

### M.SC. INFORMATION TECHNOLOGY

| SEM         | COURSE CODE  | COURSE                        | COURSE TITLE                                   | INS. HRS | CREDIT | MARKS |      | TOTAL |     |
|-------------|--------------|-------------------------------|--|----------|--------|-------|------|-------|-----|
|             |              |                               |  |          |        | CIA   | ESE  |       |     |
| I           | 20PIT1CC1    | Core– I                       | ASP.NET  | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT1CC2    | Core – II                     | Data Structures and Algorithms                 | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT1CC3    | Core– III                     | Database Systems                               | 6        | 4      | 25    | 75   | 100   |     |
|             | 20PIT1CC4P1  | Core– IV A                    | ASP.NET Lab - Practical                        | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT1CC4P2  | Core– IV B                    | RDBMS Lab - Practical                          | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT1DE1A/B | DSE – I #                     |  | 6        | 4      | 25    | 75   | 100   |     |
|             |              | TOTAL                         |  |          | 30     | 22    |      |       | 500 |
| II          | 20PIT2CC5    | Core– V                       | Java Programming                               | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT2CC6    | Core– VI                      | Mobile Communication                           | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT2CC7    | Core– VII                     | Data Science and R Programming                 | 6        | 4      | 25    | 75   | 100   |     |
|             | 20PIT2CC8P1  | Core– VIII A                  | Java Programming Lab - Practical               | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT2CC8P2  | Core– VIII B                  | R Programming Lab - Practical                  | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT2DE2A/B | DSE – II#                     |  | 6        | 4      | 25    | 75   | 100   |     |
|             |              | TOTAL                         |  |          | 30     | 22    |      |       | 500 |
| III         | 20PIT3CC9    | Core– IX                      | Software Testing                               | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT3CC10   | Core– X                       | Web Services                                   | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT3CC11   | Core– XI                      | Internet of Things                             | 6        | 4      | 25    | 75   | 100   |     |
|             | 20PIT3CC12P1 | Core– XII A                   | Software Testing Lab - Practical               | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT3CC12P2 | Core– XII B                   | Web Services Lab- Practical                    | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT3DE3A/B | DSE – III#                    |  | 6        | 4      | 25    | 75   | 100   |     |
|             | 20PIT3EC1    | Extra Credit Course-I         | Online Course (MOOC)                           | -        | 1*     | -     | -    | -     |     |
|             |              | TOTAL                         |  |          | 30     | 22    |      |       | 500 |
| IV          | 20PIT4CC13   | Core– XIII                    | Open Source Technology                         | 6        | 5      | 25    | 75   | 100   |     |
|             | 20PIT4CC14P1 | Core– XIVA                    | Open Source Technology Lab - Practical         | 3        | 3      | 10    | 40   | 50    |     |
|             | 20PIT4CC14P2 | Core– XIVB                    | Angular JS Lab - Practical                     | 3        | 2      | 10    | 40   | 50    |     |
|             | 20PIT4PW     | Project                       | Project work                                   | 18       | 13     | -     | 300  | 300   |     |
|             | 20PIT4EC2    | Extra Credit Course -II       | Information Technology for Career Examinations | -        | 5*     | -     | 100* | 100*  |     |
|             | 20PCNOC      | Online Course<br>(Compulsory) |  | -        | 1      | -     | -    | -     |     |
|             |              | TOTAL                         |  |          | 30     | 24    |      |       | 500 |
| GRAND TOTAL |              |                               |  | 120      | 90     |       |      | 2000  |     |

\*Not considered for grand total and CGPA

### # DISCIPLINE SPECIFIC ELECTIVES

| SEMESTER   | COURSE CODE | COURSE TITLE                                 |
|------------|-------------|--|
| <b>I</b>   | 20PIT1DE1A  | Artificial Intelligence and Machine Learning |
|            | 20PIT1DE1B  | Data Communication Networks                  |
| <b>II</b>  | 20PIT2DE2A  | Semantic Web                                 |
|            | 20PIT2DE2B  | Cryptography and Network Security            |
| <b>III</b> | 20PIT3DE3A  | Soft Computing                               |
|            | 20PIT3DE3B  | Cloud Computing                              |

| Semester | Code      | Course   | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|----------|---------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1CC1 | Core – I | ASP.NET             | 6     | 5       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Acquire working knowledge of web applications development
2. Able to display dynamic data from data sources
3. Provide Knowledge on security in web services.
4. Develop Secured web applications
5. Select of appropriate programming language for the real world problems.

### UNIT I: ASP.NET Introduction

18 hours

**The .NET Framework:** .NET Programming Framework – VB.NET, C# and the .NET Languages- CLR – Class Library – ASP.NET. **Learning the .NET Languages:** The .NET Languages – Data Types – Declaring Variables – Scope and Accessibility – Variable Operations – Object-Based Manipulations – Conditional Structures – **# Loop Structures – Functions and Subroutines #.**

### UNIT II: Developing ASP.NET Applications

18 hours

**Web From Fundamentals:** A simple Page Applet – Improving the Currency Changes – A Deeper Look at HTML Control Classes – The Page Class. **Web Controls:** Stepping Up to Web Controls – Web Control Classes – AutoPostBack and Web Control Events – A simple Web Page Applet – Accessing Web Controls.

### UNIT III: Forms

18 hours

**Validation and Rich Controls:** The Calendar Control – Formatting the calendar – The AdRotator – The Advertisements File – The AdRotator Class – Validation – A simple Validation Example – Regular Expressions. **State Management:** Viewstate – Transferring Information – Custom Cookies – Session State – Session State Configuration – **# Application State #.**

### UNIT IV: Working With Data

18 hours

**Overview of ADO.NET:** Introducing ADO.NET and Data Management – Characteristics of ADO.NET – ADO.NET Object Model. **ADO.NET Data Access:** The SQL Select, Update, Insert and Delete statement – Creating a Connection – Defining a Select Command – Command With DataReader- Updating Data – Accessing, Modifying, Updating Disconnected Data. **The DataList, DataGrid, and Repeater:** Comparing the Template Controls – Selecting, Editing, Paging and Sorting with the DataGrid.

### UNIT V

18 hours

**Web Services Architecture:** Internet Programming Then and Now – WSDL – SOAP – Communicating with a Web service – Web Service Discovery and UDDI. **Creating Web Services:** Web Service Basics – The StockQuote, Documenting, Testing your Web Service – Web Service Data Types. **Using Web Services:** Consuming a Web Service – **# Using the Proxy Class #.**

### # ..... # Self-study portion

#### Text Book:

ASP.Net: The Complete Reference, Matthew MacDonald, McGraw Hill Edition (India) Edition 2002.

**UNIT I :** Part 1: Section 1, 2

**UNIT II :** Part 2: Section 6, 7

**UNIT III :** Part 2: Section 9, 10

**UNIT IV :** Part 3: Section 12, 13, 15

**UNIT V :** Part 4: Section 18, 19, 20

#### Books for References:

1. Professional ASP.NET 1.1 Bill Evjen , Devin Rader , Farhan Muhammad , Scott Hanselman, Srivakumar Wrox.
2. ASP. NET Black Book DreamTech.

**Web Reference:**

<https://www.w3schools.com/asp/default.ASP>

<https://www.tutorialspoint.com/asp.net/index.htm>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     | Hours                              |      |      | Credits |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|------|---------|------|
| I  | 20PIT1CC1                |     | ASP.NET             |     |     | 6                                  |      |      | 5       |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |      |         |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3 | PSO4    | PSO5 |
| CO1  | ✓                        | ✓   | ✓                   | ✓   |     | ✓                                  |      | ✓    |         | ✓    |
| CO2  |                          | ✓   | ✓                   | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| CO3  | ✓                        |     | ✓                   | ✓   | ✓   | ✓                                  |      | ✓    | ✓       | ✓    |
| CO4  | ✓                        | ✓   | ✓                   | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| CO5  |                          | ✓   |                     | ✓   | ✓   |                                    | ✓    |      |         | ✓    |
| Number of matches (✓) = 37, Relationship: High |                          |     |                     |     |     |                                    |      |      |         |      |

Prepared by:

1. B. Benazir Butto

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1. Dr. K. Nafees Ahmed

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code      | Course    | Title of the Course            | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|-----------|--------------------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1CC2 | Core – II | DATA STRUCTURES AND ALGORITHMS | 6     | 5       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Select appropriate data structures for any specified problem
2. Implement the various operations (Traverse, Search, Insert, Delete)
3. Learn mathematical background for analysing algorithm
4. Apply the proper algorithm design method for problem solving.
5. Analyze the algorithms and data structures used in the problem to determine the time and memory consumption.

### UNIT I

**18 hours**

Lists, Stacks and Queues: Abstract Data Types (ADTs) - The Stack ADT - The Queue ADT

### UNIT II

**18 hours**

Trees: Introduction - Binary Trees - Representing Binary Trees in Memory - Traversing Binary Trees - Traversal Algorithms using Stacks - Header Nodes: Threads. Binary Search Trees - Searching and Inserting in Binary Search Trees - Deleting in a Binary Search Tree - AVL Search Trees - Insertion in an AVL Search Tree - Deletion in an Search Tree - m-way Search Trees - Searching Insertion and Deletion in an m-way Search Tree - B Trees - Searching Insertion and Deletion in B Trees - Heap: Heapsort. **# Path Lengths: Huffman's Algorithm - General Trees #.**

### UNIT III

**18 hours**

DIVIDE AND CONQUER:The General Method – Defective Chessboard – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection - **# Strassen's Matrix Multiplication #.**

### UNIT IV

**18 hours**

THE GREEDY METHOD: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - **# Optimal Storage On Tapes – Optimal Merge Patterns #** - Single Source Shortest Paths

### UNIT V

**18 hours**

DYNAMIC PROGRAMMING: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem -**# Flow Shop Scheduling #.** BACKTRACKING: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem

### # ..... # Self-study portion

#### Text Book:

1. Mark Allen Weiss, "Data Structures an Algorithm Analysis in C", Pearson publishing Company Limited, Second Edition, Reprint, Eleventh Impression 2009

**UNIT I** : Chapter 3

2. Seymour Lipschutz, Data Structures (Schaum's Outlines), Tata McGraw-Hill Publishing Company Limited, Fourth Reprint, 2006

**UNIT II** : Chapter 7

3. Ellis Horowitz, SatrajSahni and SanguthevarRajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint 2009

**UNIT III** : Chapter 3 (3.1 – 3.8)

**UNIT IV**: Chapter 4

**UNIT V** : Chapter 5 and 7

#### Books for References:

Introduction to Algorithms3 rdEditionSep2010 Charles E. Leiserson. Ronald L. Rivest. Clifford Stein.

