DHANALAKSHMI SRINIVASAN
COLLEGE OF ARTS AND SCIENCE FOR WOMEN (AUTONOMOUS)
Affiliated to Bharathidasan University, Tiruchirappalli
(Nationally Re-Accredited with A++ Grade by NAAC)
Perambalur – 621212.
Master of Computer Applications
Choice Based Credit System-Learning Outcomes Based Curriculum Framework (CBCS-LOCF)
(Applicable to the candidates admitted from the academic year 2024-25 onwards)

Programme Pattern

Sem	Course	Course Title	Course Code	Ins.Hrs	Credit	Exam Hours	Marks		Total
							Internal	Externa	
I	Core Course-I	Advanced Java Programming	24PCA1C1	5	4	3	25	75	100
	Core Course-II	Mathematical Foundation for Computer Applications	24PCA1C2	5	4	3	25	75	100
	Core Course-III	Data Structures and Algorithms	24PCA1C3	5	4	3	25	75	100
	Core Practical-I	Advanced Java Programming Lab	24PCA1C1P	4	3	3	40	60	100
	Core Practical-II	Data Structures and Algorithms lab	24PCA1C2P	4	3	3	40	60	100
	Core Elective-I	Hybrid Database Management Systems	24PCA1E1A	4	3	3	25	75	100
		IOT	24PCA1E1B						
	Value Added Course-1	Hardware and Networking Essentials	24PCA1VAC	3	2	3	25	75	100
				30	**23**		**-**	**-**	**700**
II	Core Course- IV	Web Technologies	24PCA2C4	5	4	3	25	75	100
	Core Course-V	Probability and Random Process	24PCA2C5	5	4	3	25	75	100
	Core Course-VI	Python Programming	24PCA2C6	5	4	3	25	75	100
	Core Practical-III	Web Technologies Lab	24PCA2C3P	4	3	3	40	60	100
	CorePractical-IV	Python Programming Lab	24PCA2C4P	4	3	3	40	60	100
	Core Elective-II	Cloud Computing	24PCA2E2A	4	3	3	25	75	100
		Mongo DB	24PCA2E2B						
	Non Major Elective-I	Funtamentals of Information Technology	24PCA2N1A	3	2	3	25	75	100
		Internet Applications	24PCA2N1B						
	Self-Paced learning- I(Online course)			-	2*				
				30	**23**		**-**	**-**	**700**

III	Core Course-VII	Artificial Intelligence and Machine Learning	24PCA3C7	5	4	3	25	75	100
	Core Course-VIII	Cyber Security	24PCA3C8	5	4	3	25	75	100
	Core Course-IX	Mobile Application Development	24PCA3C9	5	4	3	25	75	100
	CorePractical-V	AI&ML Lab	24PCA3C5P	4	3		40	60	100
	CorePractical-VI	Mobile Application Development Lab	24PCA3C6P	4	3		40	60	100
	Core Elective-III	Natural Language Processing	24PCA3E3A	4	3	3	25	75	100
		Image Processing	24PCA3E3B						
	Non Major Elective-II	HTML and XML	24PCA3N2A	3	2	3	25	75	100
		Web Designing	24PCA3N2B						
	Internship/Field Study/ Industrial Visit		24P3IV		1				100*
	Self-Paced learning- II(Online course)				2*				
				30	**24**		**-**	**-**	**700**
IV	Core Course-X	Data Mining and Warehousing	24PCA4C10	5	4	3	25	75	100
	Core Course-XI	Managerial Skills	24PCA4C11	5	4	3	25	75	100
	Industrial based course	Technology Innovations and Sustainable Enterprise	24PCA4I	5	4	3	25	75	100
	Project Work	Dissertation	24PCA4PW	15	8		40	60	100
				30	**20**		**-**	**-**	**400**
Total				**120**	**90**				**2500**
Extra Credit Course				**90(4*)**					**2500**

1 University Representative: Dr.Lakshmi Prabha

2 Subject Expert:Dr.R.Mohan

Industry CorporateSector/Allied
3 Area Representative:Mr.M.Manoharan

Principal's Nominee from
4 Alumnae:Ms.K.Lavanya

5 Chair Person:Mrs.S.Gowri Members:

1 Mrs.K.Suriya
2 Mrs.M.Shiyamala
3 Dr.P.Kavitha
4 Mrs.S.Dhara
5 Mrs.S.Durgadevi
6 Mrs.J.Preethi

Semester	code	Title of the	Hours	Credits
I	24PCA1C1	CC-I: ADVANCED JAVA PROGRAMMING	5	4

Objectives:

To Introduce the basics of Java Programming. Understand and develop Transaction applications.

