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 : INFORMATION TECHNOLOGY

NAME OF THE PROGRAMME : M.Sc. INFORMATION TECHNOLOGY

PROGRAMME CODE   : PSIT

ACADEMIC YEAR   : 2020 - 2021

DEPARTMENT OF INFORMATION TECHNOLOGY
M. Sc. (Information Technology)
SYLLABUS Front Page 2020 - 2021

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
SEMESTER - I						
19PG1IT1	Data Structures and Algorithm Analysis	4	4	40	60	100
19PG1IT2	Object Oriented Software Engineering	4	4	40	60	100
19PG1IT3	Data Storage and Management	4	4	40	60	100
19PG1IT4	Distributed Operating System	4	4	40	60	100
19PG1IT5	Lab 1 : C++ and Data Structure	5	3	40	60	100
19PG1IT6	Lab 2 : RDBMS	5	3	40	60	100
19IT1EDC	EDC : Business Information System	3	3	40	60	100
	Library	1	-	-	-	-
Total		**30**	**25**			
SEMESTER - II						
19PG2IT7	Java & J2EE	4	4	40	60	100
19PG2IT8	Network Security	4	4	40	60	100
19PG2IT9	Mobile Application Development using Android Studio	4	4	40	60	100
19PG2IT10	Elective - I	4	5	40	60	100
19PG2IT11	Lab 3 Java & J2EE	5	3	40	60	100

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
19PG2IT12	Lab -4 - Mobile Application Development using Android Studio	5	3	40	60	100
19IT2EDC	EDC Animation Software	3	3	40	60	100
	Library	1		-	-	-
19PG2IT10A 19PG2IT10B 19PG2IT10C	Elective - I Cloud Computing Multimedia Systems Management Information System					
Total		30	26			
SEMESTER – III						
19PG3IT13	Data Mining and Data Warehousing	5	5	40	60	100
19PG3IT14	Python Programming	5	5	40	60	100
19PG3IT15	Major Elective II	5	5	40	60	100
19PG3IT16	Major Elective III	5	5	40	60	100
19PG3IT17	Lab 5 Data Mining and Data Warehousing	5	3	40	60	100
19PG3IT18	Lab 6 Python Programming	5	3	40	60	100
19PG3ITSI1	Internship/Summer Project*	-	3	50	50	100
19PG3IT15A	Elective - II Software Testing					

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
19PG3IT15B	Digital Image Processing					
19PG3IT15C	Linux Shell Programming					
19PG3IT16A 19PG3IT16B 19PG3IT16C	Elective - III Big Data Analytics Internet of Things Mobile Communication					
Total		**30**	**29**			
SEMESTER – IV						
19PG4IT19	Project & Viva Voce	-	6	50	50	100
19PG4IT20	SSP : R- Programming	-	4	40	60	100
Total		**-**	**10**			
	Total	**120**	**90**			

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG1IT1	Data Structures and Algorithm Analysis	PG Core	4 Hrs.	4

COURSE DESCRIPTION:

This course provides in-depth coverage of data structures and Algorithmic analysis.

COURSE OBJECTIVES :

The course is aimed at providing problem solving , the factors that analyze algorithm and to assess how the choice of data structures and algorithm design methods impacts the performance of programs.

UNITS

UNIT –I : LINEAR DATA STRUCTURES – STACKS, QUEUES   (11 Hrs.)

ADT – List ADT – Implementation of List – Stack ADT – **Queue ADT (Self Study)**

UNIT –II DESIGN TECHNIQUES: (11 Hrs)

Greedy Algorithms-   Divide and Conquer- Dynamic Programming – Backtracking - **Branch and Bound. (Self Study)**

UNIT –III NON LINEAR DATA STRUCTURES -TREES   (11 Hrs)

Preliminaries – Binary tree - Search Tree ADT – AVL Trees- Tree traversal – B-Tree

UNIT –IV NON LINEAR DATA STRUCTURES – GRAPHS   (11 Hrs)

Definition – Representation of Graph – Shortest path Algorithm – Network flow problems – Minimum Spanning tree- **Applications of Depth – first search. (Self Study)**

UNIT –V SEARCHING, SORTING AND HASHING TECHNIQUES   (12 Hrs)

Searching- Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – **Insertion sort – Shell sort – Radix sort(Self Study)**. Hashing- Hash Functions – Separate Chaining – Hash table without linked list – Rehashing – **Extendible Hashing (Self Study)**.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (4 HRS.)

Case study on Searching, sorting techniques, Tress and Graphs

REFERENCES:

1. Mark Allen Weiss, ―Data Structures and Algorithm Analysis in C++, 3rd Edition, Pearson Education,1997.
2. Reema Thareja, ―Data Structures Using C‖, Second Edition , Oxford University Press, 2011
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, ―Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
4. Aho, Hopcroft and Ullman, ―Data Structures and Algorithms‖, Pearson Education,1983.
5. Stephen G. Kochan, ―Programming in C‖, 3rd edition, Pearson Education.
6. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, ―Fundamentals of Data Structures in C‖, Second Edition, University Press, 2008.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To learn about Linear Data Structures	K2	PSO1 & PSO2
CO 2	To develop knowledge on different design techniques	K2,K3	PSO2 & PSO3
CO 3	To learn about the non-linear data structures - Trees	K2	PSO2 & PSO4
CO 4	To Implement appropriate operations for Graphs and sorting	K3, K4	PSO5, PSO6
CO 5	To analyze various techniques in sorting and searching.	K4 & K5	PSO8 & PSO9

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG1IT2	OBJECT ORIENTED SOFTWARE ENGINEERING	PG Core	4 Hrs.	4

COURSE DESCRIPTION:

Object Oriented software Engineering provides object oriented programming techniques, explains various object oriented development cycles with appropriate testing methods, 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

UNITS

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 (Self Study).**

UNIT –II SYSTEM MODELING REQUIREMENTS   **(12 Hrs)**

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

UNIT –III DESIGN ENGINEERING   **(11 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(Self Study)**

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(Self Study)**

UNIT –V UML   **(10 Hrs)**

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

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   **(3 Hrs)**
Case study in software engineering tools and techniques

REFERENCES :

1*. Software Engineering – A Practitioner's Approach*, Roger S. Pressman, 6th Edition, McGraw Hill Higher Education, 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

3. ***Object Oriented Software Engineering***, Ivar Jacobson, Magnus Christerson, Patrik Jonsson, Gunnar Overgaard, Pearson Education, Seventh Reprint, 2009.

4. ***Object Oriented Software Engineering***, Yogesh Singh and Ruchika Malhotra, PHI Learning Pvt Ltd, 2012.

5. ***Applying UML and Patterns***, Craig Larman, Third Edition, Pearson publication, 2012.

6. ***Object-Oriented Software Engineering***, Stephen R Schach, First Edition, CTI Reviews, 2014.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Differentiate traditional and object oriented software engineering	K2	PSO1 & PSO2
CO 2	Explain various SDLC methods of OOSE	K2,K3	PSO3 & PSO4
CO 3	Describe techniques used in OOSE	K3, K4	PSO5, PSO9
CO 4	Explain OOSE testing methods	K3,K4	PSO3,PSO6
CO 5	Analyze and choose necessary method for a particular project	K4, K5	PSO7 & PSO8

I M.Sc.

SEMESTER –I

For those who joined in 2019 onwards

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG1IT3	DATA STORAGE AND MANAGEMENT	PG Core	4 Hrs.	4

COURSE DESCRIPTION:

This course provides an in-sight to learn and understand the concepts of relational database management and its programming techniques.

COURSE OBJECTIVES :

The course is aimed to expose the student to the fundamental concepts and techniques in database use and development as well provides a foundation for research in databases

UNITS

UNIT I : INTRODUCTION TO RDBMS   (10 Hrs)

Introduction – RBMS technology – The Relational data structure – Relational data Integrity – Relational Data manipulations – Codd's Rules

UNIT II : DATABASE ARCHITECTURE, DATA & E-R MODELING   (11 Hrs)

Introduction – Conceptual, Physical & Logical database models – Database Design – Design Constraints – Functional Dependencies – **Entity – Relationship Modeling: Introduction - Components of an ER model – E-R Diagrams – E-R modeling Symbols (Self Study)**

UNIT III : DATA NORMALIZATION, RELATIONAL ALGEBRA & CALCULUS
(12 Hrs)

Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Domain Key Normal Form – Denormalization – Relational Algebra – Relational Calculus

UNIT IV : PROGRAMMING WITH SQL & TRIGGERS   (12 Hrs)

Introduction – Query Processing – Embedded SQL – Dynamic SQL – Triggers: Introduction – What is A Trigger – Types of Triggers – Trigger Syntax – Combining trigger types – Setting inserted values – Disabling and Enabling Triggers – Replacing triggers – Dropping Triggers – Advantages & Limitations of Triggers .