**Web Reference:**

<https://www.tutorialride.com/data-structures/trees-in-data-structure.htm>

<https://www.javatpoint.com/daa-algorithm-design-techniques>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester  | Code                     |     | Title of the Course            |     |     | Hours                              |      |      | Credits |      |
|---|--------------------------|-----|--------------------------------|-----|-----|------------------------------------|------|------|---------|------|
| I   | 20PIT1CC2                |     | DATA STRUCTURES AND ALGORITHMS |     |     | 6                                  |      |      | 5       |      |
| Course Outcomes (COs)                               | Programme Outcomes (POs) |     |                                |     |     | Programme Specific Outcomes (PSOs) |      |      |         |      |
|   | PO1                      | PO2 | PO3                            | PO4 | PO5 | PSO1                               | PSO2 | PSO3 | PSO4    | PSO5 |
| CO1   | ✓                        | ✓   |                                | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       |      |
| CO2   | ✓                        | ✓   |                                | ✓   |     | ✓                                  | ✓    | ✓    |         | ✓    |
| CO3   | ✓                        | ✓   | ✓                              | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| CO4   | ✓                        | ✓   | ✓                              | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| CO5   | ✓                        | ✓   | ✓                              | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| Number of matches (✓) = 45, Relationship: Very High |                          |     |                                |     |     |                                    |      |      |         |      |

Prepared by:

1. O.S. Abdul Qadir

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1. Dr. K. Nafees Ahmed

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code      | Course     | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|------------|---------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1CC3 | Core – III | DATABASE SYSTEMS    | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Demonstrate an understanding of the elementary & advanced features of DBMS & RDBMS
2. Attain a good practical understanding of the SQL
3. Develop clear concepts about Relational Model.
4. Examine techniques pertaining to Database design practices
5. Execute various advance SQL queries related to Transaction Processing & Locking using concept of Concurrency control.

### UNIT I

**18 hours**

Introduction: Database System Applications – Purpose of Database Systems – Views of Data – Database Languages – Data Storage and Querying – Database Architecture – Database Users and Administrator – Structure of Relational Database – Keys – **# Schema Diagrams #**– Formal Relational Query Languages: Relational Algebra

### UNIT II

**18 hours**

Introduction to SQL: Over View of SQL – SQL Definition – Basic Structure of SQL Queries – Additional Basic Operations – Set Operations – Null Values – Aggregate Functions – Nested Sub-queries – Modification of the database - Intermediate SQL: Join Expression – Views. Entity-Relationship Model – Constraints – Removing Redundant Attributes in Entity Sets – **# Entity- Relationship Diagram #**.

### UNIT III

**18 hours**

Normalization: Purpose of Normalization – How Normalization Support Database Design – Data Redundancy and Update Anomalies – Functional Dependencies – First Normal Form – Second Normal Form – Third Normal Form. Advanced Normalization: More on Functional Dependencies – BCNF – 4NF – 5NF.

### UNIT IV

**18 hours**

Storage and File Structure: RAID - File Organization – Organization of Records in Files – Data Dictionary storage. Indexing and Hashing: Basic Concepts – Ordered Indices – B<sup>+</sup>-Tree Index Files – Static Hashing – **# Dynamic Hashing #**.

### UNIT V

**18 hours**

Transaction: Transaction Concept – A simple Transaction Model – Storage Structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability – Concurrency Control: Lock-Based Protocol – Timestamp-Based Protocol – Validation-Based Protocol – **# Recovery Systems: Failure Classification – Recovery and Atomicity #**.

### # ..... # Self-study portion

#### Text Book:

1. Abraham Silberschatz, Hendry F. Korth and S. Sudarshan, Database System Concepts, 6th Edition, McGraw- Hill International Edition

**UNIT I:** Chapter (1.1-1.5, 1.9, 1.12, 2.1, 2.3, 2.4, 6.1)

**UNIT II:** Chapter (3.1 – 3.9, 4.1, 4.2, 7.2, 7.3, 7.5)

**UNIT IV:** Chapter (10.3, 10.5-10.7, 11.1-11.3, 11.6, 11.7)

**UNIT V:** Chapter (14.1 – 14.6, 15.1, 15.4, 15.5, 16.1, 16.3)

2. Database Systems A Practical Approach to Design, Implementation, and Management, 4<sup>th</sup> Edition by Thomas M.Connolly, Carolyn E.Begg, Pearson Education, Fifth Impression, 2012.

**UNIT III:** Chapter 13(13.1-13.4, 13.6-13.9) Chapter 14(14.1.14.2, 14.4, 14.5)

**Books for References:**

1. Fundamentals of Database Systems, 5th Edition by RamezElmasri, Shamkant B. Navathe, Pearson Education Ltd.
2. C.J Date, A. Kannan and S.Swaminathan, An Introduction to Database Systems, 8th Edition, Pearson Education Asia.

**Web Reference:**

<https://www.db-book.com/db6/slide-dir/>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     | Hours                              |      |      | Credits |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|------|---------|------|
| I  | 20PIT1CC3                |     | DATABASE SYSTEMS    |     |     | 6                                  |      |      | 4       |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |      |         |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3 | PSO4    | PSO5 |
| CO1  | ✓                        |     |                     | ✓   | ✓   | ✓                                  |      | ✓    | ✓       |      |
| CO2  | ✓                        |     |                     | ✓   | ✓   | ✓                                  |      | ✓    | ✓       |      |
| CO3  | ✓                        | ✓   |                     | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| CO4  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| CO5  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓    | ✓       | ✓    |
| Number of matches (✓) = 41, Relationship: High |                          |     |                     |     |     |                                    |      |      |         |      |

Prepared by:

1. S. Syed Ibrahim

Checked by:

1. Dr. K. Nafees Ahmed

Note:

| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
|--------------|-----------|--------|----------|--------|-----------|
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code        | Course      | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-------------|-------------|---------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1CC4P1 | Core – IV A | ASP.NET LAB         | 3     | 2       | 50         | 10             | 40             |

1. **Simple Programs:**

- Develop a Program to demonstrate String Object.
- Display first N Fibonacci numbers.
- Write a program to find the eligibility of admission for a professional course based on the following criteria:

Marks in Maths  $\geq 65$ , Marks in Phy  $\geq 55$ , Marks in Chem  $\geq 50$ , Total in all three subject  $\geq 180$ , total in Math and Subjects  $\geq 140$

Test Data :

Input the marks obtained in Physics :65

Input the marks obtained in Chemistry :51

Input the marks obtained in Mathematics :72

2. **Web Forms Programs:**

- Making use of Currency Changes.
  - Write a program to create a table dynamically.
  - Develop a program to generate the Greeting Card Automatically.
- Making use of AdRotator control.
  - Create a Bio- data Using Validation Controls.
  - Write a program to implement state management techniques.
  - Write a program to implement view state and session state.
  - Create a program to manipulate student details using DML Commands through connected approach.
  - Write a program to access the data in DataList and DataGrid.
  - Develop a project to update and delete few records using Disconnected Access.
  - Design an ASP.NET to perform basic mathematical operations using web services.
  - Design an ASP.Net client for web service.

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| Semester | Code        | Course      | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-------------|-------------|---------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1CC4P2 | Core – IV B | RDBMS LAB           | 3     | 2       | 50         | 10             | 40             |

## I. Data Definition Languages

### 1. Create the following relations

Customer (customer-Id (Primary key), customer-name, address)  
Account (account-number (Primary key), branch-name, balance)  
Loan (loan-number (Primary key), branch-name, amount)  
Branch (branch-name, branch-city, assets)  
Depositor (customer-name, account-number)  
Borrower (customer-name, loan-number)  
Supplier (supplier-number, part-number, color, quantity) use candidate key

2. Write DDL query to perform foreign key with on delete cascade - A foreign key with cascade delete means that if a record in the parent table is deleted, then the corresponding records in the child table will automatically be deleted.

3. Write DDL query to change the column and table name.

### 4. Alter with three options

Add – add columns in the existing table  
Modify – modify the data type and size in the existing table  
Drop – delete column from existing table

## II. Data Manipulation Languages

### (1) Insert Operation

### (2) Rename Operation

Display the customer-name instead of customer-id

### (3) Tuple Variables

Using branch relation, Find the names of all branches that have assets greater than at least one branch located in a city (any city)

### (4) String Operations

Find the customer names whose names start with M.  
Find the customer names whose names end with R.  
Find the customer name whose names contain “ mo” as a substring  
Find the customer name whose names exactly six character.  
Find the customer name whose names at least five character.

### (5) Ordering of Tuples

To list in alphabetic order all customers who have loan at a branch (ex: cantonment)  
To list customer names in descending order.

### (6) Set Operation – (union, Intersect, minus)

Find all customers having a loan, an account or both at the bank.  
Find all customers who have both a loan and account at the bank.  
Find all customers who have an account but no loan at the bank.  
Find all customers who have a loan but not an account at the bank.

### (7) Aggregate functions – (average, minimum, maximum, total, and count)

Find average account balance at a branch. (any branch name like cantonment branch)  
Find the minimum balance at a branch.  
Find the maximum balance at a branch.  
Find the total balance at a branch  
Find the number of accounts in a branch.

### (8) Aggregate functions with group by and having clause)

Find the average account balance at each branch.  
Find branch names those branches where the total balance is more than Rs. 1, 00,000.  
Find the branches those branches where the total accounts are more than 3.

### (9) Nested sub-queries. Membership (in and notin)

Find all customers who have both a loan and account at the bank.  
Find all customers who have an account but no loan at the bank.  
Set Comparison (some, all)

Using branch relation, Find the names of all branches that have asset value greater than at least one branch located in a city (any city)

Find the names of all branches that have asset value greater than that of each branch located in a city (any city)

(10) Views

Create the view consisting of customer-names and branch-names who have either loan or an account at the branch.

(11) Deletion

Delete the tuples of all accounts with balances below the average at the bank (sub-query).

Delete all accounts tuples at every branch located in a city( any city)

(12) Updates

All balances are to be increased by 5 percent.