UNIT-I **(15 Periods)**

An overview of Java –Types of Java applications –Data types, variables and arrays–Operators - Control statements –Classes and Methods– Inheritance –Packages and Interfaces Exception Handling- Multithreaded Programming.

UNIT-II **(15 Periods)**

Java in Databases - JDBC principles – data base access – Interacting - data base search– Creating multimedia databases – Database support in web applications

UNIT-III **(15 Periods)**

Java Foundation classes(JFC) /Swings –JButtons, JLabels, JCheck boxes, JRadio Buttons, JChoices, Lists, JText Fields and JText areas – JScrollbars – Canvases – Event Delegation model – Exceptions – Event classes – Listener Interfaces – Containers and Layout Managers– Adding tool tips and icons – Popup menus – Tabbed panes – sliders –progress bars – Tables.

UNIT-IV **(18 Periods)**

Servlet basics-the servlet life cycle- retrieving information- sending HTML information- the session tracking- database connectivity. JSP: Introducing Java server pages – basics- beneath JSP -JSP session - JSP architecture – security.

UNIT-V **(12 Periods)**

EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB

UNIT–VI **(12 Periods)**

CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the during the Semester Concerned.

Text Book(s):

1.Herbert Scheldt, Java The Complete Reference, Eleventh Edition, McGraw-Hill Education,2019 C. Muthu, Programming with Java, Vijay Nicole imprints private Limited, 2004(for JDBC only).

2.J.Mc Govern,R.Adatia,Y.Fain,J2EE1.4Bible,Wiley-DreamTechIndiaPvt.Ltd, New Delhi, 2003

3 . H. Schildt, Java2Complete Reference, Fifth Edition, TataMcGraw-Hill, New Delhi, 002

Reference Book(s):

1. Sierra Kathy, Head First Java, Second Edition, O'Reilly Media, 2005
2. Holzner Steve, Holzner Steven, Java 2 Black Book , Second Edition,ParaglyphPress,2002
3. https://www.edureka.co/blog/advanced-java-tutorial
4. https://www.khanacademy.org/computing/computer-programming
5. https://docs.oracle.com/javase/tutorial/uiswing/start/about.html

Outcome

CO Number	CO Statement On the successful completion of the , students will be able to	Knowledge Level K-Levels
CO1	Understand the classes and object, multithreading and interface of java	**K1**
CO2	Understand JDBC and RMI concepts	**K2**
CO3	Understand Java foundation classes	**K3**
CO4	Develop server applications using servlet	**K3**
CO5	Design and develop EJB for transaction in business services.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the								Hours	Credits
I	24PCA1C1	CC-I: ADVANCED JAVA PROGRAMMING								5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	1	2	2.1
CO-2	2	3	2	2	2	2	2	2	2	2	2.1
CO-3	3	2	1	2	2	2	2	2	2	2	2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	2	2	2	3	2	2	3	2	2.2
Mean overall score											2.2 (High)

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Semester	code	Title of the	Hours	Credits
I	24PCA1C2	MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS	5	4

Objective:

To enlighten the Discrete Mathematical Structures with Applications to Computer Science

Learning Outcomes:

1. Understanding the mathematical logic and set theory
2. Plan and deliver the binary relations and its properties
3. Write the basic concepts of graph theory

UNIT- I **(12 Periods)**

Matrix Algebra: Matrices – Rank of a matrix – Solving system of equations – Eigenvalues and Eigenvectors – Cayley – Hamilton theorem – Inverse of a matrix.

UNIT- II **(12 Periods)**

Basic Set Theory: Notation – Inclusion and Equality of Sets – The Power Set – Some Operations on Sets – Venn Diagrams – Some Basic Set Identities – The Principle of Specification – Ordered Pairs and n – tuples – Cartesian Products.

