaying List-Immediate Solutions : Allowing

Word Breaks Using the WBR Element – Displaying The Preformatted Text – Using the DIV Element - Positionaing Text Using the DIV Element – Using the SPAN Element – Formatting Text Using Tables – Creating the Ruby Text – Creating Lists.

UNIT IV: CREATING TABLES   (9 Hrs)

Creating Tables - Understanding Tables – Describing the TABLE Elements – CAPTION –COLGROUP – COL – TBODY – THEAD – TFOOT – TR – TD and TH - Creating a Simple Table – Adding a Title to a Table – Caption to a Table – Specifying the Properties of the Columns – Spanning Rows and Columns – Using Images in a Table.

UNIT V: UNDERSTANDING CSS   (9 Hrs)

Overview of CSS – Discussing the Evolution of CSS – Understanding the Syntax of CSS – Exploring CSS Selectors – Inserting CSS in an HTML Document.

SELF STUDY:

UNIT I: Working with Headings-Character Entities – Horizontal Rules – Line Breaks – Paragraph – Citations – Quotations – Definitions - Comments

UNIT III: Arranging text – Allowing Word Breaks- Defining the preformatted Text - DIV Element and SPAN Element – Formatting Text in Tables - Creating Ruby (Captioned) Text

UNIT IV: Adding a Title to a Table – Caption to a Table – Specifying the Properties of the Columns

TEXT BOOK

HTML5 Black Book, Kogent Learning Solutions Inc., Dreamtech Press, 2012.

Chapters (Page Numbers) : 2(31-50 & 68-76) ; 3(77-94); 4(113-128) ; 6 (145-164) ; 18 (465-476)

REFERENCES:

1. **Sergey's HTML5 & CSS3 Quick Reference: Color Edition,** Sergey Mavrody, Published 16 Nov 2009.
2. **HTML5: The Missing Manual,** Matthew MacDonald,Published in 2011.
3. **Head First HTML5 Programming: Building Web Apps with JavaScript,** Elisabeth Freeman and Eric Freeman, Published in 2011.
4. **Beginning HTML5 and CSS3 For Dummies,** Chris Minnick and Ed Tittel, Published 2013.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Define various tags of HTML
CO 2	Design a web page with attractive display
CO 3	Create a Layout for a webpage using Block tags
CO 4	Explain how and where to apply CSS
CO 5	Analyze content to design website

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2B7	EXTREME PROGRAMMING – ASP.NET	Lecture	4	4

COURSE DESCRIPTION

Extreme Programming – ASP.NET contains Introduction about ASP.NET3.5 , Types of Server Control, State Management, Fundamentals of ADO.Net , SQL Data Source and Object Data Source, Data Binding concepts using Rich Data Controls and Web Navigation Controls.

COURSE OBJECTIVES

- To understand the Architecture of ASP.NET
- To acquire a working knowledge of the .NET programming model
- To implement database applications using SQL Data Source and Object Data Source
- To design and develop Master pages and navigation of web pages.

UNIT I: INTRODUCING ASP .NET (12Hrs)
The Evolution of Web Development – Seven Important Facts about ASP .NET – ASP .NET 3.5.
*WebForms:*Page Processing – Web Forms Processing Stages – The Page As a Control Container –The Page Class.

UNIT II: SERVER CONTROLS (12Hrs)
Types of Server Controls – HTML Server Controls – Web Controls – The List Controls – Input Validation Controls – Rich Controls.
*State Management:*ASP .NET State Management – View State – Transferring Information Between Pages – Cookies – Session State – Application State.

UNIT III:ADO .NET FUNDAMENTALS (12 Hrs)
The ADO.NET Architecture – The Connection Class – The Command and Data Reader Classes – Transactions – Provider – Agnostic Code.
Data Components and the DataSet: Building a Data Access Component – Disconnected Data – The DataSet – The DataAdapter Class – The DataView Class – Typed DataSets.

UNIT IV: DATA BINDING (**12 Hrs**)

Basic Data Binding – Data Source Controls – The SQLDataSource - The ObjectDataSource – The Limits of the Data Source Controls.
*Rich Data Controls:*TheGridView – Formatting the GridView – GridView Row Selection – Sorting the GridView – Paging the GridView – GridView Templates – The ListView – The DetailsView and FormView – Advanced Grids.

UNIT V:THEMES AND MASTER PAGES (**12 Hrs**)

Cascading Style Sheets – Themes – Standardizing Website Layout – Master Page Basics – Advanced Master Pages.
*Website Navigation:*Pages with Multiple Views – Site Maps – The TreeView Control – The Menu Control.

SELF STUDY:

UNIT I: ASP .NET 3.5– The Page Class.

UNIT II: HTML Server Controls – The List Controls

UNIT IV: The DetailsView and FormView – Advanced Grids.

UNIT V: Advanced Master Pages – The Menu Control.

TEXT BOOK

Pro ASP.NET 3.5 in C# 2008, Matthew MacDonald and Mario Szpuszta, 2nd Edition, 2008.
Chapters: 1, 3, 4, 6, 7, 8, 9, 10, 16, 17

REFERENCES:
1. ***Microsoft ASP.NET 3.5***, George Shepherd, PHI Pvt Ltd , 2008.
2. ***Professional ASP.NET 3.5 in C# & VB***, Bill Evjen, Scott Hanselman& Devin Rader, Wiley Publication, 2009.
3. ***Programming Microsoft ASP.NET4,*** Dino Esposito, Dream Tech press, 2011.
4. ***The Complete Reference ASP.NET***, Matthew MacDonald, Tata McGrow Hill Education Pvt Ltd, 2012.
5. ***Beginning ASP.NET 4.5 in C# and VB,***ImarSpaanjaars, Wiley India Pvt Ltd, 2013.
6. ***ASP.NET developer's Guide***, Greg Buczek, McGrow Hill Education Pvt Ltd, 2014.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Design and develop web applications using different Server Controls.
CO 2	Implement web applications with different state managements
CO 3	Create Data Access Technology using ADO.NET architecture.
CO 4	Design and utilize Data Sources using SQL Data Source , Object Data Source for data manipulation operation.
CO 5	Design and develop web sites.

I M.Sc. Computer Science
SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2B8	Mobile Application Development Using Android Studio	Lecture	4	4

COURSE DESCRIPTION

The primary goals will be design the next generation of mobile website, apps and other mobile interfaces across multiple platform such as IOS, android, windows and mobile web.

COURSE OBJECTIVES

- Develop a grasp of the android OS architecture.
- Understand the application development lifecycle.
- Identify ,analyze and choose tools for android development including device emulator, profiling tools and IDE

UNIT I - WIRELESS COMMUNICATION FUNDAMENTALS   (12 Hrs)

Introduction – Wireless transmission – Signal Propagation – Multiplexing

UNIT II - TELECOMMUNICATION NETWORKS&SATELLITE SYSTEMS   (12 Hrs)

Telecommunications Systems: GSM: Mobile Services, System Architecture. Satellite Systems: Basics (GEO,LEO,MEO) – Routing – Localization – Handover

UNIT III - MOBILE NETWORK & TRANSPORT LAYERS   (12 Hrs)

Mobile IP : Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse Tunneling.
Mobile Transport Layer : Traditional TCP – Classical TCP improvements

UNIT IV : MOBILE APPLICATION DEVELOPMENT   (12 Hrs)

Application Design : The Screen Layout and the main.xml File - Component IDs - A Few Simple Controls - Creating and Configuring an Android Emulator - Communicating with the Emulator

Controls and User Interface : Check Boxes - Radio Buttons - The Spinner
DatePicker - Follow-Up - Key Classes Used in the controls
UNIT V : MULTISCREEEN APPLICATIONS & WORKING WITH IMAGES (12 Hrs)
Multiscreen Applications : Stretching the Screen - Pop-Up Dialog Boxes and
Toasts - Menus on the Android Device - Follow-Up. - Key Classes Used in
Multiscreen Applications
Working with Images : Displaying Images, Using Images Stored on the
Android Device, Follow-Up, Key Classes Used in working with images

SELF STUDY:
UNIT I : Signal Propagation
UNIT II : Basics (GEO,LEO,MEO)
UNIT III : Key Classes Used in the controls
UNIT IV : Key Classes Used in working with images

TEXT BOOK:
1. Mobile Communications, Jochen Schiller, 2nd Edition, PHI/Pearson
Education, 2003.
Unit I: Chapters :1.1, 2.1 – 2.5 (Page No. : 1 -9, 25-46)
Unit II : Chapters: 4.1.1   4.1.2 , 5.3, 5.4, 5.5, 5.6 (Page No. : 96 -105)
Unit III: Chapters: 8.1.1 – 8.1.8 , 9.1,9.2 (Page No. : 303 – 323, 351 - 366)
 2. Android Application Development for Java Programmers, JamesC.Sheusi,
CourseTechnology PTR
UNIT IV: Chapter 3, 4
UNIT V : Chapter : 7, 8

REFERENCES:
1. Wireless Networks, Client Smith & Daniel Collins, 3rd Edition, McGraw
   Hill Publication, 2014.
2. Wireless Communications and Networks, William Stallings, PHI/Pearson
   Education, 2002.
3. Principles of Wireless Networks, Kaveh Pahlavan, Prasanth
   Krishnamoorthy, PHI/Pearson Education, 2003.
4. Mobile Design and Development: Practical concepts and techniques for
   creating mobile sites and web apps, Brian Fling, 1st Edition, O'Reilly
   Publications, 2018.
5. Beginning Android 4 Application Development, Wei-Meng Lee Authorized
   reprint by wileyindiapvt.ltd, 2016 .
6. Android Application Development(With Kitkat Support) Black Book , DT
   Editiorial Services &Pradeep Kothari Published By Dreamtech Press
   2017

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Design scripts to meet given interface and media control requirements
CO 2	Utilize variables, properties and other code elements appropriately to implement the code design
CO 3	Implement and evaluate techniques for the installation of mobile applications
CO 4	Explain the principles of technologies which support media production and delivery on a variety of platforms
CO 5	Evaluate alternative mobile frameworks, and contrast different programming platforms

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2B9	Design and Analysis of Algorithms	Lecture	4	4

COURSE DESCRIPTION

This course explains many algorithms and how to solve various problems using same or different kind of algorithms with efficient manner.