Update with case statements

All accounts with balances over 10000 receives 10 percent interest where as others receive 5 percent

(13) Join Operations

Inner join – Find the customer-names who have loan from a branch (KK nagar)

Left outer join – Show the relation, which loan not buy a single customer.

Right outer join – Show the relation, which customers bought loan, that loan details

not in the loan relation

**III. PL/SQL Procedure**

1. Reverse the string.
2. Student Mark Sheet Preparation
3. Pay Roll preparation
4. Find factorial number using recursive function.
5. Find Fibonacci series using recursive function.

**IV. SQL FORMS**

1. Student Mark System
2. Pay Roll Preparation
3. Income Tax Calculation

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| Semester | Code       | Course  | Title of the Course                          | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|---------|--|-------|---------|------------|----------------|----------------|
| I        | 20PIT1DE1A | DSE - I | ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Recognize appropriate search algorithms for any Artificial Intelligence problems
2. Represent a problem using formal and non-formal knowledge representation
3. Develop a machine learning system for association rule learning algorithm
4. Implement and apply reinforcement and statistical learning algorithms for solving a real-world problem
5. Apply the machine learning technique for solving a real-world problem

### UNIT I

**18 hours**

INTRODUCTION- Definitions of Artificial Intelligence- Topics of Artificial Intelligence – Production Systems- State Space Representation- Branches of Artificial Intelligence – Applications of Artificial Intelligence-HEURISTIC SEARCHTECHNIQUES:Generate –and-test – Hill climbing-Search Techniques –Problem Reduction- Constraint Satisfaction – Means-ends Analysis – # **GAME PLAYING: MINIMAX Procedure- Alpha-Beta Pruning- Combined Approach#.**

### UNIT II

**18hours**

**KNOWLEDGE REPRESENTATION:** Knowledge Management- Types of Knowledge- Knowledge Representation – Approaches to Knowledge Representation- Issues in Knowledge Representation- Knowledge base- KNOWLEDGE REPRESENTATION STRUCTURES: First Order Logic – Frames-Conceptual Dependency- Scripts-Semantic Network- REASONING: # **Types of Reasoning#** -Non-monotonic Inference Methods-Non-monotonic Reasoning-Truth Maintenance System – Reasoning with Fuzzy Logic- Rule-based Reasoning- Diagnosis Reasoning

### UNIT III

**18 hours**

**LEARNING:** Types of Learning- Machine Learning – Intelligent Agents-ASSOCIATION LEARNING: Basis of Association- APRIORI Algorithm – Éclat Algorithm –FP Growth Algorithm – TERTIUS Algorithm-SCADA Application by FP Growth Algorithm-CLUSTERING- # **Means Clustering- Fuzzy Clustering #**-Hierarchical Clustering-Cluster Similarity

### UNIT IV

**18 hours**

**REINFORMENT LEARNING:** Markov Decision Problem-Q-learning- Temporal Difference Learning – Learning Automata-STATISTCAL LEARNING: Hidden Markov Models- Linear Classifiers-Quadratic Classifiers- Decision Trees – Bayesian Networks

### UNIT V

**18 hours**

**ARTIFICIAL NEURAL NETS:** ANN Basics-ANN-Learning Process –Perceptron- RBF Networks- ANN summary- SUPERVISED LEARNING: Support Vector Machines-Inductive Logic Programming- Case-based reasoning-Ensemble Classifiers-Nearest Neighbourhood- Fuzzy Network- UNSUPERVISED LEARNING: Expectation Maximization-Self Organizing Maps- Adaptive Resonance Theory

### # ..... # Self-study portion

#### Text Book:

Vinod Chandra S.S and AnandHareendran S, Artificial Intelligence and Machine learning, PHI Learning Private Limited, 2014

**UNIT I** : Chapter I, Chapter II, and Chapter III

**UNIT II** : Chapter IV, Chapter V and Chapter VI

**UNIT III** : Chapter VII, Chapter VIII and Chapter IX

**UNIT IV** : Chapter X and Chapter XI

**UNIT V** : Chapter XII, Chapter XII and Chapter XIII

#### Books for References:

1. Elaine Rich, Kevin Knight and Shivasankar B Nair, Artificial Intelligence, Third Edition, Tata McGraw Hill Education Private Limited, 2010
2. John Mueller and Luca Massaron , Machine Learning For Dummies, John Wiley & Son, 2016

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course                          |     |     | Hours                              |      |      | Credits |      |
|--|--------------------------|-----|--|-----|-----|------------------------------------|------|------|---------|------|
| I  | 20PIT1DE1A               |     | ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING |     |     | 6                                  |      |      | 4       |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |  |     |     | Programme Specific Outcomes (PSOs) |      |      |         |      |
|  | PO1                      | PO2 | PO3  | PO4 | PO5 | PSO1                               | PSO2 | PSO3 | PSO4    | PSO5 |
| CO1  | ✓                        | ✓   |  | ✓   | ✓   | ✓                                  |      |      |         |      |
| CO2  | ✓                        | ✓   |  | ✓   | ✓   | ✓                                  |      |      |         |      |
| CO3  | ✓                        | ✓   | ✓  | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| CO4  | ✓                        | ✓   | ✓  | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| CO5  | ✓                        | ✓   | ✓  | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| Number of matches (✓) = 37, Relationship: High |                          |     |  |     |     |                                    |      |      |         |      |

Prepared by:

1. Dr. G. Ravi

Checked by:

1. Dr. K. Nafees Ahmed

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code       | Course  | Title of the Course         | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|---------|-----------------------------|-------|---------|------------|----------------|----------------|
| I        | 20PIT1DE1B | DSE - I | DATA COMMUNICATION NETWORKS | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand the concepts of Computer networks, OSI Reference Model, TCP Reference Model and Routing algorithms.
2. Explain CSMA/CD, internetworking technologies, Routing and Addressing.
3. Develop current research problems and research methods in advance computer networks.
4. Apply security principles and investigate network security threat to system design.
5. Apply research in network security.

### UNIT I

**18 hours**

INTRODUCTION: Data Communications – Networks. Network Models: The OSI Model – Layers in the OSI Model – TCP/IP Protocol suite – Physical Layer: # **Multiplexing** #– Transmission Media: Guided Media- Telephone Network.

### UNIT II

**18 hours**

Data Link Layer: Error Detection and Correction: Introduction – Block coding – Cyclic Codes – Checksum. Data Link Control: Framing – # **Flow and Error Control** # – Protocols – Noiseless Channels – Noisy Channel – HDLC-PPP.

### UNIT III

**18 hours**

Network Layer Design Issues – Routing Algorithms: The Optimality Principle – Shortest Path Algorithm – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcasting Routing – Congestion Control Algorithms – Network Layer in the Internet: IP Addresses- The IP Version 6 Protocol.

### UNIT IV

**18 hours**

Transport Layer: Process to Process Delivery – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP)- Stream Control Transport Protocol (SCTP).

### UNIT V

**18 hours**

Application Layer: Name Space – Domain Name Space (DNS) – Distribution of Name Space – DNS in the Internet – Remote Logging – E-Mail – File Transfer-Network Management System (NMS) –# **Simple Network Management Protocol (SNMP)** #.

### # ..... # Self-study portion

#### Text Book:

1. Behrouz A Forouzan, Data Communications and Networking, Fourth Edition, Tata McGraw-Hill, Special Indian Edition

2006

**UNIT I** : Chapter 1.1, 1.2, 2.2 – 2.4, 6.1, 7.1, 9.1

**UNIT II** : Chapter 10.1, 10.2, 10.4, 10.5, 11.1 – 11.7

**UNIT IV**: Chapter 23.1 – 23.4, 25.1 – 25.4, 26.1 – 26.3 2

**UNIT V** : Chapter 25.1 – 25.4, 26.1 – 26.3, 28.1, 28.2

2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Fifth Edition, Pearson Education, Inc., Publishing as Prentice Hall, 2011

**UNIT III** : Chapter 5.1.1 – 5.1.5, 5.2.1 – 5.2.7, 5.3.1 – 5.3.5, 5.6.2 – 5.6.3

#### Books for References:

William Stallings, Data and Computer Communication, PHI, Eighth Edition, 2009

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     | Title of the Course         |     |     |     | Hours                              | Credits |      |      |      |
|--|--------------------------|-----------------------------|-----|-----|-----|------------------------------------|---------|------|------|------|
| I  | 20PIT1DE1B               | DATA COMMUNICATION NETWORKS |     |     |     | 6                                  | 4       |      |      |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |                             |     |     |     | Programme Specific Outcomes (PSOs) |         |      |      |      |
|  | PO1                      | PO2                         | PO3 | PO4 | PO5 | PSO1                               | PSO2    | PSO3 | PSO4 | PSO5 |
| CO1  | ✓                        |                             |     | ✓   | ✓   | ✓                                  |         | ✓    | ✓    |      |
| CO2  | ✓                        |                             |     | ✓   |     |                                    |         | ✓    | ✓    |      |
| CO3  | ✓                        | ✓                           | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| CO4  | ✓                        | ✓                           | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| CO5  | ✓                        | ✓                           | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| Number of matches (✓) = 40, Relationship: High |                          |                             |     |     |     |                                    |         |      |      |      |

Prepared by:

1. S. Syed Ibrahim

Checked by:

1. Dr. K. Nafees Ahmed

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code      | Course   | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|----------|---------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2CC5 | Core – V | JAVA PROGRAMMING    | 6     | 5       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand the structure and model of the Java programming language.
2. Use the Java programming language for various programming technologies.
3. Develop software in the Java programming language.
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.
5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem.

### UNIT I

**18 hours**

Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The this keyword – Garbage Collection – Overloading Methods – Call by value, Call by reference – Recursion – Understanding static – final. Inheritance: Inheritance Basics – Using super – Method overriding – **#Dynamic Method Dispatch #**- Using Abstract Classes

### UNIT II

**18 hours**

Packages and Interfaces: Declaring Packages – Access Protection – Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types – try, catch – throw – throws – finally – Creating User-defined Exceptions. Multithreaded Programming: The Java Thread Model – Creating a Thread – Thread Priorities - String Handling.

### UNIT III

**18 hours**

The Collection Interfaces and Utility Classes: ArrayList, LinkedList, Vector, Stack, and Date classes. Files and IO Streams: File – The Byte Streams: DataInputStream – DataOutputStream-FileInputStream – FileOutputStream – SequenceInputStream – PrintStream. **# The Character Streams: FileReader – FileWriter #**– Serialization.