UNIT- III **(12 Periods)**

Mathematical Logic: Statements and Notation – Connectives – Negation – Conjunction – Disjunction – Statement of Formulae and Truth Tables – Logical Capabilities of Programming Languages – Conditional and Biconditional – Well-formed Formulas – Tautologies.

UNIT- IV **(12 Periods)**

Formal Languages: Discussion of Grammars – Formal Definition of a Language – Notions of Syntax Analysis.

UNIT- V **(12 Periods)**

Graph Theory: Introduction -The Konigsberg Bridge Problem – Graphs and sub graphs – Definition and Examples – Degrees – Sub graphs – Isomorphism – Independent sets.

UNIT VI (Advanced topics only for discussion)

Current contours:

Graph Coloring

TEXT BOOK:

1. J.P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill, 2003
2. A. Singaravelu, Allied Mathematics, Meenakshi Agency, Edition 2007
3. S. Arumugam and S. Ramachandran, Invitation to Graph Theory, Sci Tech Publications (India), Pvt, Ltd., Chennai, 2006.

Unit I: Chapter 2 of [2]
Unit II: Chapter 2 of [1], Section: 2.1 to 2.1.9
Unit III: Chapter 1 of [1], Section: 1.1 to 1.2.8

Unit IV: Chapter 3 of [1], Section: 3.3.1 to 3.3.3
Unit V: Chapter 1 of [3], Section: 1.0 to 1.1 and Chapter 2, Section: 2.0 to 2.4 and 2.6

REFERENCE BOOK:

1. Discrete Mathematics - Johnson Baugh McGraw-Hill
2. Discrete Computational Structures - KorfhafeRr Academic Press
3. Graph theory and Applications – NarasinghDeo, Prentice hall of India Pvt. Ltd New Delhi 2003.

Outcomes:

CO Number	CO STATEMENT On the Successful completion of the the student would be able to	KNOWLEDGE LEVEL K-Levels
CO 1	Know about the matrix, eigen values	K4
CO 2	Understanding the set theory	K4
CO 3	Know about the truth table, Mathematical logic	K5
CO 4	Know the basic of Grammars	K4
CO 5	Write the basic concepts of graph theory	K3

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the					Hours	Credits
I	24PCA1C2		MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS					5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	1	3	3	2	2	3	2	2.1
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.1 (High)

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Semester	code	Title of the	Hours	Credits
I	24PCA1C3	CC-III: DATASTRUCTURES AND ALGORITHMS	5	4

Objectives:

Understand the basics of Data Structures and its applications. Apply the real time applications in Linear Data Structures. Analyze the different types of Trees and its basic operations. Evaluate the various types of algorithms in finding the complexities of the algorithms. Analyze and design algorithms for various applications.

UNIT–I **(12 Periods)**

Linear Data Structures: Concepts Of Non-Primitive Data Structures - Storage Structure For Arrays -Stacks -Operations On Stacks - Queues - Priority Queues.

UNIT–II **(12 Periods)**

Linked Linear Lists: Operations On Linked Linear Lists - Circularly Linked Lists - Doubly Linked Linear Lists. Non-Linear Data Structure: Trees - Binary Trees –Tree Traversal - Operations On Binary Trees - AVL Trees - Storage Representation And Manipulations Of Binary Trees.

UNIT–III **(12 Periods)**

Algorithms: Algorithm Specification - Pseudo Code Conventions, Recursive Algorithms. Divide And Conquer: General Method - Sequential Search - Binary Search - Finding The Maximum And Minimum - Merge Sort Quick Sort- Insertion Sort - Selection Sort.

UNIT– IV **(12 Periods)**

(a)Greedy Method: General Method – Knapsack problem – Job Sequencing with Deadlines -Optimal Merge Patterns–Spanning Tree -Minimum Cost Spanning Trees. (b) Algorithm Design Methods: Sub goals - Hill Climbing and Working Backward - Heuristics - Backtrack Programming - Branch and Bound.

UNIT–V **(12 Periods)**

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

Text Book(s) :

1.Jean-Paul Tremblay and Paul G. Sorenson, "An introduction to data structures with applications", 2nd Ed, Tata McGraw Hill Publishing Company Limited, New Delhi, 1995. Units I and II.