COURSE OBJECTIVES

- To stress the importance of the efficiency in writing programs
- To write algorithms efficient in terms of design and time complexity

UNIT I : INTRODUCTION   (12 hrs)

Introduction: Definition – Algorithm Specification – Performance Analysis – Space Complexity – Time Complexity – Amortized Complexity – Asymptotic Notation - Randomized Algorithms – Basics of Probability Theory – Randomized Algorithms: An Informal Description

UNIT II : DATA STRUCTURES   (12 hrs)

Elementary Data Structures: Stacks And Queues – Trees - Binary Trees– Dictionaries - Binary Search Trees– Priority Queues – Heaps – Heapsort – Sets and Disjoint Set Union - Graphs – Introduction – Definitions – Graph Representations

UNIT III : DIVIDE AND CONQUER   (12 hrs)

Divide And Conquer: General Method – Binary Search – Finding the Maximum and Minimum –   Merge Sort. Greedy Method: The General Method – Container Loading – Knapsack Problem – Minimum Cost Spanning Trees.

UNIT IV : DYNAMIC PROGRAMMING   (12 hrs)

Dynamic Programming: The General Method – Multistage Graphs – All Pairs Shortest Paths – Single-Source Shortest Paths: General Weights – Optimal Binary Search Trees – 0/1-Knapsack – The Traveling Salesperson Problem.

UNIT V : BACKTRACKING   (12 hrs)

Backtracking: The General Method – The 8 Queens Problem – Graph Coloring. NP-Hard and   NP-Complete Problems: Basic Concepts – NP-Hard Graph Problems – Clique Decision Problem – Node Cover Decision Problem, Chromatic Number Decision Problem, Directed Hamiltonian Cycle - Travelling Salesperson Decision Problem – AND/OR Graph Decision Problem.

SELF STUDY: UNIT II

TEXT BOOK

Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni&Sanguthevar Rajasekaran,2nd Edition, University Press, 2017.

Chapters: 1.1,1.2,1.3.1 – 1.3.4, 1.4.1, 1.4.2, 2, 3.1,3.3 – 3.5, 4.1 – 4.3, 4.6, 5.1 – 5.5, 5.7, 5.9, 7.1, 7.2, 7.4,   11.1, 11.3

REFERENCES:

1. ***Design and Analysis of Algorithms***, Prabhakar Gupta, Vineet Agarwal, Manish Varshney, Phi learning Pvt.Ltd, New Delhi, 2012.
2. ***Algorithm and Data Structures***, Levitin, Anany, 2nd Edition, Pearson Publication, Delhi, 2013.
3. ***Algorithm and Data Structures***, M. M. Raghuwanshi, Narosha Publishing House, 2016.

COURSE OUTCOMES (CO)

NO.	COURSE OUTCOMES
CO 1	Analyze the time and space complexity of given Algorithms.
CO 2	Demonstrate operations like searching, insertion, and deletion on various data structures.
CO 3	Identify appropriate sorting/searching technique for given problem.
CO 4	Apply the dynamic programming technique to solve the problems.
CO 5	Discuss advanced tree and graph applications.

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2B10	Lab III- Extreme Programming	Lecture	5	3

COURSE DESCRIPTION

This course consists of Types of Server Control, State Management, Fundamentals of ADO.Net , SQL Data Source and Object Data Source,Data Binding concepts using Rich Data Controls and Web Navigation Controls

COURSE OBJECTIVES

- To design and develop dynamic Control and validate the inputs by validation controls
- To design and develop different State Management Techniques..
- To implement ADO.NET classes and also develop data manipulation operation using SQL Data Source controls and Object Data Source
- To design and developWeb Site Layout and web site navigations.

SYLLABUS

Programs are written using the following concepts

- Validation of Server controls, Application using Server controls and State Management such as view state, session state, Application state.
- ADO.NET classes and Data Bound controls such as Data Adapter, Data Set , Data Table and SQL Data Source controls and Object Data Source.
- Implementing DML operation using SQL Data Source controls and Object Data Source.
- ASP.NET Application using Rich Data Control such as Data Grid, Data List, Repeater and GridView, Detail View, Form View.
- Standardizing Web Site Layout – Master Page Basics and Advanced Master Pages.
- Website navigation using Sitemap Control,Treeview Control and Menu View Control.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Design and develop web applications using different Server Controls.
CO 2	Develop web applications using different state management's techniques.
CO 3	Implement web applications using ADO.NET architecture.
CO 4	DML(Data Manipulation Language) Operations are implemented using SQL Data Source , Object Data Source.
CO 5	Create simple web sites using different data sources.

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2B11	LAB IV – Mobile Application Development Using Android Studio	Lecture	5	3

COURSE DESCRIPTION

To Mobile User Interface (UI) Design is also essential in the creation of Mobile Apps. mobile UI considers constraints, context, screen, input, and mobility as outlines for design.

COURSE OBJECTIVES

- Develop a grasp of the android OS architecture.
- Understand the application development lifecycle.
- Identify,analyze and choose tools for android development including device emulator, profiling tools and IDE

SYLLABUS

Programs are written using the following concepts

- Simulate mobile application that uses GUI components.
- Simulate mobile application that uses Layout Managers and event listeners.
- Simulate mobile application to create native calculator application.
- Simulate mobile application that makes use of database.
- Simulate mobile application that makes use of RSS Feed.
- Simulate mobile a native application that uses GPS location information.
- Simulate mobile application that writes data to the SD card.
- Simulate mobile application that creates an alert upon receiving a message.
- Write a mobile application that creates alarm clock.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Develop enterprise-level mobile solutions.
CO 2	Install and configure Android application development tools
CO 3	Demonstrate Save State information across important operating system events
CO 4	Develop advanced application programs using Android
CO 5	Design and develop mobile applications.

I M.Sc. Computer Science
SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG2BE1	Computational Intelligence	Lecture	5	5

COURSE DESCRIPTION
The expression computational intelligence usually refers to the ability of a computer to learn a specific task from data or experimental observation.

COURSE OBJECTIVES
- Throws light on all categories of Evolutionary Computing
- To motivate to pursue research

SYLLABUS

UNIT I : INTRODUCTION   (15 Hrs)
Artificial Intelligence – a brief Review, Pitfalls of the Traditional AI, Computational Intelligence- an Emergence of a New Computational Paradigm, Computational Intelligence- a Formal Definition, Soft computing- Definitions, Fundamental Elements of Soft Computing, Computational Learning Theory, Synergism in Softcomputing.

UNIT II : FUZZY SETS AND RELATIONS   (15 Hrs)
Conventional Sets, Fuzzy Sets, Membership Functions, Continuous and Discrete Membership Functions, Typical Membership Functions, Operations on Fuzzy Sets, Basic Concepts Associated with Fuzzy Sets, Extension Principle of Fuzzy Sets, Fuzzy Relations, Projection of Fuzzy Relations, Fuzzy Pattern Recognition-Introduction, The Fuzzy C-Means Clustering Algorithm, Image Segmentation Using Fuzzy C-Means.

UNIT III : MACHINE LEARNING USING NEURAL NETS   (15 Hrs)
Biological Neural Networks, Artificial Neural Networks, Principles of Learning in a Neural Net, Stability and Convergence, Three Important Theorems for Stability Analysis of Neural Dynamics, Supervised Neural Learning Algorithms-Introduction, McCulloch-Pitts Model, The Perceptron Learning Model, Unsupervised Neural Learning Algorithms-Introduction, Discrete Hopfield Network, Continuous Hopfield Neural Net.

UNIT IV: EVOLUTIONARY COMPUTING ALGORITHMS (15 Hrs)

Introduction – Genetic algorithm: How does it work? – Deterministic explanation of Holland's observation – Stochastic Explanation of GA – The Markov model for convergence analysis – Application of GA in optimization problems – Application of GA in machine learning – Application of Gain intelligent search – Genetic Programming – Conclusions.

UNIT V : EMERGING AREAS OF COMPUTATIONAL INTELLIGENCE (15 Hrs)

Introduction – Artificial life – particle Swarm optimization – Fuzzy Chaos theory – Rough sets – Granular computing.

SELF STUDY :

UNIT I : Computational Learning Theory, Synergism in Softcomputing.
UNIT II: Fuzzy Pattern Recognition-Introduction, The Fuzzy C-Means Clustering Algorithm, Image Segmentation Using Fuzzy C-Means.
UNIT III: McCulloch-Pitts Model, The Perceptron Learning Model
UNIT IV: Application of GA in optimization problems – Application of GA in machine learning – Application of Gain intelligent search
UNIT V: Artificial life

TEXT BOOK

Computational Intelligence Principles, Techniques and Applications, Amit Konar, Springer, 2007.