UNIT V : DISTRIBUTED DATABASE & WEB DATABASE   (12 Hrs)

Introduction – Advantages of Distributed database – Client / Server database Architecture – Database Links – Transaction Processing in Distributed System – Functions of Distributed Management Systems – Advantages and disadvantages of Distribute systems – **Web Database : Introduction – Internet & WWW - Accessing Databases on Web –Oracle 9i Applications server portal (Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (3 Hrs)
Latest Database concepts – Couch DB – Mongo DB

TEXT BOOKS:
1. Alexix Leon , Mathew Leon "Database Management Systems" , Leon Vikas Publication.
   Unit I: Chapters 7   Unit II: Chapters 8, 9 Unit III: Chapters 11,12
   Unit IV: Chapters 22,25   Unit V: Chapters 33,38

REFERENCE :

1. Abraham Silberschatz, Henry F. Korth, S.Sudarshan, "Database System Concepts", Tata McGraw Hill publishers, 6th Edition, 2015.

2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Addison-Wesley, 2011.

3. Frank. P. Coyle, "XML, Web Services and The Data Revolution", Pearson Education,2012.

4. Raghu Ramakrishnan, ─Database Management Systems, 4th Edition, McGraw-Hill College Publications, 2015.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Differentiate traditional and object oriented software engineering	K2	PSO1& PSO2
CO 2	Explain various SDLC methods of OOSE	K2, K3	PSO3,PSO4
CO 3	Describe techniques used in OOSE	K2,K4	PSO2,PSO6
CO 4	Explain OOSE testing methods	K2,K3	PSO3,PSO4
CO 5	Analyze and choose necessary method for a particular project	K4,K5	PSO8,PSO9

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG1IT4	DISTRIBUTED OPERATING SYSTEM	PG Core	4 Hrs.	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.

UNITS

UNIT –I INTRODUCTION   (10 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) (Self Study)**.

UNIT –II MESSAGE PASSING   (11 Hrs)

Message Passing – Introduction – Desirable features of a good message-passing system – Issues in IPC by message passing – Synchronization – Buffering – Multi datagram 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. (Self Study)**

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. (Self Study)**

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 Sub shells – Control Structures – **TCSH/C Shell Control structures.(Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (3 Hrs.)

Analysis of different types of Operating systems in real time applications.

REFERENCES:

1. ***Distributed Operating Systems Concepts and Design,*** Pradeep K. Sinha, Prentice Hall of India Private Limited, 2012.
2. ***Linux: The Complete Reference,***   Richard Petersen, McGraw Hill Education (India) Private Limited, 6th Edition, 2011.
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

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the core concepts of distributed systems.	K2	PSO1, PSO2
CO 2	Analyze various message passing mechanisms with its model.	K2, K4	PSO4,PSO6
CO 3	Identify the inherent difficulties that arise due to distribution of computing resources.	K3 & K4	PSO3,PSO6
CO 4	Explain migration with the process management policies.	K2, K3	PSO2,PSO5
CO 5	Explain the basic concepts, design and structure of the LINUX operating system.	K2 & K4	PSO4,PSO6

I M.Sc

SEMESTER –I

For those who joined in 2019 onwards

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG1IT5	Lab I- C++ AND DATA STRUCTURES	PG Core	5 Hrs.	6

COURSE DESCRIPTION

This course provides to apply the use of various OOPs concepts with the help of programs

COURSE OBJECTIVES

Programs to demonstrate the implementation of problem solving skills for writing programs in C++ and Data Structures.

UNITS

Program list :

1. Classes and Objects
2. Constructors and Destructors
3. Operator Overloading
4. Function Overloading
5. Inheritance

DATA STRUCTURES

6. Stack Operation
7. Queue Operation
8. Linked List

9. Sorting

10. Searching

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop solutions for a range of problems using objects and classes	K4	PSO6& PSO8
CO 2	Programs to demonstrate the implementation of constructors, destructors and operator overloading.	K4 & K5	PSO6& PSO8
CO 3	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism	K4 & K5	PSO6& PSO8
CO 4	Understand generic Data structures programming like Stack, Queue and Linked List.	K4 & K5	PSO6& PSO8
CO 5	Implement the concept of Sorting and Searching techniques	K4 & K5	PSO6& PSO8

I M.Sc.,

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG1IT6	LAB II – RDBMS -	PG Core	5 Hrs.	6

COURSE DESCRIPTION

This course provides to understand the Data storage, management and organisation techniques.

COURSE OBJECTIVES

The major objective of this lab is to provide a strong formal foundation in database concepts, technology, relating to query processing in SQL and PLSQL

UNITS

SQL QUERIES AND PL/SQL PROGRAMS

1. Set Operations
2. SQL Operators
3. Aggregate Functions and Group By Clause
4. Views
5. Integrity Constraints
6. Joins
7. Multi table Insert and Joins

PL/SQL

1. Control Structure
2. Interaction with Oracle

3. Using Cursors

4. Error Handling

5. Sub programs

6. Packages

7. Trigger

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Implement Basic DDL, DML and DCL commands	K4 & K5	PSO7 & PSO8
CO 2	Develop sub queries and understand their purpose.	K4 & K5	PSO7 & PSO8
CO 3	Use Aggregate and group functions to summarize data	K4 & K5	PSO7 & PSO8
CO 4	Understand the PL/SQL architecture and write PL/SQL code for procedures,	K4 & K5	PSO7 & PSO8
CO 5	Develop PL/SQL program using triggers, cursors, exception handling etc	K4 & K5	PSO7 & PSO8

I M.Sc.,

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19IT1EDC	BUSINESS INFORMATION SYSTEMS	PG Core	3 Hrs.	3

COURSE DESCRIPTION

The students would be aware of various Information System solutions and the issues in successful implementation of these technology solutions in any organization

COURSE OBJECTIVES

❖ To make the students to know Information Systems and its application in organizations. The paper would expose the students to the Business relating to information systems and help them identify and evaluate various options in Organizational Information Systems

UNITS

UNIT I: BUSINESS ORGANISATION AND ROLE OF INFORMATION TECHNOLOGY **(4 Hrs)**

Introduction to Information Technology- Introduction- Why Information Technology – Management Roles- Information Technology Trends.

Strategic Information Systems - Strategic Information Systems-IT for Competitive Advantage.

UNIT II : TECHNOLOGY INFRASTRUCTURE **(6 Hrs)**

Information Technology- Types of Operating Systems- Programming Languages- Types of Information Processing- Application Software- Industry Trends.

Communication – Networks - Network Topology- Network Components – Network Architecture- Internet, Intranet and Extranet Applications- Data Communication at Work.

UNIT III : INTER AND INTRA- ORGANISATIONAL SYSTEMS   (6 Hrs)

E-business Models – E-Business Definition – Categories of E-Business Solutions- Building E-Business Models- E-Business Models- Role of M-Commerce- E-Business Security Issues- E-business Strategy.

Integrated Enterprise Systems – Integrated Information Systems – Enterprise Resource Planning(ERP) – Advantages and Disadvantages of ERP – Customer Relationship Management(CRM) – E-CRM- Supply Chain Management.

UNIT IV INTELLIGENT SYSTEMS FOR BUSINESSES   (6 Hrs)

Decision Support Systems - Decision–Making -Decision Models - Types of Decision –Making - Decision Support Systems(DSS) - Types of DSS.

Knowledge Management and Intelligent Systems- Introduction - Intelligent Systems - Knowledge Management - values of Knowledge Management – Components of Knowledge Management - Business Intelligence(BI) - Intelligent Business – Competitive Intelligence.

UNIT V PLANNING, IMPLEMENTING AND MANAGING INFORMATION SYSTEMS   (5 Hrs)

Information System Planning (ISP)- System Development Phases- System Development Methodologies .