2.Ellis Horowitz, Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotia Publications, New Delhi, 2007. Units III, IV(a) and V.

3.S.E. Goodman and S.T. Hedetniemi, "Introduction to the Design and Analysis of Algorithms", Tata McGraw Hill, International Edition, 1987. Unit: IV(b).

Outcomes

CO Number	CO Statement On the successful completion of the , students will be able to	Knowledge Level K-Levels
CO1	Understand the basics of Data Structures and its applications	**K1**
CO2	Apply the real time applications in Linear Data Structures.	**K1**
CO3	Analyze the different types of Trees and its basic operations.	**K2**
CO4	Evaluate the various types of algorithms in finding the Complexities of the algorithms	**K2**
CO5	Analyze and design algorithms for various applications.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the				Hours				Credits
I	**24PCA1C3**	**CC-III: DATASTRUCTURES AND ALGORITHMS**				**5**				**4**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**				**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	2	2	2	2	2	3	2	3	2	2.2
CO-2	2	1	2	2	2	2	2	2	3	2	2
CO-3	3	2	1	3	3	2	3	2	1	2	2.2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	2	2	2	3	2	3	3	2	2.3
Mean overall score											**2.2 (High)**

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Semester	code	Title of the	Hours	Credits
I	24PCA1C1P	CP-I: ADVANCED JAVA PROGRAMMING LAB	4	3

Objective:

To get hands on experience in developing programs using java applications.

1.Programs implementing Inheritance, method overriding **(6 Periods)**

2.Programs implementing Access specification among the package. **(5 Periods)**

3.Programs implementing Inter Thread communication. **(5 Periods)**

4.Programs implementing Calendar, random, vector classes. **(6 Periods)**

5.Programs implementing the event handling both mouse and Keyboard. **(6 Periods)**

6.Programs implementing AWT menus,font,images,images. **(6 Periods)**

7.Programs implementing JBDC to a applet window to get and displaying Student details. **(6 Periods)**

8.Programs using socket programming **(6 Periods)**

Outcomes:

CO Number	CO Statement On the successful completion of the , students will be able to	Knowledge Level K-Levels
CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.	K1
CO2	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem	K2
CO3	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.	K3
CO4	Build the user interface of the application and handle the events By using AWT components	K3

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the							Hours	Credits
I	24PCA1C1P	CP-I: ADVANCED JAVA PROGRAMMING LAB							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	2	2	3	2	2
CO-3	3	2	1	2	3	2	3	2	1	2	2.1
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	2	2	2	3	2	2	3	2	2.2
Mean overall score											2.2 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
I	24PCA1C2P	CP-II: DATA STRUCTURES AND ALGORITHMS LAB	4	3

Objective:

To Impart Practical Training in operating System.

1.Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1,2,3,4,5,6,7,8,9] Combinations of 2 distinct objects:[1,2][1,3] [1, 4] [1,5][7,8] [7, 9] [8,9]. **(4 Periods)**

2.Write a program for Linear Search and Binary search **(4 Periods)**

3.Write a program to implement Bubble Sort and Selection Sort. **(4 Periods)**

4.Write a program to implement Merge sort and Quicksort. **(4Periods)**

5.Write a program to implement Stacks and Queues **(4 Periods)**

6.Write a program to implement Singly Linked List. **(4 Periods)**

7.Write a program to implement Doubly Linked list **(4 Periods)**

8.Write a program to implement Binary Search Tree. **(4 Periods)**

Outcomes:

CO Number	CO Statement On the successful completion of the , students will be able to	Knowledge Level K-Levels
CO1	Write a program for Linear Search and Binary search	K1
CO2	Write a program to implement Bubble Sort and Selection Sort.	K2
CO3	Write a program to implement Merge sort and Quick sort.	K3
CO4	Write a program to implement Stacks and Queues	K3

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
I	24PCA1C2P		CP-II: DATA STRUCTURES AND ALGORITHMS LAB							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	3	1	2	2	3	2	3	2	2.3
CO-2	2	1	2	3	2	2	2	2	3	2	2.1
CO-3	3	2	1	3	3	2	3	2	1	2	2.2
CO-4	3	2	3	2	2	2	2	3	2	2	2.3
CO-5	3	2	2	3	2	3	2	2	3	2	2.4
Mean overall score											2.3 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
I	24PCA1E1A	CE-I: HYBRID DATABASE MANAGEMENT SYSTEMS	4	3

Objective:

To provide an overall knowledge in Database concepts and its apply data in database.