Chapters: 1, 2.1 – 2.10, 5.1 – 5.3, 7, 8.1 – 8.3, 9.1, 9.2.1, 9.2.2, 12, 22.1 – 22.3, 22.5 – 22.7

REFERENCE BOOKS

1. **Genetic Algorithms in Search, Optimization, and Machine Learning**, D. E.Goldberg, Addison-Wesley, Reading, 1989.
2. **Introduction to Machine Learning**, E. Alpaydin, Prentice-Hall of India, 2004.
3. **Computational Intelligence: Principles, Techniques and Applications**,AmitKonar, Springer, 2005.
4. **First Course on Fuzzy Theory and Applications**, K.H. Lee, Springer, 2005
5. **Computational Intelligence: An Introduction**,Andries P. Engelbrecht, John Wiley and Sons, 2007.
6. **Computational Intelligence: Methods and Techniques**,Leszek Rutkowski, Springer 2008.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Demonstrate the fundamental concepts of soft computing and its applications.
CO 2	Explain the concepts of fuzzy sets, knowledge representation using fuzzy rules, and other machine intelligence applications of fuzzy logic
CO 3	Discuss the basics of an evolutionary computing
CO 4	Analyze the concept of fuzzy sets, knowledge representation using fuzzy rules, and other machine intelligence applications of fuzzy logic
CO 5	Understand the basics of an evolutionary computing paradigm.

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG2BE2	Neural Networks	Lecture	5	5

COURSE DESCRIPTION

This Course provides a basic knowledge of how the human brain works and using that concept it explains different learning algorithms to processes the previously unseen situations with expected outputs even when the input is noisy, incomplete or inaccurate..

COURSE OBJECTIVES

- To understand the fundamentals of Neural Networks
- To apply various models and learning algorithms for the real world scenario

SYLLABUS

UNIT I: Introduction to Neural Network and Artificial Neural Networks (15 Hrs)

Introduction to Neural Networks : Neural Process, Overview – The Rise of Neurocomputing

Introduction to Artificial Neural Networks : Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison between the brain and the computer, Comparison between artificial and biological Neural Network, Basic Building blocks of Artificial Neural Networks, Artificial Neural Network Terminologies.

UNIT II: Models of Artificial Neural Networks and Perceptron Networks (15 Hrs)

Fundamental Models of Artificial Neural Networks: Introduction, McCullach-Pitts Neuron Model, Learning Rules, Hebb Net. Perceptron Networks: Introduction, Single Layer Perceptron, Brief Introduction to Multilayer Perceptron Networks

UNIT III: Learning Rules (15 Hrs)

Associative Memory Networks : Introduction, Algorithm for Pattern Association, Hetero Associative Memory Neural Networks, Auto Associative Memory Network, Bi-directional Associative Memory.

UNIT IV : Feedback and Feed forward Network (15 Hrs)

Feedback Networks: Introduction, Discrete HopFiled Net, Continuous Hoppfiled Net, Relation between BAM and Hopfiled Nets. Feed Forward Networks: Introduction, Back Propagation Network.

UNIT V: Special Networks (15 Hrs)

Special Networks: Introduction, Probabilistic Neural Network, Cognitron, Neocognitron, Boltzman Machine, Boltzman Machine with Learning, Support Vector Machine.

Application of Neural Networks: Application of Neural Networks in Arts, Bioinformatics, Knowledge Extraction.

SELF STUDY: UNIT V

TEXT BOOK

Introduction to Neural Networks Using MATLAB 6.0, S N Sivanandam, S.Sumathi, S.N.Deepa, Published by Tata McGraw – Hill Publishing Company Limited, 2008.

Chapters: 1, 2 3, 4, 6 , 7, 8.1-8.2, 12.1 – 12.6, 12.13, 13.1 – 13.3

REFERENCES:

1.***Neural Networks, Fuzzu Logic and Genetic Algorithms,***S.RAjasekaran, G.A.Vijayalakshmi, PHP Learning Private Limited, Delhi, 2015**.**

2. ***Neural Networks and Fuzzy Systems, Bart Kosko,*** PHP Learning Private Limited, Delhi, 2012**.**

3. ***Neuro-Fuzzy and Soft Computing***, Jhh-shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, Bart Kosko, PHP Learning Private Limited, Delhi, 2012.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain the basic concepts of Neural Networks.
CO 2	Describe the various Neural Network models
CO 3	Analyze Learning Rules of Neural Network to apply
CO 4	Distinguish Feedback and Feed forward networks
CO 5	Compare Special networks and discuss the applications of Neural Network.

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	**19PG2BE3**	**SOFTWARE TESTING**	Lecture	5	5

COURSE DESCRIPTION
To study fundamental concepts in software testing, planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.

COURSE OBJECTIVES
- To give strong foundation in software quality assurance by teaching standards, models and measurement techniques.
- To enhance the knowledge of the students to provide innovative solutions to various quality assurances related problems.

SYLLABUS

UNIT I:SOFTWARE QUALITY IN GLOBAL BUSINESS CONTEXT   (15 Hrs)
Introduction, Quality Attributes, Quality Challenges in Globally Outsources Business, importance of Quality as a Business Driver, Understanding Life cycle Models, Object Oriented Life cycle Models, Choosing the right type of Life cycle model for software project.

UNIT II: SQA ROLE IN AN ORGANIZATION   (15 Hrs)
Introduction, Understanding the SQA function. Managing SQA Operations **:**SQA : Organizational Level Initiatives, Defect Prevention, Quality Assurance – Important Dimensions for the QA Analyst.

UNIT III: TESTING FOR QUALITY VALIDATION   (15 Hrs)
Introduction , The Purpose of Testing , Testing is not same as Inspection and Audit, Testing is not the same as Debugging , The Testing Life Cycle, Roles and Responsibilities in Testing, Test Artefacts, The Test Plan and Test Techniques.

UNIT IV: TESTING MODELS AND TECHNIQUES   (15 Hrs)

Testing Phases with the V-Model and W-Model – Testing Techniques – Risk-based Approach to Testing – Test Process Automation and Test Tool Selection.

UNIT V :TESTING TOOLS   (15 Hrs)

Load Runner – Overview of LoadRunner – Creating Vuser script using Virtual User Generator – Creating Virtual Users Using Loadrunner Controller – JMeter – JMeter Overview – JDBC Test – HTTP Test.

SELF STUDY: UNIT 5

TEXT BOOKS

1. ***Software Quality Assurance : Principles and Practice for the New Paradigm,***N.S.Godbole, 2nd Edition, Narosa Publishing House, 2017.
   Chapters: 1, 2.1, 2.5, 4.4 - 4.6, 6.1 - 6.12
2. ***Software Testing Tools,*** Dr.K.V.K.K.Prasad, Published by Dreamtech Press, Edition, 2012.   Chapters : 7 , 8

REFERENCES:

1. ***Software Quality and Testing: A Concise Study,*** S. A. Kelkar, 3rd Edition, PHI Learning, 2012.
2. ***Software Testing - Principles, Techniques and Tools,*** M.G. Limaye, Tata McGraw-Hill Education Private Ltd., 2017.

COURSE OUTCOMES (CO)

NO.	COURSE OUTCOMES
CO 1	Discuss various software application domains and different process model used in software development.
CO 2	Demonstrate the basics of software quality assurance and defect prevention.
CO 3	Compare different testing strategies and tactics.
CO 4	Describe the software testing techniques in different environments.
CO 5	Explain high performance testing using Jmeter.

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CR EDI TS
PSCS	19PG2BE4	Embedded Systems	Lecture	5	5

COURSE DESCRIPTION

This Course gives fundamental requirements of embedded systems and the interaction between hardware and software in those systems. And explain the basic steps of hardware design and issues of real time embedded system.

COURSE OBJECTIVES

- To create interest in low level system programming
- To help students venture in to embedded designing concepts

SYLLABUS

UNIT I :INTRODUCTION   (15 Hrs)
Embedded System-Design Goals For Embedded Software-Real Time – Multitasking-Embedded Processors- Programming Languages-Real Time Kernel – Building an Embedded Application Unique. Data Representation: Fixed – Precision Binary Numbers-Integers-Real Numbers,-ASCII Representation of Text-Binary –Coded Decimal (BCD).

UNIT II:GETTING THE MOST OUT OF C   (15 Hrs)
Integer data types-mixing data types-manipulating bits in memory-manipulating bit in I/O ports-Accessing Memory mapped I/O Devices-structures-variant Access. A programmers view of computer organization: Memory –the central processing unit(CPU)-Input/output(I/O) - Intel architecture.

UNIT III:MIXING C AND ASSEMBLY   (15 Hrs)
Programming in Assembly-Register Usage Conventions-Typical Use of Addressing Options-Instruction Sequencing-Procedure Call and Return- Parameter Passing-Retrieving Parameters- Everything is Pass by Value-Temporary Variables.Input/Output Programming: The Intel I/O Instructions-Interrupt – Driven I/O.

UNIT IV:CONCURRENT SOFTWARE   (15 Hrs)

Foreground/Background Systems-Multithreaded Programming-Shared Resources And Critical Sections Scheduling: Thread States-Pending Threads-Context Switching-Round robin Scheduling-Priority –Based Scheduling- Assigning Priorities-Deadlock.

UNIT V:MEMORY MANAGEMENT   (15 Hrs)

Object in C-Scope-Lifetime -Automatic Allocation-Static Allocation –Dynamic Allocation-Recursive Functions and Memory Allocation Problems. Shared Memory: Recognizing Shared Objects-Reentrant Functions.

SELF STUDY :

UNIT I :Data Representation: Fixed –Precision Binary Numbers-Integers-Real Numbers,-ASCII Representation of Text-Binary –Coded Decimal (BCD).
UNIT II: Intel architecture.
UNIT III: The Intel I/O Instructions-Interrupt –Driven I/O
UNIT IV: Deadlock.
UNIT V: Shared Memory: Recognizing Shared Objects-Reentrant Functions.