Managing Information Systems and Organisational Change :– Roles and Responsibilities for IT Management- Business Continuity Planning - **Need for BCP – Components of BCP - Developing BCP – Roles and Responsibilities for BCP(Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (3 Hrs.)

Case study to know about the Information system in real-time environment.

REFERENCES

"Information Technology for Management ", Ramesh Behl , Tata McGraw – Hill Education Private Limited, New Delhi.

Unit I: Chapter: 1.1 - 1.4, 2.3 – 2.4

Unit II: Chapter: 3.3- 3.6 , 3.8 ,4.2 – 4.4, 4.8 – 4.10

Unit III: Chapter: 7.2 – 7.8 ,8.2 – 8.4 , 8.7 ,8.10, 8.11

Unit IV: Chapter: 9.2- 9.6 , 10.1 ,10.2,10.5-10.10

Unit V: Chapter: 11.2 - 11.4 , 12.5- 12.10

REFERENCE BOOKS

1. Henry C. Lucas, Jr., " Information Technology for Management", Tata McGraw-Hill, 7Th Edition 2001

2. Sultan chand & Sons, "Management Information Systems", sultan Chand & sons,.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain Business organisation and role of information technology	K2	PSO1
CO 2	Understands the Technology infrastructure	K2	PSO4
CO 3	Explain various Inter and intra-organisational systems	K2 & K3	PSO2, PSO5
CO 4	Analyze various Intelligent systems for businesses	K3 & K4	PSO5, PSO6
CO 5	Analyze Planning, implementing and managing information systems	K4 & K5	PSO8, PSO9

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG2IT7	JAVA & J2EE	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This course provides various techniques of Java Programming and help them to create effective programs in this language.

COURSE OBJECTIVES

This course is aimed to apply variety of technologies in JAVA for different platforms.

UNITS

UNIT –I INTRODUCTION & BASIC CONCEPTS   (11 HRS.)

Java Program Structure-Java Tokens-Java Statements- Implementing a Java Program-Java Virtual machine. Packages: Introduction- Java API Packages- Using System Packages- Nesting Conventions-Creating Packages-Accessing a Package- Using a Package- Adding a Class to a Package- Hiding Classes Applet Programming: Introduction- How Applets Differ from Applications- Preparing to Write Applets – Building Applet Code- Applet Life Cycle- Creating an Executable Applet- Designing a web page- Applet Tag-Adding Applet to HTML File- Running the Applet- More about Applet Tag-Passing Parameters to Applets- Aligning the Display – More About HTML

Tags- **Displaying Numerical Values- Getting input from the user (Self Study)**

UNIT –II SWINGS   (11 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 (Self Study)**.

UNIT –III SWING MENUS   (11 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 (Self Study)**.

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 (Self Study)**

UNIT V – JAVA SERVLETS   (12 Hrs)

Background, The Life Cycle of a Servlet, Using Tomcat For Servlet Development, A Simple Servlet- Servlet API: The Javax Servlet Package, Reading Servlet Parameters, Javax. Servlet .http Package, Handling HTTP Requests & Responses, Using Cookies, Session Tracking, Security Issues

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (3 Hrs)

Implementation of Real-time application using JAVA

REFERENCES:

1. E. Balagurusamy, "Programming with JAVA", TataMcGraw-Hill Publications, 2015, 5th Edition.

2. *Java The Complete Reference,* Herbert Schildt 9th Edition, Mc Graw Hill Education, 2016.
   Chapters: 22, 30, 31, 32, 33,38

3. *James McGovern*, Rahim Adatia and others, *J2EE 1.4 Bible,* 1st Edition, Wiley India (P) Ltd, (2008).   Chapters: 6,7,18

4. Philip Heller and Simon Roberts, "JAVA 2 Developer's Handbook", BPB Publications, 2000

5. C.Xavier , "Projects on JAVA", SCITECH Publications

6. Cay S. Horstmann GaryCornell,"Core Java Volume I fundamentals" , Pearson Education, 2008, Eigth edition.

7. Jamie Jaworski, "Java 2 Platform Unleashed" , Techmedia Publications, 1999

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the structure and model of the Java programming language.	K2	PSO1, PSO4
CO 2	To explain the concepts of Packages, Interfaces and strings.	K2, K3	PSO4, PSO5
CO 3	To develop software implementing Exception handling mechanisms	K3, K4	PSO3, PSO6
CO 4	To design software for database connectivity and able to design GUI applications	K3, K4	PSO3, PSO9
CO 5	To implement server side programming using SERVLETS	K4, K5	PSO6, PSO8

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG2IT8	NETWORK SECURITY	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This course provides knowledge on the security issues on the network

COURSE OBJECTIVES

To provide a framework of knowledge related to mechanisms that makes Information secured over communication channels.

UNITS

UNIT I : INTRODUCTION   (11 Hrs)

Introduction Attacks, Services And Mechanisms: Security Attacks – Security Services – Security Mechanism - A Model for Internetwork Security.

Symmetric Encryption and Message Confidentiality**:**   Symmetric Encryption Principles – Symmetric Block Encryption Algorithms – **Cipher Block Modes of Operation (Self Study).**

UNIT II : CRYPTOGRAPHY   (11 Hrs)

Public Key Cryptography and Message Authentication**:**   Approaches to Message Authentication   –   Secure   Hash Function – **Message Authentication Codes(Self Study)** –   Public   Key   Cryptography Principles – Public Key Cryptography Algorithms – Digital Signatures

UNIT III :WEB SECURITY & WIRELESS NETWORK SECURITY (11 Hrs)

Web Security*:* Web Security Considerations – Secure Socket Layer and Transport Layer Security – Transport Layer Security – HTTPS- **Secure Shell(SSH). (Self Study)**

Wireless Network Security : IEEE802.11 Wireless LAN Security – Wireless Application Protocol Overview – Wireless Transport Layer Security.

UNIT IV : EMAIL AND IP SECURITY   (11 Hrs)

Electronic Mail Security**:**   Pretty Good Privacy – Cryptography keys and key Rings - Public key Management – S/MIME.

      IP Security**:**   IP Security Overview – IP Security policy– Encapsulating Security Payload – **Combining Security Association(Self Study)** – Internet Key Exchange.

UNIT V : VIRUSES AND FIREWALLS   (12 Hrs)

Intruders: Intruders – Intrusion Detection – **Password Management(Self Study)**

Viruses :   Viruses- Virus Countermeasures – Worms- Distributed Denial of Service Attacks

Firewalls**:** Need for firewalls – Firewall characteristics – Types of firewalls Firewall Basing – Firewall Location and Configuration.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (4 HRS.)

Implementation of firewall and its configuration in real time environment

TEXT BOOK

  1. Network Security Essentials – Applications and Standards , 4th edition -   William Stallings, Pearson Educational Publisher-2011

      UNIT I   : Ch- 1, 2   **UNIT II:** Ch- 3   **UNIT III :** Ch- 5, 6

      UNIT IV : Ch 7,8   **UNIT V :** Ch 9, 10,11

REFERENCE BOOKS

1. Cryptography and Network Security – Principles and Practices 2nd Edition,

William Stallings, Pearson Educational Publisher

2. Internet Cryptography -   Richard E. Simth Pearson Educational Publisher

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the Attacks, Services and Mechanisms	K2	PSO1
CO 2	To explain the concepts cryptography	K2,K3	PSO1, PSO5
CO 3	To understand the concepts of Email and IP security	K2 & K3	PSO2, PSO3
CO 4	To analyze about various web security issues and protocols.	K3, K4	PSO3, PSO6
CO 5	To understand the concepts of virus and firewall .	K3 & K4	PSO3, PSO6

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG2IT9	MOBILE APPLICATION DEVELOPMENT USING ANDROID STUDIO	PG Core	4 Hrs.	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

UNITS

UNIT I: INTRODUCTION   (10 Hrs)

A Brief History of Mobile: -The Evolution of Devices. The Mobile Ecosystem**:** Operators -Networks -Devices -Platforms - Operating Systems -Application Frameworks - Size and Scope of the Mobile Market- **The Addressable Mobile Market- Mobile As a Medium. (Self Study)**

UNIT II: DESIGNING FOR CONTEXT   (12 Hrs)

Designing for Context: Thinking in Context -Taking the Next Steps . Developing a Mobile Strategy**:** New Rules. Types of Mobile Applications: **Mobile Application Medium Types. (Self Study)**