### UNIT IV

**18 hours**

Networking: Introduction-Networks Domain Names and Protocols - Ports-Transmission Control Protocol-UDP Approach. Java Database Connectivity: Establishing a connection – **# Creation of data tables – Entering data into table – Table Updating #** – Use of PreparedStatement – Obtaining metadata.

### UNIT V

**18hours**

Event Handling: Event Model – Event Classes – Event Listeners and Interfaces. Swing Component classes: Icons and JLabels - JText Fields – JButtons -JCheckBoxes – JRadioButtons - JComboBoxes.

### # ..... # Self-study portion

#### Text Book:

1. Herbert Schildt, The Complete Reference Java 2, Fifth Edition, TMH Education Pvt. Ltd.

**UNIT I** : Chapter 6, 7, 8

**UNIT II** : Chapter 9, 10, 11

**UNIT III** : Chapter 15, 17

**UNIT V** : Chapter 20, 26

2. C. Muthu, Programming with Java, Vijay Nicole imprints Private Limited, 2004.

**UNIT IV**: Chapter 15, 18

#### Books for References:

1. Herbert Schildt with Joe O’ Neil, Java –Programmer’s Reference, TMH.

#### Web Reference:

<https://www.programiz.com/java-programming>

<https://www.javatpoint.com/java-tutorial>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester   | Code                     |     | Title of the Course |     |     | Hours                              |      |      | Credits |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|------|---------|------|
| II   | 20PIT2CC5                |     | JAVA PROGRAMMING    |     |     | 6                                  |      |      | 5       |      |
| Course Outcomes (COs)                              | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |      |         |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3 | PSO4    | PSO5 |
| CO1  | ✓                        | ✓   | ✓                   |     | ✓   | ✓                                  |      |      | ✓       | ✓    |
| CO2  | ✓                        |     | ✓                   | ✓   | ✓   | ✓                                  |      | ✓    | ✓       |      |
| CO3  |                          | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓    |         |      |
| CO4  |                          | ✓   |                     | ✓   | ✓   |                                    | ✓    | ✓    | ✓       | ✓    |
| CO5  |                          | ✓   |                     | ✓   | ✓   |                                    | ✓    |      |         | ✓    |
| Number of matches (✓) = 33, Relationship: Moderate |                          |     |                     |     |     |                                    |      |      |         |      |

Prepared by:

1. M. Kamal

Checked by:

1. Dr. S. Vaaheetha Kfatheen

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |



| Semester | Code      | Course    | Title of the Course  | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|-----------|----------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2CC6 | Core – VI | MOBILE COMMUNICATION | 6     | 5       | 100        | 25             | 75             |

#### Course Outcomes (COs):

##### Students will be able to

1. Able to recognise about mobile communications and distinguish various medium access protocols.
2. Justify the current requirements for satellite systems.
3. Apply knowledge of wireless LAN systems and utilization of 802.11 systems.
4. Impart the knowledge of mobile networks.
5. Interpolate with TCP over 3G networks and inferred with spectrum technology.

#### UNIT I

**18 hours**

Mobile Computing – Dialog Control – Networks – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Standard Bodies – Players in Wireless Space. Mobile Computing Architecture: Architecture for Mobile Computing – **# Three Tier Architecture #**– Design Considerations for Mobile Computing

#### UNIT II

**18 hours**

Mobile Computing Through Telephony: Evolution of Telephony - Multiple Access Procedure –Mobile Computing Through Telephone - Voice XML - TAPI – Emerging Technologies: Bluetooth – RFID –**# Mobile IP – IPV6 #**.

#### UNIT III

**18 hours**

GSM: Global System for Mobile Communications – GSM Architecture – GSM Entities – Call Routing in GSM – Network Aspects in GSM. SMS: Mobile Computing Over SMS – SMS – Value Added Services through SMS.

#### UNIT IV

**18 hours**

GPRS: GPRS and Packet Data Network – GPRS Network Architecture – Data Services in GPRS – Billing and Charging in GPRS. WAP: Evolution of Wireless Data and WAP – **# GPRS Applications #**.

#### UNIT V

**18 hours**

CDMA and 3G: Introduction – Spread Spectrum Technology – Direct Sequence Spread Spectrum (DSSS) – IS-95: IS 95 Architecture – IS 95 Authentication and Security – IS 95 Handoff and Roaming. CDMA versus GSM. Wireless LAN: Introduction – Wireless Advantages – Wireless LAN Architecture: Types of Wireless LAN – Mobility in Wireless LAN – **# Wireless LAN Security #**.

#### # ..... # Self-study portion

#### Text Book:

Mobile Computing – Asoke K Talukder, RoopaRYavagal, Tata MC Graw Hill Publishing

**UNIT I** : Chapter 1 &2 (1.3 to 1.8,1.11 to 1.12, 2.4 to 2.6)

**UNIT II** : Chapter 3& 4 (3.1 to 3.2,3.4,3.6,3.7,4.2 to4.3,4.5 to 4.6)

**UNIT III** : Chapter 5&6 (5.1 to 5.4,5.7,6.1 to 6.3)

**UNIT IV**: Chapter 7 (7.2, 7.3, 7.5, 7.8) Chapter 8 (8.1.1, 8.4)

**UNIT V** : Chapter 9 (9.1, 9.2.1, 9.3.2, 9.3.5, 9.3.6, 9.4) Chapter 10 (10.1, 10.2, 10.4.1, 10.5, 10.8)

#### Books for References:

T.G. Palanivelu, R.Nakkeeran, Wireless and Mobile Communication, PHI Learning Private Limited, New Delhi, 2009

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester   | Code                     | Title of the Course  |     |     |     | Hours                              | Credits |      |      |      |
|--|--------------------------|----------------------|-----|-----|-----|------------------------------------|---------|------|------|------|
| II   | 20PIT2CC6                | MOBILE COMMUNICATION |     |     |     | 6                                  | 5       |      |      |      |
| Course Outcomes (COs)                              | Programme Outcomes (POs) |                      |     |     |     | Programme Specific Outcomes (PSOs) |         |      |      |      |
|  | PO1                      | PO2                  | PO3 | PO4 | PO5 | PSO1                               | PSO2    | PSO3 | PSO4 | PSO5 |
| CO1  | ✓                        |                      |     | ✓   |     | ✓                                  |         |      |      |      |
| CO2  | ✓                        | ✓                    |     | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    |      |
| CO3  | ✓                        | ✓                    | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    |      |
| CO4  | ✓                        |                      |     | ✓   |     | ✓                                  |         |      |      |      |
| CO5  | ✓                        | ✓                    | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| Number of matches (✓) = 33, Relationship: Moderate |                          |                      |     |     |     |                                    |         |      |      |      |

Prepared by:

1. B. Diana

Checked by:

1. Dr. S. Vaaheetha Kfatheen

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code      | Course     | Title of the Course            | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|------------|--------------------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2CC7 | Core – VII | DATA SCIENCE AND R PROGRAMMING | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand Data Science Process, Statistical Inference, New kinds of Data, Exploratory Data Analysis.
2. Gain basic notions of Model building, Evaluation Metrics formulas, Concepts of Data Engineering and Next-Gen Data Scientists.
3. Fetch insights behind R Programming for Data Science
4. Understand basic statistics and execute Data visualization method via R packages.
5. Implement and apply Data Analysis Techniques (Regression, Clustering, and Classification) via R Packages to build a Machine Learning model.

### UNIT I: Introduction to Data Science

18 hours

Introduction: Big Data and Data Science Hype – Getting past the hype –Datafication – The Current Landscape (Little History): Data Science Jobs - Data Science Profile – What is a Data Scientist, Really – In Academia – In Industry – Statistical Thinking in the age of Big Data – Statistical Inference – New kinds of data - Exploratory Data Analysis (EDA): Basic tools of EDA - Philosophy of exploratory data analysis – Data Science Process: Data Scientist’s Role in this process – Connection to scientific method. Data Science and Risk – About Square – The Risk Challenge (Risk Engine) – Trouble with Performance Estimation: Define error metric – Defining the labels –# **Challenges in features and learning #.**

### UNIT II: Model Building, Evaluation & Data Engineering

18 hours

Model Building Tips (Good Guidelines): Code readability and reusability – Productionizing Machine Learning models – Data Leakage: Market predictions – How to avoid leakage - Evaluating models: Accuracy – Probabilities matter, Not 0’s and 1’s. – Data Engineering: MapReduce – Enter MapReduce – Other examples of MapReduce – What can’t MapReduce Do? – Pregel – Hadoop: Brief Introduction to Hadoop – Cloudera – How to get started with Hadoop Next-Generation Data Scientists: Data Science Again –Next-Gen Data Scientists: Being a Problem Solvers – Cultivating Soft Skills –# **Being Question Askers – Being an Ethical Data Scientist #.**

### UNIT III:

18 hours

Introduction to R: Using R – Working with R – Packages – Batch Processing – Using output as input – Working with large datasets – Working through an example – Creating a dataset: Understanding datasets – Data structures in R: Vectors - Matrices – Arrays – Data frames – Factors – Lists – Data Input: Entering data from keyboard – Importing data from delimited text – Importing data from Excel –# **Importing data from XML #.**

### UNIT IV: Basic Statistics and Visualizations in R

18hours

Discriptive Statistics: Via *summary()* – *sapply()* – *describe()* – *stat.desc()* – by group using *aggregate()* – *by group using by()*.

Data Visualization (Plotting): Packages – Scatter plots - Bar Charts & Plots - R Graphics:#**Packages - The ggplot2 package – Maps #.**

### UNIT V: Data Analysis via R Packages

18 hours

Regression Analysis: Packages – Simple Regression – Clustering: Packages – k-means clustering – Machine Learning in Action (Classification): Packages – Train methods (Decision Tree – Neural Networks –# **Random Forests #).**

### # ..... # Self-study portion

#### Text Book:

1. RachellSchutt& Cathy O’Neil, “Doing Data Science – Straight Talk from the Frontline”, O’Reilly Media Inc., 2014, ISBN: 978-1-449-35865-5.

**UNIT I** : Chapter 1, 2 & 9

**UNIT II** : Chapter 9, 13, 14

2. Robert I Kabacoff, “R in Action - Data Analysis and Graphics with R”, Manning Publications Co., 2011, ISBN: 9781935182399.