TEXT BOOK

Fundamentals of Embedded Software: Where C and Assembly Meet, Daniel W.Lewis, PHI Learning Pvt. Ltd, 2011.
        Chapter 1,2,3,4,5,6,7,8,9

REFERENCES:

1. ***Making Embedded Systems***, O.RellyElecia White, 2011.
2. ***Embedded Systems:Architecture, Programming And Design***, Raj Kamal, 2011.
3. ***Embedded System Design,***Santanu Chattopadhyay, 2013.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain the concepts of embedded systems
CO 2	Analyze the architecture of embedded systems
CO 3	Describe about the processors and memory organization
CO 4	Distinguish when and where to apply embedded concepts
CO 5	Describe different embedded system design technologies

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SEMESTER –II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19B2EDC	Web Development	Extra Departmental Course	3	3

COURSE DESCRIPTION

This Course introduces basic web design using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). And this course provides knowledge to plan and design effective web pages with different text formatting and images to create website.

COURSE OBJECTIVES

- To enhance the knowledge of the students in effective webpage designing.
- To provide skills to sharply focus on needed information to be presented in a website.
- To improve the quality of the students by giving strong base in fundamental and advanced concepts.
- To give courage to face the real-world scenarios as it is practical oriented
- To inculcate the ability to explain, analyze, identify and define the technology required to build and implement a web site.

SYLLABUS

UNIT I: OVERVIEW OF HTML   (9 Hrs)
Fundamentals of HTML - Root Elements-Metadata Elements- Section Elements-Heading Elements-Flow Elements- Phrasing Elements- Embedded Elements-Interactive Elements –Working with Headings-Character Entities – Horizontal Rules – Line Breaks – Paragraph – Citations – Quotations – Definitions - Comments.

UNIT II: WORKING WITH TEXT   (9 Hrs)
Working with Text - Formatting Text with HTML Elements – Physical styles – Logical styles – Defining the MARK Element- Defining the STRONG Element- Defining the CODE Element- Defining the SMALL Element.

UNIT III: ORGANIZING TEXT (9 Hrs)

Organizing Text in HTML -Arranging text – Allowing Word Breaks- Defining the preformatted Text - DIV Element and SPAN Element – Formatting Text in Tables - Creating Ruby (Captioned) Text – Displaying List-Immediate Solutions : Allowing Word Breaks Using the WBR Element – Displaying The Preformatted Text – Using the DIV Element - Positionaing Text Using the DIV Element – Using the SPAN Element – Formatting Text Using Tables – Creating the Ruby Text – Creating Lists.

UNIT IV: CREATING TABLES (9 Hrs)

Creating Tables - Understanding Tables – Describing the TABLE Elements – CAPTION –COLGROUP – COL – TBODY – THEAD – TFOOT – TR – TD and TH - Creating a Simple Table – Adding a Title to a Table – Caption to a Table – Specifying the Properties of the Columns – Spanning Rows and Columns – Using Images in a Table.

UNIT V: UNDERSTANDING CSS (9 Hrs)

Overview of CSS – Discussing the Evolution of CSS – Understanding the Syntax of CSS – Exploring CSS Selectors – Inserting CSS in an HTML Document.

SELF STUDY:

UNIT I: Working with Headings-Character Entities – Horizontal Rules – Line Breaks – Paragraph – Citations – Quotations – Definitions - Comments

UNIT III: Arranging text – Allowing Word Breaks- Defining the preformatted Text - DIV Element and SPAN Element – Formatting Text in Tables - Creating Ruby (Captioned) Text

UNIT IV: Adding a Title to a Table – Caption to a Table – Specifying the Properties of the Columns

TEXT BOOK

HTML5 Black Book, Kogent Learning Solutions Inc., Dreamtech Press, 2012.

Chapters (Page Nos.) : 2(31-50 & 68-76) ; 3(77-94); 4(113-128) ; 6 (145-164) ; 18 (465-476)

REFERENCES:

1. **Sergey's HTML5 & CSS3 Quick Reference: Color Edition,** Sergey Mavrody, Published 16 Nov 2009.
2. **HTML5: The Missing Manual,** Matthew MacDonald,Published in 2011.
3. **Head First HTML5 Programming: Building Web Apps with JavaScript,** Elisabeth Freeman and Eric Freeman, Published in 2011.

4. ***Beginning HTML5 and CSS3 For Dummies,*** Chris Minnick and Ed Tittel, Published 2013.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Define various tags of HTML
CO 2	Design a web page with attractive display
CO 3	Create a Layout for a webpage using Block tags
CO 4	Explain how and where to apply CSS
CO 5	Analyze content to design website

I M.Sc. Computer Science
SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG3B12	Digital Image Processing	Lecture	5	5

COURSE DESCRIPTION

The course helps to create interest in image processing techniques and infuse research thirst in this area

COURSE OBJECTIVES

- To inculcate ideas and create interest in processing images techniques.
- To provide a research orientation inducing them to pursue research.

SYLLABUS

UNIT I : INTRODUCTION   (15 Hrs)

Introduction- What is Digital Image Processing- The Origins of Digital Image Processing – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image Processing System.

UNIT II : DIGITAL IMAGE FUNDAMENTALS   (15 Hrs)

Elements of Visual Perception – Light and the Electromagnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – image interpolation - Some Basic Relationships between Pixels – An Introduction to the Mathematical Tools Used in Digital Image Processing.

UNIT III: INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING (15 Hrs)

Background-Some Basic Intensity Transformation Functions - Histogram Processing – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters – Combining Spatial Enhancement Methods.

UNIT IV: IMAGE RESTORATION AND RECONSTRUCTION   (15 Hrs)

A Model of the Image Degradation/Restoration Process-Noise Models - Restoration in the Presence of Noise Only-Spatial Filtering. **Color Image Processing:** Color Fundamentals – Color Models

UNIT V: IMAGE COMPRESSION AND SEGMENTATION   (15 Hrs)

Fundamentals – Huffman coding – Golomb coding- Arithmetic coding – LZW coding- Runlength coding - Segmentation Fundamentals - Point, Line and Edge Detection.

SELF STUDY :
UNIT I :Examples of Fields that Use Digital Image Processing
UNIT II : Elements of Visual Perception – Light and the Electromagnetic Spectrum
UNIT III: Combining Spatial Enhancement Methods.
UNIT IV :Color Models
UNIT V : Edge Detection

TEXT BOOK

Digital Image Processing, Rafael.C.Gonzalez and Richard E.Woods, 3rd Edition, Pearson Publications,   2014.

Chapters: 1, 2, 3.1 – 3.7, 5.1 – 5.3, 6.1, 6.2, 8.1 - 8.2.5, 10.1, 10.2

REFERENCES:

1. ***Fundamentals of Digital image processing***, Anil Jain, PHI Learning Pvt Ltd. 2011.
2. ***Digital Image Processing & Analysis***, B.Chanda, D.Dutta Majumder, 2nd Edition, PHI Learning Pvt Ltd. 2013.
3. ***Digital Image Processing***, Chaturvedi, 1st Edition, Vayu Educaton India Publisher, 2013.
4. ***Digital Image Processing: Principles and Applications***, Wilhelm **Burger and Mark J. Burge,** 2nd Edition, Springer, 2016.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain the representation of digital image and its manipulations
CO 2	Analyze image sampling and quantization requirements and implications
CO 3	Describe various Transformation and Filtering Techniques
CO 4	Demonstrate Restoration And Reconstruction models
CO 5	Utilize Image Compression And Segmentation for efficient storage

II M.Sc. Computer Science
SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3B13	Data Mining And Data Warehousing	Lecture	5	5

COURSE DESCRIPTION

Data Mining and Data Warehousing consists of introduction about data mining, data pre-processing, mining frequent pattern, association, classification and cluster analysis and applications of data mining

COURSE OBJECTIVES

- To interpret the contribution of data mining and data warehousing to the decision support level of organizations
- To understand different models used for OLAP and data pre-processing
- To categorize and differentiate between situations for applying different data mining techniques: mining frequent pattern, association, classification and cluster analysis
- To utilize Data Mining techniques in various real applications

SYLLABUS

UNIT I: INTRODUCTION   (15 Hrs)

Introduction to Data Mining-its importance — Data Mining on what kind of Data- Data Mining Functionalities-What Kinds of Patterns Can Be Mined – Are All of the Patterns Interesting – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of Data Mining System with a Database or Data Warehouse System – Major Issues in Data Mining.

UNIT   II: DATA PREPROCESSING   (15 Hrs)

Need to Pre-process the Data - Descriptive Data Summarization – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Data Warehouse and OLAP Technology : An Overview - What is a Data Warehouse – A Multidimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation – From Data Warehousing to a Data Mining.

UNIT III: MINING FREQUENT PATTERNS AND CLASSIFICATION **(15 Hrs)**

Efficient and Scalable Frequent Itemset Mining Methods: The Apriori Algorithm : Finding Frequent Itemsets Using Candidate Generation- Generating Association Rules from Frequent Itemsets- Improving the Efficiency of Apriori – Mining Frequent Itemsets without Candidate Generation- Mining Frequent Itemsets Using Vertical Data Format – Mining Closed Frequent Itemsets. Classification - Prediction – Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule-Based Classification – Classification by Back propagation – Support Vector Machines.

UNIT IV: CLUSTER ANALYSIS **(15 Hrs)**

What is 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.