UNIT III: ARCHITECTURE (12 Hrs)

Mobile Information Architecture **:** Mobile Information Architecture -The Design Myth. Mobile Design: Interpreting Design-The Mobile Design Tent-Pole-Designing for the Best Possible Experience-The Elements of Mobile Design -Mobile Design Tools -Designing for the Right Device -Designing for Different Screen Sizes. Mobile Web Apps Versus Native Applications: The Ubiquity Principle - **When to Make a Native Application - When to Make a Mobile Web Application. (Self Study)**

UNIT IV: MOBILE WEB DEVELOPMENT (10 Hrs)

Mobile 2.0**:** Mobile 2.0. Mobile Web Development**:** Web Standards -Designing for Multiple Mobile Browsers –Device Plans -Markup - CSS: Cascading Style Sheets- JavaScript. iPhone Web Apps: Markup- CSS- JavaScript- Creating a Mobile Web App- **Web Apps As Native Apps -PhoneGap -Tools and Libraries. (Self Study)**

UNIT V: ADAPTING TO DEVICES (12 Hrs)

Adapting to Devices**:** Strategy #1: Do Nothing- Strategy #2: Progressive Enhancement- Strategy #3: Device Targeting- Strategy #4: Full Adaptation-What Domain Do I Use. Making Money in Mobile: Working with Operators- Working with an App Store- Add Advertising- Invent a New Model. Supporting Devices: Having a Device Plan- Device Testing- **Desktop Testing- Usability(Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) (4 Hrs.)

Current trends in mobile application development

REFERENCES:

1. Mobile Design and Development: Practical concepts and techniques for creating mobile sites and web apps, Brian   Fling, 1st Edition, O'Reilly Publications, 2018.   Chapters: 1-15
2. Designing Mobile Interfaces: Patterns for Interaction Design,   Steven Hoober, Eric Berkman, 1st Edition,O'Reilly Publications, 2012.
3. Mobile Design Pattern Gallery: UI Patterns for Smartphone Apps, Theresa Neil, 2nd Edition, O'Reilly Publications, 2014.
4. Android user interface design ,Lan G.Clifton 2nd Edition,Pearson Publication 2016
5. Wei-Meng Lee,   Beginning Android 4 Application Development, Authorized reprint by wiley india pvt.ltd, 2016
6. Android Application Development(With Kitkat Support) Black Book DT Editiorial Services &Pradeep Kothari Published By Dreamtech Press 2017

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design scripts to meet given interface and media control requirements	K2	PSO1, PSO4
CO 2	Utilize variables, properties and other code elements appropriately to implement the code design.	K2, K3	PSO2, PSO5
CO 3	Implement and evaluate techniques for the installation of mobile applications.	K3 , K4	PSO5, PSO6
CO 4	Explain the principles of technologies which support media production and delivery on a variety of platforms.	K3, K4	PSO3, PSO6
CO 5	Evaluate alternative mobile frameworks, and contrast different programming platforms	K4 , K5	PSO6, PSO8

Skill Development 100%

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG2IT 10A	CLOUD COMPUTING	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This course provides current cloud computing technologies, including technologies for different cloud services

COURSE OBJECTIVES

This course is aimed to Analyze the components of cloud computing showing how business agility in an organization can be created.

UNITS

UNIT I : BASICS OF CLOUD COMPUTING (11 Hrs)

Getting to Know the Cloud- Cloud and other similar Configurations – Peer to Peer ,Client Server and Grid Computing – Cloud Computing Versus Peer to Peer Architecture – Cloud Computing Versus Client Server Architecture – Cloud Computing Versus Grid Computing – How we got the cloud – Concept Phase –Pre Cloud phase- Cloud Phase – Server Virtualization versus Cloud Computing – Components of Cloud Computing – Cloud Types –Private ,Public, and Hybrid –The Public Clouds- The Private Clouds- The Community Clouds – The Hybrid Cloud-Impact of Cloud Computing on Businesses –Organizations that Could Benefit from Public or Private Clouds – The Cloud is not for Everyone –**When you Might not Benefit from the Cloud –Cloud Computing Service Delivery Models (Self Study)**

UNIT II : CLOUD COMPUTING SERVICES (11 Hrs)

Infrastructure as a Services (IaaS)-Platform as a Service (PaaS)-Leveraging PaaS for Productivity –Guidelines for Selecting a PaaS Provider-Concerns with PaaS – Language and PaaS-Software as a Service(SaaS) – **Database as a Service (DBaaS)-Specialized Cloud Services(Self Study)**

UNIT III : INTRODUCING VIRTUALIZATION (11 Hrs)

Introducing Virtualization and its Benefits – Benefits – Implementation Levels of Virtualization-Comparison between the Implementation Levels of Virtualization –Virtualization Design Requirements – Virtualization Providers – Virtualization at the OS Level –Virtualization Structure – Hosted Structure - Bare-Metal Structure – Virtualization Mechanisms- Open Source Virtualization Technology –KVM versus the Xen Hypervisor – Xen Virtualization Architecture- Binary Translation with Full Virtualization – Para virtualization with Compiler Support – Virtualization of CPU ,Memory, and I/O Devices- Hardware Support for Virtualization in Intex x86 Processor –CPU Virtualization – **Memory Virtualization – Device and I/O Virtualization – Virtualization in Multicore Processors(Self Study)**

UNIT IV : CLOUD TYPES AND MODELS (11 Hrs)

Private Cloud- Components of a Private Cloud- Implementation Phases of a Private Cloud- Hardening a Private Cloud- What is Not a Private Cloud- Use Cases of a Private Cloud- Case Study : Private Cloud for Central and State Governments – Case Study : Private Cloud for College to Create a Virtual Computing Lab- Community Cloud- Public Cloud – When to Avoid Public Clouds – Public Versus Community Cloud- Cloud APIs – Case Study : Weather Forecasting Using a Public Cloud – Case Study : **Software Development and Testing in a Public Cloud – Hybrid Clouds – Private Versus Hybrid Cloud(Self Study)**

UNIT V : DATA SECURITY IN THE CLOUD (11 Hrs)

Challenges with Cloud Data - Challenges with Data Redundancy - Challenges with Disaster Recovery - Challenges with Data Backup - Challenges with Data Replication - Challenges with Data Residency or Location - Challenges with Data Reliability - Challenges with Data Fragmentation - Challenges with Data Integration - Challenges with Data

Transformation - Challenges with Data Migration - Challenges with Data Security – Data Confidentiality and Encryption – Key Protection – Key Length – Backup Data – Data Availability – Data Integrity – Cloud Data Management Interface – Cloud Storage Gateway (CSGs) – Advantages of Using a CSG – Cloud Firewall – Virtual Firewall – Recent Trends : Conflict of Interest for Public Cloud and IT Product Providers – Recent Trends in Cloud Compliance – Recent Trends in Security : BYOD and Encryption Exposures – Recent Trends in Cloud Standards – Approaches to Implement Interoperability between Clouds – Recent Changes in Professional Certifications –Cloud Rating – **Cloud Computing Trends that are Accelerating Adoption. (Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 Hrs.)

Techniques in cloud computing in current trends.

TEXTBOOK

Kailash Jayaswal, Jagannath Kallakurchi , Donald J.Houde, Dr.Devan Shah, "Cloud Computing Black Book" , Dreamtech Press, 2015.

UNIT I – Chapter 1   **UNIT II**-Chapter 3   **UNIT III**- Chapter 2

UNIT IV- Chapter 6   **UNIT V**- Chapter 9,11

REFERENCE

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley Publishing, New Delhi, 2014.

2. Ray Rafaels, "Cloud Computing: From Beginning to End", Create Space Independent Publishing Platform, New Delhi, 2015.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the fundamental principles of cloud computing and its model	K2	PSO1,PSO4
CO 2	To apply concepts of IAAS, SASS, PAAS	K2, K3	PSO 2, PSO3
CO 3	To develop business models that underlie Cloud Computing.	K3, K4	PSO3, PSO6
CO 4	To describe the importance of virtualization in distributed computing	K2, K3	PSO4, PSO5
CO 5	To analyse the importance of cloud security	K4, K5	PSO6, PSO7

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG2IT10B	MULTIMEDIA SYSTEMS	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This course provides an introduction to multimedia systems, multimedia compression, and multimedia information systems.