**UNIT III** : Chapter 1 & 2

**UNIT IV:** Chapter 7 & 8

3. Dan Toomy, “R for Data Science – Learn and Explore the Fundamentals of Data Science with R”, Packt Publishing Ltd., 2014, ISBN: 978-1-78439-086-0.

**Books for References:**

1. Roger D. Peng, "R Programming for Data Science", Leanpub, 2014.
2. Hadley Wickham, Garrett Golemund, " R for Data Science – Import-Tidy-Transform-Visualize and Model Data", O'Reilly Media Inc., 2017, ISBN: 978-1-491-91039-9
3. Richard Cotton, "Learning R – A Step by step Function Guide to Data Analysis", O'Reilly Media Inc., 2013, ISBN: 978-1-449-35710-8.
4. Garrett Golemund, "Hands-on Programming With R – Write your own functions and Simulations", O'Reilly Media Inc., 2014, ISBN: 978-1-449-35901-0.
5. Joel Grus, "Data Science from Scratch – First Principles with Python", O'Reilly Media Inc., 2015, 978-1-491-90142-7.
6. NimaZumel, John Mount, "Practical Data Science with R", Manning Publications, 2014. ISBN 9781617291562.
7. Avrim Blum, John Hopcraft, RavindranKannan, "Foundations of Data Science", January 2018.
8. W.N. Vennables, D.M. Smith and R Core Team, "An Introduction to R", Manual for R, version 3.6.1, 2019.

**Web Reference:**

[www.r-project.org](http://www.r-project.org)  
[www.cran.r-project.org](http://www.cran.r-project.org)  
<https://www.rstudio.com>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     | Title of the Course            |     |     |     | Hours                              | Credits |      |      |      |
|--|--------------------------|--------------------------------|-----|-----|-----|------------------------------------|---------|------|------|------|
| II   | 20PIT2CC7                | DATA SCIENCE AND R PROGRAMMING |     |     |     | 6                                  | 4       |      |      |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |                                |     |     |     | Programme Specific Outcomes (PSOs) |         |      |      |      |
|  | PO1                      | PO2                            | PO3 | PO4 | PO5 | PSO1                               | PSO2    | PSO3 | PSO4 | PSO5 |
| CO1  | ✓                        |                                |     | ✓   | ✓   | ✓                                  |         | ✓    |      |      |
| CO2  | ✓                        |                                |     | ✓   | ✓   | ✓                                  |         | ✓    |      |      |
| CO3  | ✓                        | ✓                              | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| CO4  | ✓                        | ✓                              | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| CO5  | ✓                        | ✓                              | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| Number of matches (✓) = 40, Relationship: High |                          |                                |     |     |     |                                    |         |      |      |      |

Prepared by:

Checked by:

1. Dr. M. Sabibullah

1. Dr. K. Nafees Ahmed

2. Dr. S. Vaaheetha Kfatheen

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code        | Course        | Title of the Course  | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-------------|---------------|----------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2CC8P1 | Core – VIII A | JAVA PROGRAMMING LAB | 3     | 2       | 50         | 10             | 40             |

Develop a program in Java

1. To create class and object to prepare student report using NetBeans.
2. To implement inheritance to find area & perimeter of a rectangle using NetBeans.
3. To create abstract class Department with abstract method calcBonus(double salary) and normal method dispTotSalary(string dept). Define classes Accounts and Sales which extends Department and contains calcBonus() with its own implementation.
4. To implement multilevel inheritance by applying various access controls to its data members and methods.
5. To create two threads. First thread displays a message for every one second, the second thread displays a message for every two seconds.
6. To create thread using Runnable interface to compute and display factorials of first five natural numbers.
7. To arrange the given names in alphabetical order and to display the all the names in reverse order.
8. To demonstrate various Vector operations using NetBeans.
9. To print the contents of ArrayList in reverse order using NetBeans.
10. To display the file properties of a given file or directory using NetBeans.
11. To merge the two files using SequenceInputStream using NetBeans.
13. To find the local machine and Host IP address using NetBeans.
14. To send a text from one system to another using TCP/IP Sockets using NetBeans.
15. To prepare invoice using swing controls and to store the details in database using JDBC.
16. To make use of Swing controls to create three buttons Red, Green and Blue. Using ActionEvent class set background by applying color on button click.

Prepared by:

1. M. Kamal

Checked by:

1. Dr. S. Vaaheetha Kfatheen

| Semester | Code        | Course        | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-------------|---------------|---------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2CC8P2 | Core – VIII B | R PROGRAMMING LAB   | 3     | 2       | 50         | 10             | 40             |

1. Installing R and R Studio
2. Applying Simple Commands in R
3. R as a Calculator application
4. Execution of Loops and Functions via R - Control Structures
5. Basic Descriptive Statistics using *summary()* – *sapply()* – *describe()* – *stat.desc()* – by group using *aggregate()* in R
6. Reading and writing different types of Datasets in R
7. Visualizations: Visualize various Plotting and Graphics in R
8. Regression: Perform Simple Regression using R Package
9. Clustering: Apply k-means by using R Package
10. Classification: Use Random Forest / Naïve Bayes / NN by using R Package

Prepared by:

1. Dr. M. Sabibullah
2. Dr. S. VaaheethaKfatheen

Checked by:

1. Dr. K. Nafees Ahmed

| Semester | Code       | Course   | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|----------|---------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2DE2A | DSE - II | SEMANTIC WEB        | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand the semantic web
2. Analyze the notions for description logic and precisely define reasoning techniques.
3. Learn the web ontology language that helps in understanding classes and properties.
4. Implement the semantic web service in real time applications.
5. Gain knowledge on ontology libraries that is relevant to indexing of resources in the semantic web.

### UNIT I

18 hours

Future of internet: Introduction – The syntactic web- The semantic web- Working of semantic web -What the semantic web is not. Ontology in computer science: Defining the term ontology-Classifying the Ontologies-Web Ontology Description Languages-# **Ontologies, categories and intelligence** #.

### UNIT II

18 hours

Knowledge representation in description logic: Introduction – Informal Examples Inference problems. RDF and RDF schema: introduction – # **XML essentials** #- RDF- RDF schema

### UNIT III

18 hours

OWL: Introduction – Requirement for web ontology description languages-Header information, versioning , annotation properties-Properties – # **Classes- Individuals – Data types** #- A summary of OWL vocabulary. Rule languages: introduction – Usage scenarios for rule languages- ruleML- SWRL-TRIPLE.

### UNIT IV

18 hours

Semantic web services: Introduction –Web service essentials- OWL-S service ontology- An OWL-S example-scenario description – Informal process definition – OWL-S process definition. Methods for ontology development: Introduction – uschold and king ontology development method- Methontology.

### UNIT V

18 hours

Ontology sources: introduction- Meta data Definition –Dublin core – Warwick framework-Upper ontologies: SUMO-KR Ontology-word net. Semantic web software tools: Introduction- Metadata and ontology editors.

### # ..... # Self-study portion

#### Text Book:

Karin K. Breitman, Macro Antonio Casanova,WalterTruszkowski, Semantic Web, Springer International Edition.

**UNIT I** : Chapter 1.1-1.5, 2.1, 2.3-2.5

**UNIT II** : Chapter 3.1, 3.2-3.4, 4.1-4.4

**UNIT III** : Chapter 5.1-5.8, 6.1-6.2, 6.4-6.6

**UNIT IV** : Chapter 7.1-7.4 (7.4.1-7.4.2), 8.1, 8.2, 8.4

**UNIT V** : Chapter 9.1-9.2 (9.2.1-9.2.3), 9.3.1-9.3.2, 9.3.4, 10.1-10.2

#### Books for References:

Semantic Web Services Processes And Application (Sie) by Cardoso J, Springer Exclusive (Cbs), 2004

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester   | Code                     | Title of the Course |     |     |     | Hours                              | Credits |      |      |      |
|--|--------------------------|---------------------|-----|-----|-----|------------------------------------|---------|------|------|------|
| II   | 20PIT2DE2A               | SEMANTIC WEB        |     |     |     | 6                                  | 4       |      |      |      |
| Course Outcomes (COs)                              | Programme Outcomes (POs) |                     |     |     |     | Programme Specific Outcomes (PSOs) |         |      |      |      |
|  | PO1                      | PO2                 | PO3 | PO4 | PO5 | PSO1                               | PSO2    | PSO3 | PSO4 | PSO5 |
| CO1  | ✓                        |                     |     | ✓   | ✓   | ✓                                  |         |      |      |      |
| CO2  | ✓                        |                     |     | ✓   | ✓   | ✓                                  |         |      |      |      |
| CO3  | ✓                        |                     |     | ✓   | ✓   | ✓                                  |         |      |      |      |
| CO4  | ✓                        | ✓                   | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| CO5  | ✓                        | ✓                   | ✓   | ✓   | ✓   | ✓                                  | ✓       | ✓    | ✓    | ✓    |
| Number of matches (✓) = 32, Relationship: Moderate |                          |                     |     |     |     |                                    |         |      |      |      |

Prepared by:

1. Mozibur Raheman Khan

Checked by:

1. Dr. S. Vaaheetha Kfatheen

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |



| Semester | Code       | Course   | Title of the Course               | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|----------|-----------------------------------|-------|---------|------------|----------------|----------------|
| II       | 20PIT2DE2B | DSE - II | CRYPTOGRAPHY AND NETWORK SECURITY | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand cryptography and network security concepts and applications
2. Apply security policy in system design
3. Analyse network security protocols
4. Identify a network security threat
5. Design the code to implement the cryptographic algorithm

### UNIT I

**18 hours**

Overview: Computer Security Concepts- The OSI Security Architecture -Security Attacks -Security Services - Security Mechanisms - A Model for Network Security - Classical Encryption Techniques: Symmetric Cipher Model - # Substitution Techniques # -Transposition Techniques - Steganography

### UNIT II

**18hours**

Block Ciphers and the Data Encryption Standard: Block Cipher Principles - The Data Encryption Standard - A DES Example - The Strength of DES - Differential and Linear Cryptanalysis - Block Cipher Design Principles - Advanced Encryption Standard - AES Structure - AES Transformation Functions - AES Key Expansion -An AES Example

### UNIT III

**18hours**

Block Cipher Operation: Multiple Encryption and Triple DES - Electronic Code Book - Cipher Block Chaining Mode. Public-key Cryptography and RSA: Principles of Public-key Cryptosystems - # The RSA Algorithm #. Other Public-Key Cryptosystems: Diffie-Hellman Key Exchange.