UNIT V: APPLICATIONS AND TRENDS IN DATA MINING **(15 Hrs)**

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

SELF STUDY:

UNIT I: Integration of Data Mining System with a Database or Data Warehouse System

UNIT II: A Multidimensional Data Model – Data Warehouse Architecture

UNIT IV: Grid-Based Methods – Model-Based Clustering Methods.

UNIT V: Data Mining System Products and Research Prototypes – Additional Themes on Data Mining

TEXT BOOK

Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Morgan Kaufmann Publishers An Imprint of Elsevier, 2009.

Chapters:1, 2, 3, 5.2, 6.1 - 6.7, 7.1 – 7.8, 11

REFERENCES:
1. *Data Mining Techniques and Applications: An Introduction,*Hongbo DLL, Cengage Lmg Business Press, 2010.
2. *Data Warehousing: Concepts, Techniques, Products and Applications*, 3rd Edition, PHI Learning, Delhi, 2012.
3. *Data Mining & Data Warehousing*, Udit Agarwal, 1st Edition, S.K.Kataria& sons Publication, 2016.
4. *Data Mining: Concepts and Techniques*, Jiawei Han, Micheline Kamber, 3rd Edition Morgan Kauffmann Publishers, 2011.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain the fundamental concept of Data Mining andanalyze and evaluate the data cleaning, integration , transformation and reduction techniques
CO 2	Design multidimensional data using Data Warehouse architecture.
CO 3	Design and evaluate Classification algorithms
CO 4	Identify the types of data in Cluster Analysis and categorize the Cluster Methods
CO 5	Utilize the Data Mining techniques in various real applications and in major issues

II M.Sc. Computer Science
SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG3B14	LAB V- Digital Image Processing	Practical	5	3

COURSE DESCRIPTION

The course helps to create interest in image processing techniques and infuse research thirst in this area

COURSE OBJECTIVES

- To inculcate ideas and create interest in processing images techniques.
- To provide a research orientation inducing them to pursue research.

SYLLABUS

Programs are written using the following concepts

Image Enhancement Techniques

Histogram Processing, Median Filtering, Spatial Filtering, Filtering in Frequency

Domain.

Image Analysis and Segmentation

Feature Extraction, Edge deduction, Thresholding

Image Compression Techniques

Scalar and Vector Quantisation, Huffman encoding, Run Length encoding., Transform image coding

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome
CO 1	Demonstrate Fundamental Steps involved in Digital Image Processing
CO 2	Analyze and use Mathematical Tools for Digital Image Processing
CO 3	Apply Intensity Transformation functions and Spatial filtering methods
CO 4	Utilize Color Image Processing with different Color Models
CO 5	Implement Image Segmentation Techniques and Image Compression Techniques using Huffman ,Golomb and Arithmetic coding algorithms

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3B15	LAB VI – Data Mining And Data Warehousing	Practical	5	3

COURSE DESCRIPTION

Data Mining and Data Warehousing consists of introduction about data mining, data warehousing, data pre-processing, :mining frequent pattern, association, classification and cluster analysis and applications of data mining.

COURSE OBJECTIVES

- To assess data pre-processing steps involved in different datasets
- To evaluate   classification algorithms using Weka tool with sample data.
- To evaluate   clusters algorithms using Weka tool with sample data .

SYLLABUS

DATA MINING AND DATA WAREHOUSE PROGRAM - WEKA TOOL

1. Rules for identifying attributes.
2. Listing of categorical attributes and the real-valued attributes separately.
3. Demonstration of preprocessing on dataset student.arff
4. Demonstration of Association rule process on dataset weather-nominal.arff using apriorialgorithm
5. Demonstration of Mining Frequent Itemsets without Candidate Generation using supermarker.arff.
6. Test on classification of decision tree using segment-test.arff
7. Demonstration of classification rule process on dataset contact-lens.arff using j48 algorithm.
8. Demonstration of classification rule process on dataset iris.arff using id3 algorithm
9. Demonstration of classification rule process on dataset labor.arff using naïve bayes algorithm.
10.   Demonstration of clustering rule process on dataset vote.arff using k-means algorithm

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Utilize Weka tool to evaluate Data Mining algorithms.
CO 2	Demonstrate pre-processing steps involved in different datasets.
CO 3	Develop the decision tree algorithm using different datasets
CO 4	Demonstrate the classification and clusters algorithms using large datasets.
CO 5	Analyze Data Mining techniques for realistic data.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BSI	Summer Internship/ Training/ Online Certification	Major Core	-	3

It is a summer training programme undertaken by the students in a company of their choice. This is aimed to help them have an experience of the real time environment. It will act as a platform for the future placement.

The students are mandated to complete one online course in the area of their interest.

The students have to submit a report after the internship. This report will be assessed through a viva-voce internal exam.

COURSE OUTCOME

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Identify employment contacts leading directly to a full-time job following course completion
CO 2	Create communication, interpersonal and other soft skills essential for the job interview process
CO 3	Analyse the project requirements and engages in continuing professional development
CO 4	Analyze a problem and identify the computing requirements appropriate to its solution.
CO 5	Utilizing a new software tool.

II M.Sc.

SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE5	Python Programming	Lecture	5	5

COURSE DESCRIPTION

Python is an interpreted, high-level, general-purpose programming language. it provides constructs that enable clear programming on both small and large scales.

COURSE OBJECTIVES

- To understand why python is a useful scripting language for developers.
- To learn how to design and program python applications.
- To learn how to use lists, tuples, and dictionaries in python programs

SYLLABUS

UNIT I: BASIC OF PYTHON PROGRAMMING   (15 HRS)

Features of Python-History of Python-The Future of Python-Writing and Executing First Python Program-Literal Constants-Variables and Identifiers-Data Types- Input Operation-Comments-Reserved Words-Indentation-Operation and Expressions-Expression in Python –Operations on Strings-Other Data Types-Type Conversion.

UNIT II: DECISION CONTROL STATEMENTS   (15 HRS)

Introduction to Decision Control Statements-Selection /Conditional Branching Statements-Basic Loop Structure /Iterative Statements-Nested Loops-The Break Statement-The Continue Statement-The Pass Statement-The Else Statement used with Loops. Functions and Modules: Introduction – Function Declaration and Definition-Function Call-Variables Scope and Lifetime-The Return Statement-More On Defining Function-Lambda Functions or Anonymous Functions-Documentation Strings.

UNIT III: PYTHON STRINGS REVISITED   (15 HRS)

Concatenating ,Appending ,and Multiplying Strings-String Formatting Operator-Build in String Methods and Functions-Slice Operation-Ord()and Chr() Function-Comparing String-Iteration String –The String Module-Regular Expressions-Metacharacters in Regular Expression. File Handling: File Path-Types of Files-Opening and Closing Files-Reading and Writing Files-File Positions-Renaming and Deleting Files-Directory Methods.

UNIT IV: DATA STRUCTURES   (15 HRS)

Sequence-Lists-Functional Programming-Tuple-Sets-Dictionaries Classes and Objects:Classes and Objects-Class Methods and Self Arguments,Constructer-Class Variables and Object Variables-Other Special Methods-Public and Private Data Members-Private Methods-Built in Function-Built in Class Attributes-Garbage Collection-Class Methods-Static Methods

UNIT V: INHERITANCE   (15 HRS)

Inheriting Classes in Python-Types of Inheritance-Composition-Abstract Classes and Interfaces-Metaclass. Operator overloading: Introduction-Implementing Operator Overloading-Reverse Adding-Overriding –Getitem-(),Setitem-(),Methods-Overriding the in Operator-Overloading Miscellaneous Function-Overriding the –Call-() Method. Error and Exception Handling: Introduction to Errors and Exceptions-Handling Exceptions-Multiple Except Blocks-Multiple Exceptions in A Single Block-Except Block without Exception –The else Clause- Raising Exception-Instantiating Exceptions-Handling Exception in Invoked Functions.

UNIT VI: SIMPLE WEB APPLICATION DEVELOPMENT (INTERNAL)

SELF STUDY: UNIT II

TEXT BOOK
1. *Python Programming using Problem Solving Approach,* Reema Thareja,Published By Oxford Higher Education, 2017

REFERENCES:
1. *Problem Solving and Python Programming,* S.A. Kulkarni, Published ByYesdee, 2017
2. *Python for Software Design How to Think Like a computer scientist,* Allen B.Downey Cambridge University Press, 2018
3. *Introduction to Programming using Python ,*Y.DanielLiang,Published By Pearson, 2018.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Understand python is a useful scripting language for developers.
CO 2	Apply to lists, tuples, and dictionaries in python programs
CO 3	Identify the structure and components of a python program.
CO 4	Analyze the design philosophy that emphasizes code readability, notably using significant whitespace.
CO 5	Utilizing a new software tool.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE6	Cryptography and Network Security	Lecture	5	5

COURSE DESCRIPTION

To understand design issues in Network Security and to understand security threats, security services and mechanisms to counter them.

COURSE OBJECTIVES
- To know the methods of conventional encryption.
- To understand the concepts of public key encryption
- To understand authentication and Hash functions.
- To know the network security tools and applications.
- To understand the system level security used.

SYLLABUS

UNIT I: INTRODUCTION   (15 Hrs)
Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography, Block Ciphers and the DES: Traditional Block Cipher Structure – The Data Encryption Standard – A DES Example – The Strength of DES – Block Cipher Design Principles.

UNIT II: PUBLIC KEY CRYPTOGRAPHY   (15 Hrs)
Public Key Cryptography and RSA:Principles of Public-key Cryptosystems – The RSA Algorithm, Other Public Key Cryptosystems: Diffie-Hellman key Exchange – Elgamal Cryptographic System - Elliptic Curve Arithmetic and Cryptography.