COURSE OBJECTIVES

This course is aimed to impart basic knowledge required to work with various components of multimedia such as text, graphics, animation, audio and video.

UNITS

UNIT I: INTRODUCTION TO MULTIMEDIA (11 Hrs)

What is Multimedia – Multimedia and Hypermedia – World Wide Web – Overview of Multimedia Software Tools
Multimedia Authoring and Tools : - Multimedia Authoring – **Some Useful Editing and Authoring Tools – VRML(Self study).**

UNIT II : GRAPHICS AND IMAGE DATA REPRESENTATION (11 Hrs)
Graphics / Image Data Types – Popular File Formats - Color in Image and Video : - Color Models in Images – **Color Models in Video(Self study)**

UNIT III: FUNDAMENTAL CONCEPTS IN VIDEO (11 Hrs)
Types of Video Signals – Analog Video – Digital Video – Basics of Digital

Audio : - Digitization of Sound – Musical Instrument Digital Interface – **Quantization and Transmission of Audio (Self study)**

UNIT IV : LOSSLESS COMPRESSION ALGORITHMS　　　　　(11 Hrs)

Introduction – Run-Length Coding – Variable Length Coding – Lossless Image Compression – Lossy Compression Algorithms **:** - Introduction – Distortion Measures – **The Rate-Distortion Theory – Quantization(Self study)**.

UNIT V : IMAGE COMPRESSION STANDARDS　　　　　(11 Hrs)

The JPEG Standard – MPEG Video Coding : – MPEG 1 - MPEG 2 – **Overview of MPEG 4 (Self study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)　　　　(5 HRS.)

Image-Based 3D Face Modeling, Holographic 3D Display System - Human Action Recognition Technology

REFERENCES:

1. Ze-Nian Li, Mark S. Drew, *"Fundamentals of Multimedia"*, Pearsons Education, New Delhi, 2005.

2. John F. Koegel Bufford, *"Mutimedia Systems"*, Pearson Education, Delhi, 2005.

3. Ralf Steinmetz, Klara Nahrstedt, *"Multimedia Computing, Communications & Applications"*, Pearsons Education Inc., New Delhi, 2006.

4. David Hillman, *"Multimedia Technology & Applications"*, Galgotia Publications, New Delhi, 2010.
   .

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To identify and use the elements and principles of design in multimedia.	K2, K3	PSO1, PSO5
CO 2	To understand terminology associated with the concepts, techniques, and processes used throughout the multimedia environment.	K2, K3	PSO2, PSO5
CO 3	To Demonstrate an advanced knowledge of photo editing.	K3 , K4	PSO3, PSO6
CO 4	To explain the concepts of importing, exporting, effects, transitions, color correcting, and flow.	K3, K4	PSO3, PSO6
CO 5	To describe Image compression Standards	K2 ,K5	PSO4, PSO7

Skill Development 100%

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG2IT10C	MANAGEMENT INFORMATION SYSTEM	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This course provides a formal discipline within business education that bridges the gap between information technology and organization

COURSE OBJECTIVES

This course is aimed to evaluate the role of information systems in today's competitive business environment

UNITS

UNIT I : AN OVERVIEW OF MANAGEMENT INFORMATION SYSTEMS
(11 hrs)

Concepts of Management Information System- Types of Information System – Information System Architecture – Challenges in Building and Using Information Systems – Information and System Concepts –Information – Information as Organizational Resource – Dimensions of Information – Types of Information- Sources of Information – System – Types of System- Organization and Information System- **Concept of Organization – Organization Information Requirements.(Self Study)**

UNIT II DATABASE MANAGEMENT SYSTEM   **(11 hrs)**

Database Technology – Database Management System- Concepts of DBMS – Database Administrator – Database Users- Database Software- Database – Database Design- Conceptual Design- Logical Design – Physical Design – Communication Technology – Computer Network – Application / Importance

of Networking- Network Topology – Types of Computers- LAN –MAN-WAN-Internet – **Enterprise Wide Computing – Traditional Computing – Client / Server Computing(Self study)**.

UNIT III TRANSACTION PROCESSING SYSTEMS   (11   hrs)

Concepts of Transaction Processing System- Components of Transaction Processing System- Transaction Processing Cycle – Methods of Transaction Processing – Control of Transaction Processing

DECISION SUPPORT SYSTEM- Concepts of Decision Support System-Types of Decision Support System-Components of Decision Support System-Approaches to development of DSS- Integrated Information System – **Enterprise Resource Planning(ERP) – ERP Implementation-ERP Package- Supply Chain Management System- Supply Chain Information Technology Framework – Customer Relationship Management System(Self Study)**.

UNIT IV INFORMATION SYSTEM CONCEPT   (11   hrs)

Quality Information –Building Blocks for the Information System-Information System Concepts – Feedback and Control- Other System Characteristics(Open and Closed Systems)- System Classifications-Difference between Organizational System and MIS-Strategic Information System-Adaptive System – Business as a System – Business System Planning – Business as an Information System – Business goals and Objectives- Principal Functional Systems in a business –Product flow and Information flow- Principal documents associated with Information Flow – Information and the Organization – Operation workers – Information workers-**Information Sources(Internal and External data ,Interviewing managers) – Information System- Business Function Information System(Self study)**

UNIT V INFORMATION TECHNOLOGY AND ORGANIZATION   (11 hrs)

Introduction to IT – Trends of IT – Multimedia- Image Processing System and Document Management System- Interleaving Technique use (Multiprogramming ,Multitasking , Time Sharing , Foreground/Background Processing , Virtual Memory, Multiprocessing , i.e Parallel Processing)-

Sequential Processing Vs Parallel Processing – Fifth generation Computers – Massively Parallel Computers- Information System Technology – Contemporary Approaches to Information System- Organization and Information Technology relationship- Different Kinds of Information System- Relationship of Information System- One to other Information System in organization – Role of Information Technology in Transaction Processing(Book –keeping , Issuance , Controlled Reporting)- Prototyping – Computer aided software Engineering (CASE)-Decision of Information for Proper MIS – **How Japanese and Western Mangers frame IT management(Self study).**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 Hrs)

Management information system in current scenario

TEXT BOOKS:

 LM PRASAD, "Management Information System", SULTAN CHAND & SONS Educational Publishers, 2012.

REFERENCES:

1. CSV.Murthy, "Management Information System" ,Himalaya publishing house,Second revised edition
2. Waman S. Jawadekar, " Management Information Systems- A Global Digital Enterprise Perspective", McGraw Hill Education India Pvt. Ltd., 5th Edition.

3. Kenneth C. Laudon, Jane P. Laudon, " Management Information System – Managing the Digital Firm", Pearson Education, 12th Edition

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy.	K2	PSO1, PSO2
CO 2	To assess the relationship between the electronic commerce, electronic business and internet technology.	K2, K3	PSO3, PSO4
CO 3	To identify the major management challenges to building and using information systems in organizations.	K2, K3	PSO2, PSO5
CO 4	To understand managerial risks related to information system organization processing.	K3,K4	PSO3, PSO6
CO 5	To evaluate the benefits and limitations of enterprise systems and industrial networks.	K4,K5	PSO9,PSO8

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG2IT11	LAB III - JAVA Programming	PG Core	5 Hrs.	3

COURSE DESCRIPTION

This course provides programming skills on various concepts in JAVA.