UNIT - I **(12 Periods)**

Introduction to Database Management System (DBMS): Database Concepts, characteristics of data in database, Overview of Database Models: Hierarchical Model, Network Model, Relational Model and Object-Oriented Model. Entity Relationship Model: Entity, Attributes, Relationships.

UNIT-II **(12 Periods)**

Relational DBMS: RDBMS Terminology, Relational Data Structure, Data Integrity, Codd's Rule, Overview of Relational Algebra and Relational Calculus, Relational Database Design: Primary Keys, Foreign Keys, Candidate Keys, Relationships, Normalization, Purpose of Normalization, First Normal Form, Second Normal Form, Third Normal Form

UNIT-III **(12 Periods)**

SQL: SQL Data Types and Literals, DDL, DML, DQL, DCL, DAS, TCS, SQL operators, Creating Database, Creating, Modifying and Deleting Tables, Creating View, Indexes, Queries: Insert, Select, Update, Where Clause, Having Clause, Sub-Queries, Order By, Grouping, Creating Variables, Functions: Aggregate and Scalar, Joins, Unions, Triggers, Procedures

UNIT-IV **(12 Periods)**

Transactions: Transaction concept, Transaction Properties, Transaction States, Concurrency Control: Concurrency Control Schemes - Lock Based Protocols, Timestamp Based Protocols, Deadlock handling, User Defined Transaction.

UNIT-V **(12 Periods)**

Database Security: Data Security Risks, Data security requirements, Database Users, Database Backup, Database Recovery: Types of database Failures, Recovery Techniques - Deferred Update, Immediate Update and Shadow paging.

Text Book(s):

1.A, Leon and M.Leon,"Database Management Systems"

2.R,Elrnasri,S.Navathe,"FundamentalsofDatabaseSystem"

Reference Book(s):

1.H.Korth,A.Siilberschatz,"DatabaseSystemConcepts-"

2.P.Battachar and A.K.Majumdar :"Database Management System P.Bhattacharya"

Outcomes

CO Number	CO Statement On the successful completion of the , students will be able to	Knowledge Level K-Levels
CO1	To Understand Database models	**K1**
CO2	Apply the concepts of RDBMS	**K2**
CO3	Apply and analyze SQL Table in Database	**K3**
CO4	How to access the data in Database	**K3**
CO5	How to learn data security	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the	Hours	Credits
I	**24PCA1E1A**	**CE-I: HYBRID DATABASE MANAGEMENT SYSTEMS**	**4**	**3**

Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	3	2	2	2	2	2	2	3	2	2.2
CO-3	3	2	1	2	3	2	3	2	1	1	2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	2	2	3	3	2	2	3	2	2.3
Mean overall score											**2.3 (High)**

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Semester	code	Title of the	Hours	Credits
I	24PCA1E1B	CE-I: IOT	4	3

Objectives:

Students will understand the concepts of Internet of Things and can able to build IOT Applications.

UNIT-I: (12 Periods)

INTRODUCTION TO INTERNET OF THINGS: Introduction-Physical Design of IOT-Logical design of IOT-IOT Enabling Technologies-IOT Levels & Deployment Technologies. **DEMYSTIFYING THE IOT PARADIGM:** The Emerging IoT Flavors-The Industrial Internet of Things (IIoT) Consumer Internet of Things **(**CIoT)-Social Internet of Things **(**SIoT**)** -Semantics for the Inter operable IoT-Cognitive Internet of Things (CIoT).

UNIT- II: (12 Periods)

REALIZATION OF IOT ECOSYSTEM USING WIRELESS TECHNOLOGIES:

Introduction-Architecture for IoT Using Mobile Devices-Mobile Technologies for Supporting IoT Ecosystem-Mobile Use Cases for IoT –Low Power Wide Area Networking Technologies-Sigfox - Weightless -NWave-Ingenu-LoRa.