### UNIT IV

**18hours**

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions - Two Simple Hash Functions - Requirements and Security - Hash Functions Based on Cipher Block chaining - Secure-Hash Algorithm (SHA) - SHA-3. Message Authentication Codes: Message Authentication Requirements - # Message Authentication Functions # - Requirements for Message Authentication Codes

### UNIT V

**18hours**

Digital Signatures: Digital Signatures. Key Management and Distribution: Symmetric Key Distribution using Symmetric Encryption - Symmetric Key Distribution using Asymmetric Encryption - Distribution of Public keys - X.509 Certificates - Public-Key Infrastructure - User Authentication: Kereberos.

### # ..... # Self-study portion

#### Text Book:

William Stallings, "Cryptography and Network Security Principles and Practice", Fifth Edition, Pearson Education Inc, First Impression 2011.

**UNIT I** : Chapter 1: 1.1 - 1.6 & Chapter 2: 2.1 – 2.3, 2.5

**UNIT II** : Chapter 3: 3.1 - 3.6 & Chapter 5: 5.2 - 5.5

**UNIT III** : Chapter 6: 6.1 - 6.3, Chapter 9: 9.1 - 9.2 & Chapter 10: 10.1

**UNIT IV** : Chapter 11: 11.1 - 11.6 & Chapter 12: 12.1 - 12.3

**UNIT V** : Chapter 13: 13.1, Chapter 14: 14.1 to 14.5 & Chapter 15: 15.3

#### Books for References:

1. William Stallings, "Network Security Essentials Applications and Standards", Third Edition, Pearson Education Inc, Fifth Impression 2011
2. Behrouz A. Ferouzan, Cryptography and Network Security", Tata McGraw Hill, 2007

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester   | Code                     | Title of the Course               |     |     |     | Hours                              | Credits |      |      |      |
|--|--------------------------|-----------------------------------|-----|-----|-----|------------------------------------|---------|------|------|------|
| II   | 20PIT2DE2B               | CRYPTOGRAPHY AND NETWORK SECURITY |     |     |     | 6                                  | 4       |      |      |      |
| Course Outcomes (COs)                              | Programme Outcomes (POs) |                                   |     |     |     | Programme Specific Outcomes (PSOs) |         |      |      |      |
|  | PO1                      | PO2                               | PO3 | PO4 | PO5 | PSO1                               | PSO2    | PSO3 | PSO4 | PSO5 |
| CO1  | ✓                        | ✓                                 |     | ✓   | ✓   |                                    | ✓       |      | ✓    | ✓    |
| CO2  | ✓                        |                                   | ✓   |     | ✓   | ✓                                  | ✓       | ✓    |      |      |
| CO3  | ✓                        | ✓                                 | ✓   | ✓   | ✓   | ✓                                  |         | ✓    | ✓    | ✓    |
| CO4  |                          | ✓                                 | ✓   | ✓   | ✓   |                                    | ✓       |      | ✓    | ✓    |
| CO5  |                          |                                   |     | ✓   | ✓   |                                    |         | ✓    |      | ✓    |
| Number of matches (✓) = 33, Relationship: Moderate |                          |                                   |     |     |     |                                    |         |      |      |      |

Prepared by:

1. M. Kamal
2. Dr. M. Sabibullah

Checked by:

1. Dr. S. Vaaheetha Kfatheen

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very poor | Poor   | Moderate | High   | Very high |

| Semester | Code      | Course   | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|----------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3CC9 | CORE– IX | SOFTWARE TESTING    | 6     | 5       | 100        | 25             | 75             |

### Course Outcome (COs):

#### Students will be able to

1. Study the fundamental concepts in software testing
2. Discuss various software testing issues and solutions in software unit test, integration and performance testing
3. Expose the advanced software testing topics, such as Internationalization testing
4. Understand the concepts of automation
5. Implement the various test concepts

#### UNIT I

**18 hours**

Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - White Box Testing: What is White Box Testing? – Static Testing – #Structural Testing# – Challenges - Black Box Testing: What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

#### UNIT II

**18 hours**

Integration Testing: What is Integration Testing? – Integration testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - System and Acceptance Testing: Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – #Non Functional Testing# – Acceptance Testing – Summary of Testing Phases

#### UNIT III

**18 hours**

Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - Regression Testing: – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – #Best Practices in Regression Testing#.

#### UNIT IV

**18 hours**

**Internationalization Testing:** Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – Ad hoc Testing: - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: - What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – #Accessibility Testing# – Tools – Lab Setup – Test Roles

#### UNIT V

**18 hours**

Test Planning, Management, Execution and Reporting: Test Planning -Test Management – Test Process – Test Reporting – Best Practices - Software Test Automation: What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – #Challenges in Automation#.

### #.....# Self-study portion

#### Text Book:

Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing – Principle & Practices, Pearson Education, New Delhi, 2006.

**UNIT I** : Chapter 2: 2.1 – 2.5, Chapter 3: 3.1 – 3.4 & Chapter 4: 4.1 – 4.4

**UNIT II** : Chapter 5: 5.1 – 5.5, Chapter 6: 6.1 – 6.7

**UNIT III** : Chapter 7: 7.2 – 7.5 & Chapter 8: 8.1 – 8.5

**UNIT IV** : Chapter 9: 9.2 – 9.6, 9.8 – 9.11, Chapter 10: 10.1 – 10.7 & Chapter 12: 12.1 – 12.10

**UNIT V** : Chapter 15: 15.2 – 15.6, Chapter 16: 16.1 – 16.10

**Books for References:**

1. Ron Patton, *"Software Testing"*, 2nd Edition, Pearson Education, New Delhi, 2006.
2. William E. Perry, *"Effective Methods for Software Testing"*, 3rd Ed., Wiley India, 2006.
3. Renu Rajani, Pradeep Oak, *"Software Testing – Effective Methods, Tools and Techniques"*, TMH Publishing Company Limited, New Delhi, 2004.

**Web references**

[https://www.tutorialspoint.com/software\\_testing](https://www.tutorialspoint.com/software_testing)

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     | Hours                              |      | Credits |      |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|---------|------|------|
| III  | 20PIT3CC9                |     | SOFTWARE TESTING    |     |     | 6                                  |      | 5       |      |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |         |      |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3    | PSO4 | PSO5 |
| CO1  | ✓                        | ✓   | ✓                   | ✓   |     | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO2  | ✓                        | ✓   |                     |     | ✓   | ✓                                  | ✓    |         | ✓    |      |
| CO3  | ✓                        | ✓   | ✓                   | ✓   |     | ✓                                  | ✓    | ✓       | ✓    |      |
| CO4  | ✓                        | ✓   |                     | ✓   | ✓   | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO5  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| Number of matches (✓) = 42, Relationship: High |                          |     |                     |     |     |                                    |      |         |      |      |

**Prepared by:**

Mr.S. Peer Basha

**Checked by:**

Mr. M. Kamal

**Note:**

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |

| Semester | Code       | Course  | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|---------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3CC10 | CORE– X | WEB SERVICES        | 6     | 5       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Understand the difference between a web service and web application
2. Explain the basic flow of data and the responsibilities for web service consumption
3. Describe the formats for requests to and responses from a web service that uses a SOAP interface
4. Describe the formats for requests to and responses from a web service that uses a WSDL
5. Identify and describe the responsibilities for the design patterns that are appropriate for the design of a subsystem consuming a web service

#### UNIT I

**18 hours**

Evolution and Emergence of web services: What is distributed computing? – Importance of distributed computing – Client-Server applications – CORBA – Java RMI – DCOM – Message oriented middleware – The Role of J2EE and XML in distributed computing – Emergence of web services – Introduction to web services: What are web services? – Motivation and Characteristics – Why use web services? – Basic Operational model of web services – CORE Web services standards – #Key Benefits of web services#

#### UNIT II

**18 hours**

Web services architecture and technologies: Web services architecture and its CORE building blocks –Tools of the Trade: SOAP – WSDL – UDDI – Implementing web services – Developing web services enabled applications – Developing Web services using SOAP – XML based protocols and SOAP – Anatomy of a SOAP message – SOAP encoding – #Building SOAP web services#

#### UNIT III

**18 hours**

Description and discovery of web services – Web Services Description Language – WSDL in the world of web services – Anatomy of a WSDL definition document – WSDL bindings – WSDL tools – Future of WSDL – Limitations of WSDL – Universal Description, Discovery and Integration (UDDI) – #UDDI registries# – Programming with UDDI – Inquiry API – Publishing API – Implementations of UDDI – Limitations of UDDI

#### UNIT IV

**18 hours**

Exploring Java Web services developer pack – Introduction to the Java Web Services Developer Pack – Java Web Services Developer Pack – Java XML Pack – Java APIs for XML – Java WSDP registry server – ANT Build tool – Downloading the web services pack – XML processing and data binding with Java APIs – XML Basics – Java API for XML Processing – JAXP – uses for JAXP – JAXP API model – #Java Architecture for XML Binding#

#### UNIT V

**18 hours**

Security in Web Services: Web Services Security – Challenges of securing web services – #XML encryption# – XML signatures – Security Assertions Markup Language – XML access control markup language

#### #.....# Self-study portion

#### Text Book:

Ramesh Nagappan, Robert Skoczylas, Rima Patel Sriganesh, “*Developing Java Web Services*”, Wiley Publication, 2006

**UNIT I** : Chapter 1, 2

**UNIT II** : Chapter 3, 4

**UNIT III** : Chapter 5

**UNIT IV** : Chapter 7, 8

**UNIT V** : Chapter 13

#### Books for Reference:

Sandeep Chatterjee, James Webber, *Developing Enterprise Web Services*, An Architect’s Guide, Pearson Education, Second Indian Reprint 2005.