COURSE OBJECTIVES

This course is aimed to learn and practice the various programming concepts in JAVA

UNITS

1. Programs using the concept of Overloading.
2. Programs using the concept of Inheritance and Constructor
3. Programs using the concept of Interface and Overriding .
4. Programs using the concept of Built_in and User defined Exception Handling.
5. Programs using the concept of Threads.
6. Programs using the concept of String Handling.
7. Programs using the concept of Packages
8. Programs for creating Applet.
9. Programs using Event Handling.
10. Programs using the concept of swing
11. Programs using the concept of servlet.
12. Programs using Data Base Connectivity

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the concept of Object Oriented Programming & Java Programming Constructs.	K4 & K5	PSO8,PSO9
CO 2	To practice the concepts of operators, classes, objects, inheritance, packages ,Enumeration and various keywords.	K4 & K5	PSO8,PSO9
CO 3	To apply exception handling mechanisms.	K4 & K5	PSO8,PSO9
CO 4	To design the applications of Java & Java applet, Swings and JDBC	K4 & K5	PSO8,PSO9
CO 5	To Analyze and implement server side programming using SERVLETS	K4 & K5	PSO8,PSO9

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG2IT12	LAB IV – MOBILE APPLICATION DEVELOPMENT USING ANDROID STUDIO	PG Core	5 Hrs.	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

LAB PROGRAMS :

- 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

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop enterprise-level mobile solutions.	K4 & K5	PSO8,PSO9
CO 2	Install and configure Android application development tools	K4 & K5	PSO8,PSO9
CO 3	Demonstrate Save State information across important operating system events	K4 & K5	PSO8,PSO9
CO 4	Develop advanced application programs using Android	K4 & K5	PSO8,PSO9
CO 5	Design and develop mobile applications.	K4 & K5	PSO8,PSO9

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19IT2EDC	LAB IV – ANIMATION SOFTWARE	PG Core	3 Hrs.	3

COURSE DESCRIPTION

This course is designed to facilitate different animation techniques in animation software.

COURSE OBJECTIVES

To facilitate the student to understand the animation techniques and make the students to develop their 3D animations.

UNITS

UNIT 1 : EXPLORING THE INTERFACE: (6 Hrs)

Introduction to Alice - download and install Alice 3.1-A brief tour of the Alice 3 IDE -A brief tour of the Menu Bar- Set Preferences -Touring the Gallery

UNIT-2: SETTING THE SCENE   (6 Hrs)

Adding an object to a scene- set object properties in the Scene editor- set special effects in a scene-Marking - position and resize an object in the Scene editor- Positioning sub-parts in Scene editor- align objects using a Snap grid- Cut, Copy, and Paste with the Clipboard

UNIT -3: LEARNING TO PROGRAM THROUGH ALICE   (6 Hrs)

Sequential & Parallel Execution - Do in order - Do together- Further nesting- Branching & Looping-Conditional execution-Relational Operators-Randomness-Repetition-While loops- Lists

UNIT-4: EVENT HANDLING AND METHODS: **(6 Hrs)**

Interactive programming & event handling - Control of flow- Events-Event handing methods.

UNIT -5: 3D TEXT AND BILLBOARDS, SOUND: **(6 Hrs)**

Create 3D Text- Billboards- Creating a Sound- Adding a Sound - Posting on YouTube

PROGRAM LIST

1. Alice Interface

2. Alice Objects

3. Alice Scene

4. Sequential and Parallel Execution

5. Branching and Looping

6. Event Handling

7. Methods

8. 3D text

REFERENCES:

"Introduction to Programming with Green foot ", by Micheal Kolling

WEB REFERNCES :

http://www.alice.org/3.1/materials_videos.php

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand basic concepts in Alice.	K3,K4 &K5	PSO5, PSO8 & PSO9
CO 2	Construct a scene.	K3,K4 &K5	PSO5, PSO8 & PSO9
CO 3	Build program in Alice using looping and branching.	K3,K4 &K5	PSO5, PSO8 & PSO9
CO 4	Apply event handlers in alice.	K3,K4 &K5	PSO5, PSO8 & PSO9
CO 5	Develop 3D animations.	K3,K4 &K5	PSO5, PSO8 & PSO9

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT13	DATA MINING AND DATA WAREHOUSING	PG Core	5 Hrs.	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

UNITS

UNIT I: INTRODUCTION   (14 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 (Self study).**

UNIT   II: DATA PREPROCESSING   (14 Hrs)

Need to Preprocess 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(Self study).**

UNIT III: MINING FREQUENT PATTERNS AND CLASSIFICATION
(18 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 (14 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 (10 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 –VI DYNAMISM (Evaluation Pattern-CIA only) (5 Hrs)

Current trends in implementation of Data Mining tools in real time applications.

REFERENCES:

1. ***Data Mining Concepts and Techniques***, Jiawei Han and Micheline Kamber, 2nd Edition, Morgan Kaufmann Publishers An Imprint of Elsevier, 2009. Chapters: 1, 2, 3, 6.1 - 6.10, 7.1 – 7.8, 11

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

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the fundamental concept of Data Mining and analyze and evaluate the data cleaning, integration , transformation and reduction techniques	K2,K3	PSO1,PSO5
CO 2	Design multidimensional data using Data Warehouse architecture.	K2, K3	PSO2,PSO5
CO 3	Analyze and evaluate Classification algorithms	K3, K4	PSO3,PSO6
CO 4	Identify the types of data in Cluster Analysis and categorize the Cluster Methods	K3 ,K4	PSO
CO 5	Utilize the Data Mining techniques in various real applications and in major issues.	K4 ,K5	

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG3IT14	PYTHON PROGRAMMING	PG Core	5 Hrs.	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.

UNITS

UNIT I: OVERVIEW   (12 Hrs)

The Context Of Software Development: Software-Development Tools-Learning Programming With Python-Writing A Python Program-A Longer Python Program.

Values And Variables: Integer Values-Variables And Assignment-Identifiers-Floating Point Types-Control Code With In Strings-User Input-The Eval Function-Controlling The Print Function.

Expressions And Arithmetic: Expression-Operator Precedence And Associativity-Comments-Errors-Arithmetic Examples-More Arithmetic Operators-Algorithms (Self study)

UNIT II CONDITIONAL STATEMENT AND ITERATION   (15 Hrs)

Conditional Execution : Boolean Expressions- Boolean Expressions – The Simple If Statement – The If/Else Statement – Compound Boolean Expressions –Nested Conditionals – Multi-Way Decision Statements – Conditional Expressions – Errors In Conditional Statements

Iteration :The While Statement – Definite Loops Vs. Indefinite Loops – The For Statement – Nested Loops – Abnormal Loop Termination – Infinite Loops – Iteration Examples

UNIT III : LISTS & FUNCTIONS   (15 Hrs)

List: Using Lists – List Assignment and Equivalence – List Bounds – Slicing – Cloning- Nested Lists-List and functions – Prime Generation with a List - List Processing : Sorting – Flexible Sorting – Search – List Permutations – Randomly Permuting a List – Reversing a List-

Functions : Introduction to Functions – Defining – Calling function –Passing Arguments- Keyword Arguments- Default Arguments – Required Arguments – Variable length Arguments – Return Statement – Nesting of Passing Arguments – Anonymous Function- Recursive function – Scope of Local and Global Variables .

UNIT IV: OBJECT ORIENTED PROGRAMMING PRINCIPLES   (15 Hrs)

Class Statement – Class Body- Objects- Class Methods – Self Variable – Class Properties and Instance Properties – Static Method – Data Hiding – Deleting an object – Constructor – Method Overriding – Inheritance – Composition Object – Abstract classes and interfaces – Metaclass- Operator overloading. – Garbage Collections.

UNIT V : TKINTER , EVENTS & EXCEPTIONS   (15 Hrs)

Tkinter : Introduction – Widget – Label – Button – Check button – Entry – List box – Radio button – Scroll bar – Text- Container – Frame – Menu – Label frame – Message – Combo box – Scale – Canvas.

Events: Event Object – Binding Call backs to Events – Events Names – Keyboard Events – Mouse events.

Handling Exceptions : Motivation – Exception Examples – Handling Exception in Invoked Function - Using Exceptions- Custom Exceptions (Self Study)

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (3 HRS.)

Application development based on case study

REFERENCES:

1. Richard L.Halterman ,"LEARNING TO PROGRAM WITH PYTHON",ELITE PUBLISHING, 2011
2. Ch. Satyanarayana, M. Radhika mani, B.N. Jagadesh, " Python Programming", Universities press,2018.

WEB REFERENCES:

1. www.universitiespress.com/chsatyanarayana/pythonprogramming

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the basic programming style in python .	K2	PSO1& PSO2
CO 2	Apply various types of control flow statements in python programs	K2, K3	PSO3,PSO4
CO 3	Identify the structure and components of a python program.	K3 ,K4	PSO5, PSO6
CO 4	Analyze Object oriented programming concepts and techniques in python	K2, K3 & K5	PSO2, PSO3, PSO7
CO 5	Implementing the GUI concepts in Python	K4, K5	PSO8, PSO9

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT15A	SOFTWARE TESTING	PG Core	5 Hrs.	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.