UNIT- III: (12 Periods)

INFRASTRUCTURE AND SERVICE DISCOVERY PROTOCOLS FOR THE IOT ECOSYSTEM:

Introduction-Layered Architecture for IoT-Protocol Architecture of IoT -Infrastructure Protocols- Device or Service Discovery for IoT-Protocols for IoT Service Discovery.

UNIT-IV: (12 Periods)

THE INTEGRATION TECHNOLOGIES AND TOOLS FOR IOT ENVIRONMENTS:

Introduction- The IoT Portion for Smarter Enterprises and Environments-Sensor and Actuator Networks-The REST Paradigm-The Device Integration Protocols and Middleware

IOT AND M2M: Introduction-M2M-Difference between IOT and M2M-SDN and NFV for IOT- DEVELOPING IOT: IOT Design Methodology.

UNIT-V: **(12 Periods)**

SECURITY MANAGEMENT OF AN IOT ECOSYSTEM:

Introduction-Security Requirements of an IoT Infrastructure-Authentication, Authorization, and Audit Trial (AAA) Framework-Défense-in- Depth-Security Concerns of Cloud Platforms-Security Threats of Big Data-Security Threats in Smart Phones-Security Solutions for Mobile Devices -Security Concerns in IoT Components -Security Measures for IoT Platforms/Devices.

Text Book(s):

1.Pethuru Raj and Anupama C.Raman "The Internet Of Things Enabling Technologies, Platforms, and UseCases",Taylor&Francis,CRCPress,1stEdition,2017.

2.Arshdeep Bahga, Vijay Madisetti, "Internet of Things, A Hands-On Approach ",Universities Press(INDIA)Private Limited ,1stEdition,2015.

Reference Book(s):

1.Jan Holler , Vlasios Tsiatsis, Catherine Mulligan,S tefan Avesand, Stamatis Karnouskos,DavidBoyle,"FromMachine-to–MachinetotheInternetofThings:Introduction to a New Age of Intelligence",1stEdition,Academic Press,2014

Outcomes:

CO Number	**CO Statement** After completion of the , student shall be able to	**Knowledge Level K-Levels**
CO1	Gain the basic knowledge about IoT and they will be able to use IoT related products in real life.	**K1**
CO2	Help sorely lesson physical resources and started to do their work smarter.	**K2**
CO3	Able to understand the application are as of IOT	**K3**
CO4	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks	**K3**
CO5	Able to understand building blocks of Internet of Things and characteristics.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
I	24PCA1E1B		CE-I: IOT							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	2	2	3	2	3	2	2.4
CO-2	3	1	2	2	2	2	2	2	3	2	2.1
CO-3	3	2	2	3	3	2	3	2	1	2	2.3
CO-4	3	2	2	2	2	2	2	3	2	2	2.2
CO-5	2	3	2	3	2	3	2	2	3	2	2.4
Mean overall score											2.3 (High)

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Semester	code	Title of the	Hours	Credits
I	24PCA1VAC	VAC-1: HARDWARE AND NETWORKING ESSENTIALS	3	2

OBECTIVES:

To know the basic components of computer system.

Understand the PC architecture and assemble the PC.

Acquire the knowledge of storage devices.

Know the fundamentals of computer networks.

Understand the functions of network connectivity devices.

UNIT-I **(12 Periods)**

Basic computer system–Main system UNIT–Peripherals–Keyboard–keyboard types –keyboard organization–keyboard ergonomic–interfacing-Mouse-mouse types– mouse interface - Printer – printer types - Monitor – monitor types - Scanner – Digital camera- Laptop,PDA- Notebook computer

UNIT-I **(12 Periods)**

PC Architecture: The Case – Case types - The Power Supply - power supply types- Motherboard – motherboard chipset - motherboard types - Motherboard architecture – motherboard installation

UNIT-II **(12 Periods)**

Processor/CPU–Processor types–Latest processor types-processor installation- Adapter Cards-Display Devices-Ports and Cables–Assemble the PC–Disassemble the PC

UNIT-IV **(12 Periods)**

Memory–Primary memory-RAM,ROM,ECC,DIP,SIPP,SIMM,DIMM,RIMM DDR, XMS memory, Cache memory, shadow memory – POST – BIOS – Secondary memory – HDD – types of hard disk drives - tracks – sectors – installing and upgrading – partitioning-magnetic recording–CHKDSK-SCAN DISK–FDISK–Optical disks– DVD – Blu-Ray

UNIT-V **(12 Periods)**

Network: Introduction–Uses of Computer Networks–Network Hardware: Personal Area Networks –Local Area Networks – Metropolitan Area Networks – Wide Area Networks– Internetworks–Protocols – Reference Models: The OSI Reference Model– The TCP/IP Reference Model -IP address

Reference book(s)

1.Manahar Lotia& Others, Modern Computer Hardware , BPB, First Edition,2004.