UNIT III: AUTHENTICATION AND HASH FUNCTION   (15 Hrs)
Cryptographic Hash Functions: Applications of Cryptographic Hash Functions- Two Simple Hash Functions – Requirements and Security – Hash Functions based on cipher block chaining - SHA, Message Authentication Codes: Message Authentication Requirements - Message Authentication Functions – Requirements of Message Authentication Codes – Security of MACs - MACs based on hash functions: HMAC.

UNIT IV: DIGITAL SIGNATURES AND KEY MANAGEMENT (15 Hrs)

Digital Signatures: properties – Attacks And Forgeries – Digital Signature Requirements – Direct Digital Signature – Elgammal Digital Signature Scheme – Schnorr Digital Signature Scheme – NIST Digital Signature Algorithm, Key Management and Distribution: Symmetric Key Distribution Using Symmetric and Asymmetric Encryption – Distribution of Public Keys.

UNIT V: NETWORK SECURITY (15 Hrs)

User Authentication: Remote user authentication principles – Kerberos Version 5, Electronic Mail Security: PGP - S/MIME, IP Security: Overview - IP Security Policy – Encapsulating Security Payload.

SELF STUDY:

UNIT 1: Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques.

UNIT IV: Key Management and Distribution: Symmetric Key Distribution Using Symmetric and Asymmetric Encryption – Distribution of Public Keys**.**

TEXT BOOK

Cryptography and Network Security Principles and Practices, W.Stallings, 6th Edition, Pearson Publications, 2015.

Chapters: 1, 2, 8, 9.1 - 9.4, 10.1 - 10.5, 11.1 - 11.5, 12.1 - 12.4, 13.1 - 13.3, 14.1, 14.3, 17.1, 17.2, 18.1 - 18.3

REFERENCES:

*1. **Cryptography and Network Security***, Behrouz A.Forouzan and Debdeep Mukhopadhyay, The McGraw Hill Publication, 2010.

*2. **Cryptography and Network Security***, Atul Kahate, 3rd Edition, McGraw Hill Education (India) Pvt. Ltd., 2013.

*3. **Network Security Essentials Applications and Standards,***WilliamStallings,Pearson Education Publications, 2013.

*4. **Cryptography and Network Security***, PS Gill, Trinity Publish, 2014.

COURSE OUTCOMES (CO)

NO.	COURSE OUTCOMES
CO 1	Explain the various symmetric encryption techniques and demonstrate the functionalities of DES algorithm.
CO 2	Analyze public key algorithms.
CO 3	Evaluate the authentication concept and hash algorithms.
CO 4	Apply the concepts of key management techniques.
CO 5	Analyze the vulnerabilities in data communication through networks.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCS	19PG3BE7	DistributedDatabase Management System	Lecture	5	5

COURSE DESCRIPTION
- Distributed Database contains Overview of Distributed Database, Query Processing , Distributed Concurrency Control , Reliability and Replication, Distributed Object Database Management

COURSE OBJECTIVES
- To understand basic concepts of Distributed Database
- To interpret Objectives of Query Processing
- To understandConcurrency Control of Distributed Database
- To describeReliability and Replication protocols and understand fundamental Object Concepts and Object Models

SYLLABUS

UNIT I : Overview Of Distributed Database   (15 Hrs)
Distributed Data Processing - What is a Distributed Database System? - Data Delivery Alternatives - Promises of DDBSs- Complicating factors - Problem Areas16 -Distributed Database Design - Top-Down Design Process - Bottom-up Design Process - Distribution Design - Fragmentation – Allocation.

UNIT II : Overview Of Query Processing   (15 Hrs)
Query Processing Problem - Objectives of Query Processing - Complexity of Relational Algebra Operations - Characterization of Query Processors - Layers of Query Processing - Query Decomposition - Localization of Distributed Data.

UNIT III : Distributed Concurrency Control   (15 Hrs)
Serializability Theory - Taxonomy of Concurrency Control Mechanisms - Locking-Based Concurrency Control Algorithms - Timestamp-Based Concurrency Control Algorithms - Optimistic Concurrency Control Algorithms - Deadlock Management - "Relaxed" Concurrency Control.

UNIT IV : Reliability And Replication   (15 Hrs)
Reliability Concepts and Measures - Failures in Distributed DBMS – Local Reliability Protocols - Distributed Reliability Protocols – Dealing with Site -

Network Partitioning - Consistency of Replicated Databases - Replication Protocols - Group Communication - Replication and Failures.

UNIT V : Distributed Object Database Management   (15 Hrs)
Fundamental Object Concepts and Object Models - Object Distribution Design - Architectural Issues - Object Management - Distributed Object Storage - Object Query Processing - Transaction Management.

SELF STUDY :
UNIT I: Overview of Distributed Database: - Promises of DDBSs- Complicating factors
UNIT II: Query Processing Problem - Objectives of Query Processing
UNIT III: Optimistic Concurrency Control Algorithms
UNIT IV: **Reliability And Replication** :Failures in Distributed DBMS, Dealing with Site
UNIT V: **Distributed Object Database Management** : Architectural Issues

TEXT BOOK

Principles of Distributed Database Systems, M. Tamer Özsu and Patrick Valduriez, 3rd Edition, Springer, 2010.   Chapters:1, 3, 6, 7, 11, 12, 13, 15.

REFERENCES:
1. ***Principles of Distributed database systems,*** M.T. Ozsu and S. Sridhar, Pearson Education Publication, 2008.
2. ***Distributed Database Systems***, Chhanda Ray, Pearson Education, India, 2009.
3. ***Distributed Database Management Systems: A Practical Approach,*** Saeed K.Rahini&Frank.S.Haug, Wiley-IEEE Computer Society Press, 2010.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Compare normal and distributed DBMS and to explain various approaches of DDBMS.
CO 2	Formulate various kinds of retrieving statements to retrieve information from DDB.
CO 3	Explain multiple processes dealing with distributed database system without clash
CO 4	Describe the set of protocols used in DDBMS to make effective communication.
CO 5	Discuss object concepts and object models.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE8	Compiler Design	Lecture	5	5

COURSE DESCRIPTION

Explore the principles, algorithms, and data structure involved in the design and construction of compilers.

COURSE OBJECTIVES
- To provide knowledge on system oriented concepts
- To help them to write efficient programs, understanding the implementational requirements

SYLLABUS
UNIT I - INTRODUCTION TO COMPILING   (15 Hrs)

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 - SYNTAX ANALYSIS   (15 Hrs)

Role of the parser –Context-Free Grammars – Writing Grammars- Top Down parsing –Bottom-up parsing – Operator Precedent Parsing – LR Parsers.

UNIT III - INTERMEDIATE CODE GENERATION   (15 Hrs)

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions –Case Statements – Back patching – Procedure calls.

UNIT IV - CODE GENERATION   (15 Hrs)

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 –Register allocation and Assignment – DAG representation of Basic Blocks – Peephole Optimization.

UNIT V - CODE OPTIMIZATION   (15 Hrs)

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Loops in flow Graphs – Introduction to Global Data Flow Analysis.

SELF STUDY:

UNIT I:Role of Lexical Analyzer – Input Buffering – Specification of Tokens.
UNIT II**:** LR Parsers.
UNIT III: Procedure calls.
UNIT IV: Peephole Optimization.
UNIT V: Introduction to Global Data Flow Analysis

TEXT BOOK

Compilers Principles, Techniques and Tools, Alfred Aho, Ravi Sethi, Jeffrey D Ullman,2nd Edition Pearson Education Asia.2015

Chapter 1,3.1 to 3.3, 4.1 to 4.7, 8, 9.1 to 9.9, 10.1 to 10.5

REFERENCES:

 1.Compiler Design *,H.S.Mohan,Narosa Publishing House,2014*

2. **Compiler Design in** *R. Venkatesh and N. Uma Maheswari and   S.Jeyanthi, Yes DeePublishing Pvt Lid,2015*

3. **Compiler Design ,***R,GodfreyWinster,S. Aruna Devi, R.Sujatha,Published By Yes DeePublishing Pvt.Ltd, 2017*

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Describe the phases of Compiler
CO 2	Explain the role and type of Parser
CO 3	Analyze and use Intermediate languages
CO 4	Describe the design of code generation with register utilization
CO 5	Demonstrate code optimization techniques.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE9	Cloud Computing	Lecture	5	5

COURSE DESCRIPTION

This course describes the cloud environment, building software systems and components that scale to millions of users in modern internet.

COURSE OBJECTIVES

- To learn Parallel anddistributed communication
- To understand distributed resource management
- To study about virtualization and cloud resource management

SYLLABUS

UNIT I: Introduction   (15 Hrs)

Introduction : Cloud Computing at a Glance - Historical Developments - Building Cloud Computing Environments - Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of Computing - Parallel vs. Distributed Computing - Elements of Parallel Computing - Elements of Distributed Computing - Technologies for Distributed Computing.

UNIT II: Virtualization & Cloud Computing Architecture   (15 Hrs)

Virtualization: Introduction - Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques - Virtualization and Cloud Computing - Pros and Cons of Virtualization, Cloud Computing Architecture : Introduction - Cloud Reference Model - Types of Clouds - Economics of the Cloud - Open Challenges.

UNIT III: Concurrent and High-Throughput Computing   (15 Hrs)

Concurrent Computing: Thread Programming : Introducing Parallelism for Single Machine Computation - Programming Applications with Threads**,** High-Throughput Computing: Task Programming : Task Computing - Task-based Application Models.

UNIT IV: Cloud Platforms and Applications   (15 Hrs)

Cloud Platforms in Industry: Amazon Web Services - Google AppEngine - Microsoft Azure – Observations, Cloud Applications: Scientific Applications - Business and Consumer Applications.