UNITS

UNIT I: SOFTWARE QUALITY IN GLOBAL BUSINESS CONTEXT (14 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(Self study)**

UNIT II: SQA ROLE IN AN ORGANIZATION   (14 Hrs)

Introduction, Understanding the SQA function. Managing SQA Operations **:** SQA : Organizational Level Initiatives, **Defect Prevention, Quality Assurance – Important Dimensions for the QA Analyst(Self study)**.

UNIT III: TESTING FOR QUALITY VALIDATION   (14 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(Self study).**

UNIT IV: TESTING MODELS AND TECHNIQUES   **(14 Hrs)**

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

UNIT V : TESTING TOOLS   **(14 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 –VI DYNAMISM (Evaluation Pattern-CIA only)   **(5 Hrs)**

Tools used in real time applications and their implementations

REFERENCES:

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

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss various software application domains and different process model used in software development.	K2	PSO1,PSO2
CO 2	Demonstrate the basics of software quality assurance and defect	K2, K3	PSO4,PSO5

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
	prevention.		
CO 3	Compare different testing strategies and tactics.	K3,K4	PSO5,PSO6
CO 4	Apply the software testing techniques in commercial environment.	K3, K4	PSO3,PSO6
CO 5	Explain high performance testing using Jmeter.	K4, K5	PSO6,PSO8

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT 15B	DIGITAL IMAGE PROCESSING	PG Core	5 Hrs.	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.

UNITS

UNIT I : INTRODUCTION (14 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(Self Study).**

UNIT II : DIGITAL IMAGE FUNDAMENTALS (14 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. (Self Study)**

UNIT III: INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING (14 Hrs)

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

UNIT IV: IMAGE RESTORATION AND RECONSTRUCTION   (14 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(Self Study)**

UNIT V: IMAGE COMPRESSION AND SEGMENTATION   (14 Hrs)

Fundamentals – Huffman coding – Golomb coding- Arithmetic coding – LZW

coding- Runlength coding - **Segmentation Fundamentals - Point, Line**

and Edge Detection(Self Study)

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 Hrs)

Image processing tools in current real time problems

REFERENCES:

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

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the representation of digital image and its manipulations	K2	PSO1,PSO2
CO 2	Analyze image sampling and quantization requirements and implications	K2, K3	PSO4,PSO5
CO 3	Describe various Transformation and Filtering Techniques	K2, K3	PSO4,PSO5
CO 4	Demonstrate Restoration And Reconstruction models	K3, K4	PSO5,PSO6
CO 5	Utilize Image Compression And Segmentation for efficient storage	K3, K5	PSO5,PSO8

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT 15C	LINUX SHELL PROGRAMMING	PG Core	5 Hrs.	5

COURSE DESCRIPTION

Linux shell programming describes about the commands used to develop the concept of shell programming.

COURSE OBJECTIVES

To learn basics of shell programming and to develop programs that access files, to use signals, processes and threads

UNITS

UNIT I : SHELL PROGRAMMING: (14 Hrs)

In Introduction to Unix, Linux and GNU - Programming Linux - Shell – Pipes and Redirection – **The Shell as a Programming Language – Shell Syntax(Self Study)**

UNIT II WORKING WITH FILES: (14 Hrs)

Linux File Structure-System calls and Device Drivers-Library Functions-Low Level File Access-Standard I/O Library-Formatted Input and Output-File and Directory Maintenance-scanning Directories-Errors-**The /proc File System (Self Study)**

UNIT III :LINUX ENVIRONMENT & PROCESS AND SIGNALS   (14 Hrs)

Program Arguments-Environment Variables-Time and Date-Temporary Files-User Information-Host Information-Logging-Resources and Limits-Process- Process Structure-**Starting New Processes – Signals(Self Study)**

UNIT IV: TERMINALS AND POSIX THREADS :   (14 Hrs)

Reading from and Writing to the Terminal-Talking to the Terminal-The Terminal Driver and the General Terminal Interface-The Termios Structure-Terminal Output-Detecting Keystrokes-   Thread - Advantages and Drawbacks of Thread- A First Threads Program-Simultaneous Execution-Synchronization -Thread   Attributes- **Canceling a Thread-Threads in Abundance (Self Study)**

UNIT V : MANAGING TEXT-BASED SCREENS WITH CURSES: (14 Hrs)

Compiling with curses-Curses Terminology and Concepts - The Screen - The Keyboard-Windows - Sub windows - The Keypad - Using Color – Pads - **The CD Collection Application (Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 Hrs.)

Case study in latest Commands in Linux

REFERENCES:

1. Beginning Linux Programming, IV Edition– Neil Mathew, Richard Stones- Wiley India Pvt.Ltd-2008.
2. Professional Linux Programming, IV Edition - Richard Stones and Neil Matthew-Wiley   India Pvt.Ltd-2008
3. Linux Complete, I Indian Edition - Grant Taylor- BPB publication-2000
4. Linux Application Development, II Edition - Michael K. Johnson and W.Troan- Pearson Education-2005.
5. Linux the Complete Reference, VI Edition–Richard Peterson-Tata McGraw Hill Edition-2008

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the fundamental concept of Shell Programming	K2	PSO1,PSO2
CO 2	Analyze the concepts of file management in Linux	K2, K3	PSO2,SPO3
CO 3	To learn the linux environment, process and signal	K2, K3	PSO4,PSO5
CO 4	Identify the types of POSIX threads and terminals	K3, K4	PSO3, PSO9
CO 5	Utilize the facilities provided in the concept of text based screens	K3, K5	PSO8, PSO9

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT16A	BIG DATA ANALYTICS-	PG Core	5Hrs.	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

UNITS

UNIT I : INTRODUCTION   (14 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 just 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(Self study).**

UNIT II : BIG DATA ANALYTICS   (14 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(Self study).**

UNIT III: THE BIG DATA TECHNOLOGY   (14 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(Self study).**

UNIT IV : INTRODUCTION TO MAP REDUCE PROGRAMMING   (14 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(Self study).**

UNIT V : RECOMMENDATION ENGINES   (14 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 –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 HRS.)

Current scenario in Big Data Analytical technologies

REFERENCES:

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

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

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the Characteristics and challenges of Big Data	K2	PSO1& PSO2

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 2	Describe the concepts of Big Data Analytics	K2	PSO4
CO 3	Utilize Hadoop for Big Data Technologies	K3, K4	PSO5, PSO6
CO 4	Demonstrate MAPREDUCE Programming	K3, K4	PSO3, PSO9
CO 5	Describe types of Recommendation Systems using Big Data Analytics.	K4, K5	PSO6, PSO8

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT 16B	INTERNET OF THINGS	PG Core	5Hrs.	5

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.

UNITS

UNIT I : INTRODUCTION TO INTERNET OF THINGS   (14 Hrs)

Introduction – Physical Design of IoT –Logical Design of IoT – IoT Enabling Technologies – **IoT Levels & Deployment Templates(Self Study)**

UNIT II : DOMAIN SPECIFIC IOTS   (14 Hrs)

Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – **Health & Lifestyle (Self Study)**

UNIT III IOT AND M2M   (14 Hrs)

Introduction – M2M- Difference between IoT and M2M – SDN and NFV for IoT . IoT System Management with NETCONF-YANG : Need for IoT Systems

Management – **Simple Network Management Protocol(SNMP) – Network Operator Requirements(Self Study)**

UNIT IV: IOT PLATFORMS DESIGN METHODOLOGY   (14 Hrs)

Introduction –IoT Design Methodology . IoT Physical Devices & Endpoints **:**

What is an IoT Device – Exemplary Device : Raspberry Pi- About the Board – **Linux on Raspberry Pi – Raspberry Pi Interfaces(Self Study)**

UNIT V CASE STUDIES ILLUSTRATING IOT DESIGN   (14 Hrs)

Introduction – Home Automation – Cities – Environment – Agriculture – **Productivity Applications. (Self Study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   (5 HRS.)