**Web Reference:**

<https://www.webagesolutions.com/courses/WA2012-programming-java-soap-and-rest-web-services-jboss-eclipse>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     |                                    | Hours |      | Credits |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|-------|------|---------|------|
| III  | 20PIT3CC10               |     | WEB SERVICES        |     |     |                                    | 6     |      | 5       |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |       |      |         |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2  | PSO3 | PSO4    | PSO5 |
| CO1  | ✓                        | ✓   | ✓                   | ✓   |     | ✓                                  | ✓     | ✓    | ✓       | ✓    |
| CO2  | ✓                        | ✓   |                     |     | ✓   | ✓                                  | ✓     |      | ✓       |      |
| CO3  | ✓                        | ✓   | ✓                   | ✓   |     | ✓                                  | ✓     | ✓    | ✓       |      |
| CO4  | ✓                        | ✓   |                     | ✓   | ✓   | ✓                                  | ✓     | ✓    | ✓       | ✓    |
| CO5  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓     | ✓    | ✓       | ✓    |
| Number of matches (✓) = 42, Relationship: High |                          |     |                     |     |     |                                    |       |      |         |      |

**Prepared by:**

Mr. M. Kamal

**Checked by:**

Mr. O. S. Abdul Qadir

**Note:**

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |

| Semester | Code       | Course   | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|----------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3CC11 | CORE– XI | INTERNET OF THINGS  | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Recognize the underlying concepts of Internet of Things
2. Identify the various IoT enabling technologies and comprehend the idea of M2M
3. Apply the concept of IoT in real world scenarios
4. Describe the IoT design methodology and IoT devices
5. Implement IoT applications using Python packages

#### UNIT I

**18 hours**

Introduction: Definition and Characteristics of IoT - Things in IoT - IoT Protocols - IoT Functional Blocks - IoT Communication Models - IoT Communication APIs

#### UNIT II

**18 hours**

IoT Enabling Technologies: Wireless Sensor Networks - Cloud Computing- #Big Data Analytics# -Communication Protocols - Embedded System. IoT & M2M: Machine to Machine-Difference between IoT and M2M-SDN and NFV for IoT

#### UNIT III

**16 hours**

Domain Specific IoTs: Home Automation-Cities-Environment - Retail-Logistics- #Agriculture# -Industry-Health & Lifestyle.

#### UNIT IV

**18 hours**

Developing IoTs: IoT Design Methodology. IoT Physical Devices & Endpoints: What is an IoT Device-Exemplary Device: Raspberry Pi-Linux on Raspberry Pi-Other IoT Devices.

#### UNIT V

**18 hours**

Python Packages of Interest for IoT: JSON-XML - HTTPLib & URLLib - SMTPLib. Case Studies: Home Automation-#Productivity Applications#.

### #.....# Self-study portion

#### Text Books:

1. Arshdeep Bahga and Vijay Madisetti, *"Internet of Things: A Hands-On Approach"*, Universities Press (India) Private Limited, 1<sup>st</sup> Edition, 2015.

**UNIT I** : Chapter 1(1.1.1, 1.2.1, 1.2.2, 1.3.1, 1.3.2, 1.3.3)

**UNIT II** : Chapter 1(1.4) & Chapter 3(3.1,3.2,3.3,3.4)

**UNIT III** : Chapter 2(2.2, 2.3, 2.4, 2.6, 2.7, 2.8, 2.9 2.10)

**UNIT IV** : Chapter 5(5.1, 5.2) & Chapter 7(7.1, 7.2, 7.4, 7.7)

**UNIT V** : Chapter 6.11 & Chapter 9(9.2, 9.6)

#### Books for Reference:

1. Cuno Pfister, *"Getting started with the internet of things"*, O'Reilly Publication, 2011

#### Web References:

1. <http://www.internet-of-things-book.com>
2. [https://www.tutorialspoint.com/internet\\_of\\_things/index.htm](https://www.tutorialspoint.com/internet_of_things/index.htm)
3. <https://data-flair.training/blogs/iot-tutorial>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester  | Code                     | Title of the Course |     |     |     |                                    | Hours |      | Credits |      |
|---|--------------------------|---------------------|-----|-----|-----|------------------------------------|-------|------|---------|------|
| III   | 20PIT3CC11               | INTERNET OF THINGS  |     |     |     |                                    | 6     |      | 4       |      |
| Course Outcomes<br>COs                                  | Programme Outcomes (POs) |                     |     |     |     | Programme Specific Outcomes (PSOs) |       |      |         |      |
|   | PO1                      | PO2                 | PO3 | PO4 | PO5 | PSO1                               | PSO2  | PSO3 | PSO4    | PSO5 |
| CO1   | ✓                        |                     | ✓   |     |     | ✓                                  |       |      | ✓       | ✓    |
| CO2   | ✓                        | ✓                   | ✓   |     |     | ✓                                  | ✓     | ✓    | ✓       | ✓    |
| CO3   | ✓                        | ✓                   | ✓   | ✓   |     |                                    | ✓     | ✓    |         | ✓    |
| CO4   |                          | ✓                   | ✓   | ✓   |     |                                    |       | ✓    | ✓       |      |
| CO5   | ✓                        |                     |     |     | ✓   |                                    |       | ✓    | ✓       | ✓    |
| Number of matches (✓) = 30,      Relationship: Moderate |                          |                     |     |     |     |                                    |       |      |         |      |

**Prepared by:**

Dr. K. Nafees Ahamed

**Checked by:**

Mr. O. S. Abdul Qadir

**Note:**

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |



| Semester | Code         | Course      | Title of the Course  | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|--------------|-------------|----------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3CC12P1 | Core– XII A | SOFTWARE TESTING LAB | 3     | 2       | 50         | 10             | 40             |

1. Installation of Automation testing tools
2. Using Selenium IDE, Write a test suite containing minimum three test cases
3. Conduct a test suite for any two web sites
4. Install Selenium server and demonstrate it using a script in Java / PHP
5. Write and test a program to login a specific web page
6. Write and test a program to update 10 student records in a table into Excel file
7. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects)
8. Write and test a program to provide total number of objects present / available on the page
9. Write and test a program to get the number of list items in a list / combo box
10. Write and test a program to count the number of check boxes on the page checked and unchecked count

**Prepared by:**

Mr. S. Peerbasha

**Checked by:**

Mr. M. Kamal

| Semester | Code         | Course      | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|--------------|-------------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3CC12P2 | Core– XII B | WEB SERVICES LAB    | 3     | 2       | 50         | 10             | 40             |

1. Develop a JAX-WS web service and client for displaying a welcome message
2. Develop a JAX-WS web service for currency conversion / temperature conversion
3. Develop a JAX-WS web service for factorial application
4. Develop a JAX-WS web service Fibonacci application
5. Develop a JAX-WS web service for printing the contents of ArrayList an order
6. Develop a JAX-WS web service for checking whether the input is palindrome or not
7. Develop a JAX-WS web service for designing a simple calculator
8. Develop a JAX-WS web service with database connectivity

**Prepared by:**

Mr. M. Kamal

**Checked by:**

Mr. O. S. Abdul Qadir

| Semester | Code      | Course    | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|-----------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3DE3 | DSE – III | CLOUD COMPUTING     | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing
2. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient
3. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model
4. Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS
5. Analyze various cloud programming models and apply them to solve problems on the cloud

### UNIT I

**18 hours**

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

**18 hours**

Introduction -Cloud Computing at a Glance - Historical Developments - Building Cloud Computing Environments

### UNIT III

**18 hours**

Cloud Computing Architecture: Introduction - Cloud Reference Model Types of Clouds - # Economics of the Cloud # - Open Challenges

### UNIT IV

**18 hours**

Infrastructure as a Service: Virtual Machines provisioning and Migration Services – Introduction and Inspiration Background and Related Work - Virtual Machine Provisioning and manageability – Virtual Machine Migration Services - PLATFORM AND SOFTWARE AS A SERVICE: Aneka – Integration of Private and Public clouds – Introduction Technologies and Tools for Cloud computing – Aneka cloud Platform – # Aneka Resource Provisioning Service #– Hybrid Cloud Implementation

### UNIT V

**18 hours**

SLA Management in Cloud Computing: Inspiration - Traditional Approaches to SLO Management - Types of SLA – Life Cycle of SLA. Resource Cloud Mashups - Introduction - Concepts of a Cloud Mashup - Realizing Resource Mashups. GOVERNANCE AND CASE STUDIES: Data Security in the Cloud – # The current state of data security in the cloud # – Cloud Computing and Data Security Risk`

**#.....# Self-study portion**

**Text Books:**

1. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, “*Mastering Cloud Computing*”, McGraw Hill Education (India) Private Limited Publications, First Reprint, 2013

**UNIT I** - Chapter 2.1 to 2.5**UNIT II**- Chapter 1.1 to 1.3**UNIT III**- Chapter 4.1 to 4.5

2. RajkumarBuyya, James Broberg and Andrzej Goscinski, “*Cloud Computing Principles and Paradigms*”, Wiley Publications, 2013

**UNIT IV** - Chapter 5.1 to 5.4 & Chapter 9.1 to 9.5**UNIT V**- Chapter – 16.1 to 16.4, Chapter 21.1 to 21.3, Chapter 23.2, 23.4**Books for Reference:**

Michael Miller, “*Cloud Computing Web Based Applications that change the way you work and collaborate online*”, Pearson Education, 2009.

**Web Reference**

<https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     | Hours                              |      | Credits |      |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|---------|------|------|
| III  | 20PIT3DE3                |     | CLOUD COMPUTING     |     |     | 6                                  |      | 4       |      |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |         |      |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3    | PSO4 | PSO5 |
| CO1  | ✓                        |     | ✓                   | ✓   | ✓   | ✓                                  |      | ✓       | ✓    |      |
| CO2  | ✓                        | ✓   | ✓                   |     |     |                                    | ✓    | ✓       | ✓    | ✓    |
| CO3  | ✓                        |     |                     | ✓   | ✓   | ✓                                  |      |         | ✓    |      |
| CO4  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO5  |                          | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓       |      | ✓    |
| Number of matches (✓) = 37, Relationship: High |                          |     |                     |     |     |                                    |      |         |      |      |

**Prepared by:**

Dr. Vaaheed Kfhadeen

**Checked by:**

Mr. M. Kamal

**Note:**

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |

| Semester | Code      | Course    | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|-----------|-----------|---------------------|-------|---------|------------|----------------|----------------|
| III      | 20PIT3DE3 | DSE – III | SOFT COMPUTING      | 6     | 4       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. Understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems

#### UNIT I

**18 hours**

Introduction to Soft Computing – Introduction – Artificial Intelligence – Artificial Neural Networks – Fuzzy Systems – Genetic Algorithm and Evolutionary Programming

#### UNIT II

**18 hours**

Artificial Neural Networks - (First Generation) : Introduction to Neural Networks – Classification of ANNs – First-generation Neural Networks

#### UNIT III

**18 hours**

Fuzzy Logic- Introduction to Fuzzy logic – Classical sets and Fuzzy sets – Fuzzy set operations – Fuzzy relations – Fuzzy Composition

#### UNIT IV

**18 hours**

Fuzzy logic Applications – Introduction to Fuzzy logic Applications – Fuzzy controllers – MATLAB implementation of Fuzzy Logic Applications – Hybrid Techniques

#### UNIT V

**18 hours**

Genetic Algorithms and Evolutionary Programming – Introduction to Genetic Algorithms – Genetic Algorithms – Procedures of GAs – Working of GAs – Genetic Algorithms Applications

### #.....# Self-study portion

#### Text Books:

N.P. Padhy and S.P.Simon, *Soft computing with MATLAB Programming*, Oxford University Press, 2015.