UNIT V: Advanced Topics in Cloud Computing   (15 Hrs)

Advanced Topics in Cloud Computing: Energy Efficiency in Clouds - Market Based Management of Clouds - Federated Clouds / InterCloud - Third Party Cloud Services.

SELF STUDY:

UNIT 1: Introduction : Cloud Computing at a Glance - Historical Developments - Building Cloud Computing Environments - Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of **Computing.**

UNIT4: Cloud Applications: Scientific Applications - Business and Consumer Applications.

TEXT BOOK

Mastering cloud computing, Rajkumar Buyya, Christian Vecchiola&S.Thamaraiselvi, Mc Graw Hill Education,
Pvt. Ltd., 2016.
Chapters: 1, 2, 3.1 – 3.5, 4, 6.1, 6.2, 7.1, 7.2, 9, 10, 11

REFERENCES:

1. ***Cloud Computing A Practical Approach,*** Anthony T.Velte, Toby J. Velte, Robert Elsenpeter Tata-McGraw- Hill,   New Delhi, 2010.
2. ***Distributed Systems Concepts and Design***, George Coulouris, Jean Dollimore, Tim Kindberg, 5th Edition, Pearson   Education Asia, 2012.
3. ***Boris Lublinsky***, Kevin T. Smith, Alexey Yakubovich, ProfessionalHadoop Solutions, Wrox, Wiley, 2013.
4. ***Distributed and Cloud Computing From Parallel Processing to the Internet of Things***, Kai Hwang, Geofrey C.   Fox and Jack J. Dongarra, 1st Edition, Elsevier Science Publication, 2013.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES
CO 1	Identify and use different cloud computing services.
CO 2	Explain the basic principles of cloud virtualization.
CO 3	Prepare the appropriate cloud computing solutions to meet the requirement of specific applications.
CO 4	Design application by utilizing cloud platforms such as Google app Engine and Amazon Web Services.
CO 5	Analyze different cloud programming models.

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SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE10	Advanced Computer Graphics & Animation	Lecture	5	5

COURSE DESCRIPTION

To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.

COURSE OBJECTIVES

- To understand the basics of geometry processing.
- To understand the fundamentals of pipelined rasterization rendering of meshed objects and curved surfaces.
- To understand and work with advanced rendering methods such as radiosity.
- To design programs for advanced animation methods and
- To become proficient at graphics programming using OpenGL

SYLLABUS

UNIT I: Output Primitive Of Attributes   **(15 Hrs)**

Points and Lines – Line-drawing algorithms – Loading the frame buffer – Line function – Circle-generating algorithms – Ellipse-generating algorithms – Other curves – Parallel curve algorithms – Curve functions – Pixel addressing – Filled-area primitives – Line attributes – Curve attributes – Color and grayscale levels – Area-fill attributes – Character attributes.

UNIT II: Two-Dimensional Geometric Transformations   **(15 Hrs)**

Basic Transformations – Matrix representations – Composite transformations – Other transformations – Transformations between coordinate systems.

UNIT III: Two-Dimensional Viewing   **(15 Hrs)**

The viewing pipeline – Viewing coordinate reference frame – Window-to-viewport coordinate transformation - Two-Dimensional viewing functions – Clipping

operations – Point clipping – Line clipping – Polygon clipping – Curve clipping – Text clipping.

UNIT IV: Introduction To Animation, Interpolation   (15 Hrs)

Perception – The heritage of animation – Animation production – Interpolation – Controlling the motion of a point.

UNIT V: Interpolation-Based Animation   (15 Hrs)

Key-frame systems – Animation languages – Deforming objects.

SELF STUDY:
UNIT I:Output Primitive: Color& grayscale levels, Area-fill attributes, Character attributes.
UNIT II: Two-Dimensional Geometric Transformations   :   Basic Transformations– Matrix representations
UNIT III:Two-Dimensional Viewing Window-to-viewport coordinate transformation
UNIT IV:Introduction To Animation, Interpolation : Controlling the motion of a point.
UNIT V:Interpolation-Based Animation: Deforming objects

TEXT BOOKS

1. **Computer Graphics**, Donald D. Hearn, M. Pauline Baker, 4th Edition, Pearson Education Publication, 2014.

Chapters: 3.1 – 3.11, 4.1 – 4.5, 5.1 – 5.5, 6.1 – 6.10

2. **Computer Animation-Algorithms and Techniques**, Rick Parent, Morgan Kaufman Publishers, 2ndEdition, 2009.

 Chapters: 1.1 – 1.3, 3.1 – 3.2, 4.1 – 4.3

REFERENCES:

1. **Computer Graphics, Multimedia and Animation**, Malay K.Pakhira, 2nd Edition, PHI Learning Pvt. Ltd., 2010.

2. **Interactive Computer Graphics: A top-down approach with OpenGL**, Edward Angel and Dave Shreiner,   6th Edition, Addison Wesley, 2012.

3. **Computer Graphics Principles and Practice**, Foley, Van Dam, Feiner, Hughes, 3rd Edition, C. Addison   Wesley, 2014.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES
CO 1	Explain the basic concepts in computer graphics.
CO 2	Analyze various algorithms and to convert the basic geometrical primitives.
CO 3	Demonstrate the importance of viewing and clipping.
CO 4	Discuss the fundamentals of animation
CO 5	Describe Interpolation-Based Animation

II M.Sc. Computer Science
SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
SPB	19PG3BE11	Big Data Analytics	Lecture	5	5

COURSE DESCRIPTION

Big Data Analytics includes Introduction to Big Data, Big Data Analytics, The Big Data Technology, Introduction to MAPREDUCE Programming: and Introduction to Recommendation Engines.

COURSE OBJECTIVES

- To understand Characteristics and challenges of Big Data
- To interpret Big Data Analytics and Big Data Technologies
- To demonstrate MAPREDUCE Programming and Recommendation Systems

SYLLABUS

UNIT I: INTRODUCTION **(15 Hrs)**

Introduction to Big Data: Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – What is Big Data – Other Characteristics of Data Which are not Definitional Traits of Big Data – Why Big Data – Are we jst an Information Consumer or Do we also Produce Information – Traditional Business Intelligence(BI) versus Big Data – A Typical Data warehouse Environment – A Typical Hadoop Environment – What is New Today – What is Changing in the Realms of Big Data.

UNIT II :BIG DATA ANALYTICS **(15 Hrs)**

Big Data Analytics: Classification of Analytics – Greatest Challenges that Prevent Businesses from Capitalizing on Big Data – Top Challenges Facing Big Data – Why is Big Data Analytics Important – What kind of Technologies are we Looking Toward to Help Meet the Challenges Posed by Big Data – Data Science – Data Scientist Your New Best Friend - Terminologies Used in Big Data Environments – Basically Available Soft State Eventual Consistency – Few Top Analytics Tools.

UNIT III: THE BIG DATA TECHNOLOGY **(15 Hrs)**

 The Big Data Technology Landscape:– Hadoop. Features of Hadoop. Key advantages of Hadoop, Version of Hadoop- Overview of hadoop Ecosystems- Hadoop distributios- Hadoop verus SQL – Integrated Hadoop System Offered by

Leading Markers Vendors- Cloud – based Hadoop Solutions. Introduction to Hadoop**:** Introducing Hadoop – Why Hadoop – Why not RDBMS – RDBMS versus Hadoop – Distributed Computing Challenges – History of Hadoop – Hadoop Overview – Use Case of Hadoop – Hadoop Distributors – HDFS (Hadoop Distributed File System) – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator) – Interacting with Hadoop Ecosystem.

UNIT IV :INTRODUCTION TO MAP REDUCE PROGRAMMING   (15 Hrs)

Introduction to MAP REDUCE Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression.Introduction to Machine Learning: Introduction to Machine Learning – Machine Learning Algorithm-Regression Model- Linear Regression- Clustering- Collaboration filtering- Association Rule Mining- Decision Tree.

UNIT V: RECOMMENDATION ENGINES   (15 Hrs)

Introduction to Recommendation Engines: Recommendation engine definition – Need for Recommender Systems – Big Data Driving the Recommender Systems – Types of Recommender Systems –Evolution of Recommender Systems with Technology. Evolution of Recommendation Engines Explained: Evolution of Recommendation Engines – Nearest Neighborhood-based Recommendation Engines – Content-based Recommender Systems – Hybrid Recommender Systems – Model-based Recommender Systems.

SELF STUDY: UNIT II

TEXT BOOK
1. Big Data and Analytics, Seema Acharya and Subhashini Chellappan, 2nd edition ,Wiley India Private Limited, 2017.   Chapters : 2,3, 4.2 - 5, 8,12.

2**. Building Recommendation Engines. -Suresh Kumar Gorakala,** 1st edition, Packt Publishing Limited, United Kingdom, 2016. Chapters: 1, 3

REFERENCE BOOKS
1. *Big Data Strategies* , Pam Baker ,1st edition , Cengage Learning India Private Limited, 2016.
2. *Big Data,*Dr. Anil Maheshwari, 1st edition , Published by McGraw Hill Education (India) Private Limited, 2017.
3. *Big Data Fundamentals Concepts, Driver & Techniques,* Thomas Erl,WajidKhattak and Paul Buhler, 3rd Edition, Pearson publication, 2018.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain Characteristics and challenges of Big Data
CO 2	Describe Big Data Analytics
CO 3	Utilize Hadoop for Big Data Technologies
CO 4	Demonstrate MAP REDUCE Programming
CO 5	Describe types of Recommendation Systems using Big Data Analytics.