Current scenario in IOT technologies

REFERENCES:

1. Adrian McEwen & Hakim Cassimally,"Designing the Internet of Things",WILEY, 2017
2. Raj Kamal ,"INTERNET OF THINGS ARCHITECTURE AND DESIGN PRINCIPLES",McGraw Hill Education , 2017
3. OLIVIER HERSENT ,DAVID BOSWARTHICK , OMAR ELLOUMI, "The Internet of Things", WILEY ,2015

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the basic concepts of IoT	K2	PSO1, PSO2
CO 2	Discuss physical and logical design of IoT enabled technologies	K2,K3	PSO2,PSO3
CO 3	Analyze how and where IoT can be applied	K3,K4	PSO5, PSO9
CO 4	Compare M2M and IoT	K2,K3,K4	PSO1, PSO3 PSO9
CO 5	Analyse the features of Python used for IoT implementation	K4,K5	PSO6, PSO8

Employability 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT16C	MOBILE COMMUNICATION	PG Core	5 Hrs.	5

COURSE DESCRIPTION

Mobile communication deals with the protocol and system to perform the data transfer through mobile devices.

COURSE OBJECTIVES

- To understand the fundamentals of Mobile communication
- To apply various protocols and algorithms for the real world scenario

UNITS

UNIT I : INTRODUCTION (14 Hrs)

Applications-A Short History of Wireless Communication-A Market For Mobile Communication-A Simplified Reference Model.

WIRELESS TRANSMISSION**:** Frequencies for Radio Transmission-Signals-Antenna-Signal Propagation-Multiplexing-Modulation-**Spread Spectrum-Cellular System(Self Study).**

UNIT II: MEDIUM ACCESS CONTROL: (14 Hrs)

Motivation for Specialized MAC- SDMA- FDMA- TDMA- CDMA. **Telecommunication System:** GSM**(Self Study).**.

UNIT III : SATELLITE SYSTEM: (14 Hrs)

Application-Basics-Routing-Localization-Handover.

Broadcast System: Digital Audio Broadcasting-Digital Video Broadcasting-**Convergence of Broadcasting and Mobile Communication(Self Study).**

UNIT IV : WIRELESS LAN: **(14 Hrs)**

Infrared Vs Radio Transmission- Infrastructure and ad-Hoc-Network-HIPERLAN-**Bluetooth**. **(Self Study).**

UNIT V: SUPPORT FOR MOBILITY   **(14 Hrs)**

World wide web: Hypertext Transfer protocol – System Architecture

Wireless Application Protocol: - Architecture- Wireless datagram protocol-Wireless Transport layer security- Wireless transaction protocol – Wireless session protocol – **Wireless Markup language- WML Script (Self Study).** Wireless telephony application.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)   **(5 HRS.)**

Current scenario in mobile communication technologies

REFERENCES:

1. Mobile communication , Second edition, Jochen Schiller
2. Wireless Networks by Clint Smith and Daniel Collins ,2014
3. Fundamentals for Wireless communication by David Tse, Pramod Viswanath

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the basic concepts in Mobile communication	K2	PSO1, PSO4
CO 2	Analyze the concept of Medium Access control	K3, K5	PSO5, PSO8
CO 3	Discuss concept of Satellite system	K2, K3	PSO1, PSO3
CO 4	Explain the concepts of Wireless LAN	K2, K3, K4	PSO1, PSO5, PSO6
CO 5	Apply the various support required for Mobility	K4,K5	PSO8, PSO9

II M.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3IT17	LAB V-DATA MINING AND DATA WAREHOUSING	PG Core	5 Hrs.	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 preprocessing 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 .

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 test.arff using apriori algorithm
5. Training a decision tree algorithm.
6. Test on classification of decision tree.
7. Demonstration of classification rule process on dataset employee.arff using j48 algorithm.

8. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
9. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
10. Demonstration of clustering rule process on dataset student.arff using simple k-m

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Utilize Weka tool to evaluate Data Mining algorithms.	K4 & K5	PSO8, PSO9
CO 2	Demonstrate preprocessing steps involved in different datasets.	K4 & K5	PSO8, PSO9
CO 3	Develop the decision tree algorithm using different datasets	K4 & K5	PSO8, PSO9
CO 4	Demonstrate the classification and clusters algorithms using large datasets.	K4 & K5	PSO8, PSO9
CO 5	Analyze Data Mining techniques for realistic data.	K4 & K5	PSO8, PSO9

Employability 100%

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEE K	CREDIT S
PSIT	19PG3IT 18	LAB VI : PYTHON PROGRAMMING	PG Core	5Hrs.	3

COURSE DESCRIPTION

This course content plays a vital role in building the basic programming skill in Python.

COURSE OBJECTIVES

The focus of the lab is to provide students with an introduction to visualize the real time problems using the Python programming language as a practical session. The goal of this course is to train the students to face the industrial requirements.

PROGRAM LIST

1. Program using String

2. Program using List

3. Program using Dictionary

4. Program using Tuple

5. Program using Sets

6. Program using Array

7. Program using Condition Statements and Loops

8. Program using Functions

9. Program using Date Time

10. Program using Class

11. Program using Data Structure

12. Program using Search and Sorting

13. Program using Recursion

14. Program using Math

15. Program using File I/O

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Demonstrate the basic concepts of variables expressions.	K4 & K5	PSO8, PSO9
CO 2	Develop basic python programs with I/O operations.	K4 & K5	PSO8, PSO9
CO 3	Develop programs with function control structure.	K4 & K5	PSO8, PSO9
CO 4	Apply strings and lists in python.	K4 & K5	PSO8, PSO9
CO 5	Develop python programs with files.	K4 & K5	PSO8, PSO9

Entrepreneurship 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG3ITSI1	SUMMER INTERNSHIP	PG Core	-	3

COURSE DESCRIPTION :

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 OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify employment contacts leading directly to a full-time job following course completion	K4 & K5	PSO8, PSO9
CO 2	Create communication, interpersonal and other soft skills essential for the	K4 & K5	PSO8, PSO9

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
	job interview process		
CO 3	Analyse the project requirements and engages in continuing professional development	K4 & K5	PSO8, PSO9
CO 4	Analyze a problem and identify the computing requirements appropriate to its solution.	K4 & K5	PSO8, PSO9
CO 5	Utilizing a new software tool.	K4 & K5	PSO8, PSO9

Entrepreneurship 100%

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG4IT19	PROJECT	PG Core	-	6

COURSE DESCRIPTION

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

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss project development and the associated business processes	K4 & K5	PSO8, PSO9
CO 2	Plan as an individual or in a team in development of technical projects.	K4 & K5	PSO8, PSO9
CO 3	Communicate with engineers and the community at large in written and oral forms.	K4 & K5	PSO8, PSO9
CO 4	Create effective communication skills for presentation	K4 & K5	PSO8, PSO9
CO 5	Analyse problems and formulate solutions	K4 & K5	PSO8, PSO9

Skill Development 100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSIT	19PG4IT20	R-PROGRAMMING	PG Core	-	4

COURSE DESCRIPTION

This Course provides knowledge of R- Programming and explains the different statements and functions used in R- Programming.

COURSE OBJECTIVES

- To understand the fundamentals of R-Programming
- To apply the concept of R- Programming in the real world scenario.

UNITS

UNIT –I : INTRODUCTION

R Data Types, Arithmetic & Logical Operators - R Matrix Tutorial: Create, Print, add Column, Slice - Factor in R: Categorical & Continuous Variables

UNIT –II : STATEMENTS

IF, ELSE, ELSE IF Statement - For Loop - While Loop

UNIT –III FUNCTIONS

apply(), lapply(), sapply(), tapply() Function

UNIT –IV IMPORTING & EXPORTING

Import Data into R: Read CSV, Excel, SPSS, Stata, SAS Files - R Exporting Data to Excel, CSV, SAS, STATA, Text File

UNIT –V AGGREGATE FUNCTIONS

Summarise & Group_by() - R Select(), Filter(), Arrange(), Pipeline

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)

R Data Frame: Create, Append, Select, Subset - R Vs Python - SAS Vs R

WEB REFERNCES

https://www.atnyla.com/syllabus/r-programming-language/7

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To understand the basic concepts in R- Programming.	K2	PSO1,PSO2
CO 2	Illustrate various statements used in R-Programming	K2, K3	PSO3, PSO5
CO 3	Analyze various techniques to import and export the data set.	K3,K4	PSO5, PSO6
CO 4	To know about the aggregate functions.	K4, K5	PSO6, PSO7
CO 5	Implementation of R-Progamming in current scenario	K4,K5	PSO8, PSO9

Signature of the HOD
Head of the Department
Department of Information Technology,
Fatima College (Autonomous), Madurai.