**UNIT I** : Chapter 1.1 to 1.5

**UNIT II** : Chapter 2.1, 2.4 & 2.5

**UNIT III** : Chapter 5.1, 5.5, 5.6, 5.7 & 5.8

**UNIT IV** : Chapter 6.1 to 6.4

**UNIT V** : Chapter 7.1 to 7.5

#### Books for Reference

1. S.N. Sivanandam and S.N. Deepa, *Principles of Soft Computing*, Wiley India Pvt. Ltd., 2017
2. I.S.R. Jang, C.T. Sun and E. Mizutani, *Neuro Fuzzy and Soft Computing*, PHI-Pearson Education, 2004

#### Web Reference:

<http://www.soft-computing.de/def.html>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester                                       | Code                     |     | Title of the Course |     |     | Hours                              |      | Credits |      |      |
|--|--------------------------|-----|---------------------|-----|-----|------------------------------------|------|---------|------|------|
| III  | 20PIT3DE3                |     | SOFT COMPUTING      |     |     | 6                                  |      | 4       |      |      |
| Course Outcomes (COs)                          | Programme Outcomes (POs) |     |                     |     |     | Programme Specific Outcomes (PSOs) |      |         |      |      |
|  | PO1                      | PO2 | PO3                 | PO4 | PO5 | PSO1                               | PSO2 | PSO3    | PSO4 | PSO5 |
| CO1  | ✓                        |     | ✓                   | ✓   | ✓   | ✓                                  |      | ✓       | ✓    |      |
| CO2  | ✓                        | ✓   | ✓                   |     |     |                                    | ✓    | ✓       | ✓    | ✓    |
| CO3  | ✓                        |     |                     | ✓   | ✓   | ✓                                  |      |         | ✓    |      |
| CO4  | ✓                        | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO5  |                          | ✓   | ✓                   | ✓   | ✓   | ✓                                  | ✓    | ✓       |      | ✓    |
| Number of matches (✓) = 37, Relationship: High |                          |     |                     |     |     |                                    |      |         |      |      |

**Prepared by:**

Dr. Vaaheedha Kfhadeen

**Checked by:**

Mr. M. Kamal

Note:

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |

| Semester | Code       | Course     | Title of the Course    | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|------------|------------|------------------------|-------|---------|------------|----------------|----------------|
| IV       | 20PIT4CC13 | Core– XIII | OPEN SOURCE TECHNOLOGY | 6     | 5       | 100        | 25             | 75             |

### Course Outcomes (COs):

#### Students will be able to

1. Explore different open source technologies like PHP, MySQL and AngularJS with different packages
2. Gain confidence to create dynamic website on real world problems
3. Able to use the principles of database design in web pages using PHP & MySQL
4. Gain the knowledge of the basic principles of AngularJS
5. Understand the design of single-page applications and how AngularJS facilitates their development

#### UNIT I

**18 hours**

Essential PHP – Creating a first PHP page – More echo power – Using PHP “Here” documents – Working with variables – Creating constants – # Understanding PHP’s internal data types # Operators and Flow control – Working with the Assignment operators – The PHP String operators – Bitwise operator – PHP Comparison operators – PHP Logical operators – Ternary operators – Using if, else, else if statement – Switch statement – Using for, while, do...while, for each loops.

#### UNIT II

**18 hours**

Strings and Arrays – The String functions – Converting to and from strings – Formatting text strings – PHP array functions – Sorting Arrays – Handling Multi dimensional arrays –# Splitting and Merging arrays # – Creating functions in PHP. File Handling – Opening files using fopen – Reading text from a file using fgets – Closing a file – Checking if a file exists with file\_exists – Writing to a file with fwrite

#### UNIT III

**18 hours**

MySQL : Connecting to and disconnecting from the server - MySQL data types - SHOW and CREATE databases - Creating a table- DESCRIBE,INSERT and SELECT command - #DROP tables and databases# Update , Alter and Delete Operations - MySQL access with PHP : Open a connection to the MySQL server - Disconnect a connection from MySQL server - Creating a database using PHP - Selecting MySQL database using PHP - Creating a table using PHP - Insert data into MySQL using PHP

#### UNIT IV

**18 hours**

Introducing AngularJS: Introduction: What is MVC? - Benefits - Philosophy - Starting out with AngularJS: A Basic AngularJS Application - AngularJS Hello World - Basic Angular JS Directives and Controllers: AngularJS Modules - Working with and Displaying arrays - Working with ng-repeat: ng-repeat Over an Object - Helper Variables in ng-repeat - # Track by ID # - ng-repeat Across Multiple HTML Elements.

#### UNIT V

**18 hours**

Forms, Inputs and Services: Working with ng-model – Working with Forms – # Leverage Data Binding and Models # - Form Validation and States – Error Handling with Forms – Other Forms Controls: Textareas – Checkboxes – Radio Buttons – Combo Boxes/Drop-Downs – Working with Filters: What are AngularJS Filters? – Creating AngularJS Filters.

**#.....# Self-study portion**

#### Text Books:

1. Steven Holzner, *The Complete Reference PHP*, Tata McGraw Hill, New Delhi, 2007.

**UNIT I:** Chapters 1 & 2

**UNIT II:** Chapters 3 , 4 & 9

2. HajiramBeevi J, Khairunnisa and MunawaraBanu S,*Primer on PHP*, Yazhini Publication, 1<sup>st</sup> Edition,2016

**UNIT III:** Chapter 8 (8.1-8.9 ), Chapter 9(9.1-9.6)

3. Shyam Seshadri and Brad Green, *AngularJS: Up and Running*, First Edition, Published by O’Reilly Media, Inc., 2014

**UNIT IV :** Chapter 1 & 2

**UNIT V :** Chapter 4 & 8

**Books for Reference:**

M.N. Rao , Fundamentals of Open Source Software, PHI Learning Private Ltd., Delhi, 2015

**Web References:**

<https://www.w3schools.com/angular/>

<https://www.tutorialspoint.com/angularjs/index.htm>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

| Semester  | Code                     |     | Title of the Course    |     |     | Hours                              |      | Credits |      |      |
|---|--------------------------|-----|------------------------|-----|-----|------------------------------------|------|---------|------|------|
| IV  | 20PIT4C13                |     | OPEN SOURCE TECHNOLOGY |     |     | 6                                  |      | 5       |      |      |
| Course Outcomes COs                                 | Programme Outcomes (POs) |     |                        |     |     | Programme Specific Outcomes (PSOs) |      |         |      |      |
|   | PO1                      | PO2 | PO3                    | PO4 | PO5 | PSO1                               | PSO2 | PSO3    | PSO4 | PSO5 |
| CO1   | ✓                        |     | ✓                      | ✓   |     | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO2   | ✓                        |     | ✓                      |     | ✓   | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| CO3   | ✓                        | ✓   | ✓                      | ✓   | ✓   | ✓                                  | ✓    | ✓       |      | ✓    |
| CO4   |                          |     | ✓                      | ✓   |     | ✓                                  |      | ✓       | ✓    | ✓    |
| CO5   | ✓                        | ✓   | ✓                      | ✓   |     | ✓                                  | ✓    | ✓       | ✓    | ✓    |
| Number of matches (✓) = 40,      Relationship: High |                          |     |                        |     |     |                                    |      |         |      |      |

**Prepared by**

Ms. B. Benazir Butto

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Mr. M. Kamal

**Note:**

|              |           |        |          |        |           |
|--------------|-----------|--------|----------|--------|-----------|
| Mapping      | 1-29%     | 30-59% | 60-69%   | 70-89% | 90-100%   |
| Matches      | 1-14      | 15-29  | 30-34    | 35-44  | 45-50     |
| Relationship | Very Poor | Poor   | Moderate | High   | Very High |



| Semester | Code         | Course     | Title of the Course        | Hour | Credits | Max. Marks | Internal Marks | External Marks |
|----------|--------------|------------|----------------------------|------|---------|------------|----------------|----------------|
| IV       | 20PIT4CC14P1 | Core –XIVA | Open Source Technology Lab | 3    | 3       | 50         | 10             | 40             |

- Write a simple PHP program to :
  - Print Floyd triangle
  - Find the given year is a leap year or not.
  - Print Fibonacci series of a given number
  - Print sum of digits of a given number (with and without using while loop)
- Develop a simple PHP program to :
  - Sort a given set of numbers
  - Retrieve all combinations of a given string using arrays
  - Demonstrate Six string functions
- Develop a simple PHP program to draw a human face.
- Develop a PHP program to create a simple calculator.
- Develop a PHP program to demonstrate file handling.
- Demonstrate DDL and DML commands using MySQL.
- Develop a PHP Program to store an image in database.
- Develop a simple CRUD operations using PHP and MySQL.
- Design an authentication web page in PHP with MySQL.
- Develop a PHP program to convert the PHP objects into JSON.

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| Semester | Code         | Course     | Title of the Course | Hours | Credits | Max. Marks | Internal Marks | External Marks |
|----------|--------------|------------|---------------------|-------|---------|------------|----------------|----------------|
| IV       | 20PIT4CC14P2 | Core– XIVB | ANGULAR JS LAB      | 3     | 2       | 50         | 10             | 40             |

Develop programs using AngularJS application:

1. Simple applications:
  - a) To display the values for different data types
  - b) To perform basic arithmetic operations
2. To demonstrate a shopping list using various built-in functions in Array
3. To change the date format using ng-model
4. To illustrate the use of Filter
5. Using Keyboard and Mouse events
6. For slide Toggle animation
7. To read JSON values and display it
8. Design a simple calculator
9. Design Login form and validate the username and password
10. To implement a basic search functionality application
11. Develop a simple text fade application
12. Develop a simple ToDo Application

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Mr. M. Kamal