II M.Sc. Computer Science
SEMESTER –III

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG3BE12	Deep Learning	Lecture	5	5

COURSE DESCRIPTION

The course aims to instil the research acumen in the field of Artificial Intelligence, by providing basic knowledge on the concepts of Deep Learning**.**

COURSE OBJECTIVES

- To provide knowledge about the three classes of Deep Learning
- To understand the difference between supervised and unsupervised learning
- To elaborate on application of Deep Learning in Language processing, Object recognition and Computer Vision for more clarity

SYLLABUS

UNIT I: Deep Feedforward Networks   (15 Hrs)
Example: Learning XOR-Gradient-Based Learning-Hidden Units-Architecture Design-Back-Propagation and Other differentiation Algorithm-Historical Notes

UNIT II: Regularization for Deep Learning   (15 Hrs)
Regularization for Deep Learning: Parameter Norm Penalties-Norm Penalties as Constrained Optimization-Regularization and Under-Constrained Problem-Dataset Augmentation-Noise Robustness-Semi-Supervised Learning-Multitask Learning-Early Stopping-Parameter Tying and Parameter Sharing-Sparse Representations-Bagging and Other Ensemble Methods

UNIT III: Optimization for Training Deep Models   (15 Hrs)
Optimization for Training Deep Models: Learning Differs from Pure Optimization-Challenges in Neural Network Optimization-Basic Algorithms-Parameter Initialization Strategies-Algorithm with Adaptive Learning Rates-Approximate Second-Order Methods-Optimization Strategies and Meta-algorithms

UNIT IV: Structured Probabilistic Models for Deep Learning   (15 Hrs)

Structured Probabilistic Models for Deep Learning:The Challenge of Unstructured Modeling-Using Graphs to Describe Model Structure-Sampling from Graphical Models—Advantages of Structured Modeling-Learning about Dependencies-Inference and Approximate Inference-The Deep Learning Approach to Structured Probabilistic Models

UNIT V: Deep Generative Models   (15 Hrs)

Deep Generative Models:Boltzmann Machines-Restricted Boltzmann Machines-Deep Belief Networks-Deep Boltzmann Machines-Boltzmann Machines for Real Valued Data-Convolution Boltzmann Machines - Boltzmann Machines for Structured or Sequential Outputs-Other Boltzmann Machines-Back Propagation through Random Operations-Directed Generative Nets

SELF STUDY :

UNIT I: **Deep Feedforward Networks :**Historical Notes

UNIT II: **Regularization for Deep Learning** :Sparse Representations-Bagging and Other Ensemble Methods

UNIT III: Optimization for Training Deep Models : Challenges in Neural Network Optimization-Basic Algorithms

UNIT IV: **Structured Probabilistic Models for Deep Learning :**The Challenge of Unstructured Modelling- Advantages of Structured Modelling

UNIT V: **Deep Generative Models** : Boltzmann Machines for Structured or Sequential Outputs-Other Boltzmann Machines

TEXT BOOK

Deep Learning, Ian Goodfellow, YoshuaBengio and Aaron Couville, Massachusetts Institute of Technology, 2016. Chap:6, 7, 8, 16, 20.1-20.10

REFERENCES:

1. ***Deep Learning (A Practical Approach),***Dr. Rajiv Chopra, Edition:2018, Published by:
   Khanna Book Publishing Co.(P) Ltd.
2.***Deep Learning***, Ian Gooffellow,YoshuaBenbio, Aaron Courville,2016 Massachusetts
   Institute of Technology.
3. ***Neural Networks and Deep Learning,*** CharuC.Aggarwal, IBM T.J. Watsn Research
Center,NY,USA, 2018.

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Explain Deep learning
CO 2	Analyze different methods used for modeling
CO 3	Choose appropriate model according to application
CO 4	Compare various learning methods
CO 5	Explain Applications in Object Recognition and Computer Vision

II M.Sc. Computer Science
SEMESTER –IV

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG4B16	Principles Of Internet Of Things	Major Core	-	4

COURSE DESCRIPTION

This Course provides knowledge of development cycle of IoT systems with sample systems. And explains the different sources needed with the integration process to build IoT systems

COURSE OBJECTIVES

- To understand the fundamentals of Internet of Things.
- To apply the concept of Internet of Things in the real world scenario.

SYLLABUS

UNIT I: Introduction To Internet Of Things
Introduction- Physical Design of IoT – Logical Design of IoT – IoT Enabling technologies.

UNIT II: Domain Specific Iots
Introduction - Home Automation – Cities – Environment.

UNIT III: IoT and M2M
Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT.

UNIT IV: IoT Platforms Design Methodology
Introduction - IoT Design Methodology – Case Study.

UNIT V: Case Studies – Audrino Studio

TEXT BOOK

Internet of Things – A hands-on approach, ArshdeepBahga, Vijay Madisetti, Universities Press, 2015.

Chapters: 1.1 – 1.4, 2.1 – 2.4, 3.1 – 3.4, 5.1 – 5.3

REFERENCES:

1. ***The Internet of Things: Connecting Objects,***HakimaChaouchi, Wiley Publishers, 2010.
2. ***Internet of Things with the Arduino Yun, (Projects to help you build a world of smarter things***, Marco Schwartz, Packt Publishing, 2014.
3. ***Internet of Things: Principles and Paradigms***, Adrian McEwen and Hakim Cassimally, John wileyand Sons, Led., 2014.
4. ***The Internet of Things***, Samuel Greengard, MIT Press, 2015.

COURSE OUTCOMES (CO)

NO.	COURSE OUTCOMES
CO 1	Explain the basic concepts of IoT
CO 2	Discuss physical and logical design of IoT enabled technologies
CO 3	Analyze how and where IoT can be applied
CO 4	Compare M2M and IoT
CO 5	Describe the features of Python used for IoT implementation

II M.Sc. Computer Science
SEMESTER –IV

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSCS	19PG4BPR	Project	Major Core	-	6

The project will be of one semester duration. The students will be sent to different organizations involved in IT as per the interest and specialization of students, mostly located in the place of the study. They will have to carry out a project related to the area of interest and submit a project report at the end of the semester. The students shall defend their dissertation in front of a panel of experts during the Viva-Voce examination.

PROJECT PLAN

❖ Facilitates experiential learning
❖ Students are offered career training as part of the curriculum through this Project.
❖ This project work motivates them and also gives insights about Software Development.
❖ Encouraged to do Real time projects.
❖ At the end of the semester the project is evaluated by conducting viva-voce with presentation of the report.

Phase – I

- Students get acceptance letter to do project in any IT company in and around Madurai
- Problem identification in various IT, Academical, Societal, Commercial and Environmental applications
- Requirements gathering and analysis for selecting tool
- Separate modules individually

Phase – II

- Design UI
- Develop programs module level, test and debug individually

Phase – III

- Integrate the modules and show individual DEMO
- Test the app with the users, improve accordingly and conclude the results
- Document the above process as a report

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Discuss project development and the associated business processes
CO 2	Plan as an individual or in a team in development of technical projects.
CO 3	Communicate with engineers and the community at large in written and oral forms.
CO 4	Create effective communication skills for presentation
CO 5	Analyse problems and formulate solutions

CERTIFICATE COURSE

I M.Sc. Computer Science

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
PSCS	Certificate course	CONTENT MANAGEMENT SYSTEMS	Certificate course	60	2

COURSE DESCRIPTION

Basic concepts and techniques of web development using Content Management System

COURSE OBJECTIVES

- To understand the basic role of CMS
- To understand the WordPress Environment
- To develop web sites using CMS software.

UNIT I: CONTENT MANAGEMENT SYSTEMS

Introduction, Components of content management, Features of CMS, Advantage of CMS, Disadvantages of CMS, Choosing CMS.

UNIT II: INTRODUCTION TO WORDPRESS

Introduction, Installation, Preparation, Step by step installation, Web host with a pre-installed version of WordPress, Updating WordPress, Getting to know the dashboard , Front end / back end, Log in (to get access to the back end), Configuring WordPress (Settings), General Settings, Writing Settings, Reading Settings, Discussion Settings, Default Article Settings

UNIT III: PAGES, POSTS, MENUS

The Basics Of WordPress, The WYSIWYG editor, Hyperlinks , Handling media, Inserting an image, Editing an image, Deleting an image, Creating a gallery, Editing or deleting a gallery,Documents (pdf, doc, xls,...)

Pages : Overview, add a new page, edit an existing page, delete a page

Posts: Overview, add a new post, edit an existing post, delete a post, categories & tags, Post categories, Post tags,

Custom menus, Introduction, Create a custom menu, Add custom links, Change the order of the menu items, creating a submenu, Remove a menu item

UNIT IV: THEME, WIDGETS, PLUGINS

User management : Introduction, Different roles in WordPress, add a Themes: Working of theme, Widgets , activate a widget, Plugins-What's a plugin?, Find a plugin, How to install a plugin?, How to configure a plugin, My favourite plugins.

UNIT V: other CMS Web Site Development

Joomla, Drupal : introduction,
Creating Web Site

References:

- **Professional WordPress: Design and Development ,**Book by Brad Williams, David Damstra, and Hal Stern, Wiley Publisher March 2010.
- **Wordpress Complete, Karol Krol (Author), Sixth Edition Paperback, 2017**

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to

NO.	COURSE OUTCOMES
CO 1	Understand the primary roles of Content Management Systems
CO 2	Able to utilize protectively the environment of Wordpress
CO 3	Able to apply themes, widget, plugings
CO 4	Can utilize effectively the pages, posts, menus
CO 5	Understanding the other CMS software and able to develop the web site