2.N.Mathivanan,Microprocessors,PC Hardware and Interfacing,PHI,2003.

3.K.L.James,Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, 2013

OUTCOMES

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Know the basic components of computer system	**K1**
CO2	Understand the PC architecture and assemble the PC	**K2**
CO3	Acquire the knowledge of storage devices	**K3**
CO4	Know the fundamentals of computer networks	**K3**
CO5	Understand the functions of network connectivity devices.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the					Hours	Credits
I	**24PCA1VAC**	**VAC-1: HARDWARE AND NETWORKING ESSENTIALS**					**3**	**2**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	3	2	3	2	3	2	2.4
CO-2	2	2	2	3	2	2	2	2	3	2	2.2
CO-3	3	2	3	2	3	2	3	2	1	2	2.3
CO-4	3	2	2	3	2	2	2	3	2	2	2.3
CO-5	3	2	2	2	2	3	2	2	3	2	2.3
Mean overall score											**2.3 (High)**

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Semester	code	Title of the	Hours	Credits
II	24PCA2C4	CC-IV: WEB TECHNOLOGIES	5	4

Objective:

Students will gain the skills and project-based experience needed for entry into web application and development careers.

UNIT-I WEB PROGRAMMING **(15 Periods)**

PHP introduction: variables – operators – control structures – Advanced concepts in PHP : Cookies –sessions – server variables .

UNIT-II PHP FILES: **(15 Periods)**

Accessing files–reading –writing- MySQL database: insert –update –delete –join– group by – aggregate functions – formats – case studies.

UNIT-III WEB SERVICES: **(15 Periods)**

Introduction – What are web services? SOAP WSDL UDDI– Web services and enterprises. XML: XML Fundamentals XML: The Lingua Franca of web services-XML Documents XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema XML schema and namespaces, A first schema, Implementing XML schema types. SAX: Simple API for XML, DOM: Document object Model.

UNIT-IV SOAP **(15 Periods)**

SOAP and WSDL5 The SOAP Model- SOAP- SOAP Messages SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults SOAP encoding – SOAP RPC- Using alternative SOAP Encodings, Document, RPC, Literal, Encoded SOAPRPC and SOAP Document Literal, SOAP web services and the REST Architecture - Syntactic differences between SOAP 1.2-WSDL structure, The stock quote WSDL interface, definitions, The type element, bindings, services, managing WSDL descriptions, Extending WSDL – Using SOAP and WSDL

UNIT-V UDDI **(15 Periods)**

UDDI: UDDI at a glance- The UDDI Business registry-UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components –Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

Text Book(S):

1. K. Meena , R. Sivakumar , A.B. Karthick Anand Babu “Web programming using PHP and MySQL” Himalaya Publishing House – 2011. (for UNIT 1 and UNIT 2)

2.Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services An Architect's Guide" Pearson Education–Second Indian Reprint 2005. (for UNIT 3, UNIT 4 and UNIT 5)

Outcomes

CO Number	CO Statement After successful completion of the ,Student shall be able to:	Knowledge Level K-Levels
CO1	Students are able to develop a dynamic webpage by the use of java script and DHTML.	**K1**
CO2	Students will be able to write a well formed/validXML document.	**K2**
CO3	Students will be able to connect a java program to a DBMS and perform insert,update and delete operations on DBMS table.	**K3**
CO4	SOAP and WSDL5	**K3**
CO5	WSCL Interface components and WSDL Workflow Business Process Management	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
II	**24PCA2C4**		**CC-IV: WEB TECHNOLOGIES**							**5**	**4**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	3	1	2	2	2	2	2	2	3	2	2.1
CO-3	3	2	2	2	3	2	3	2	1	2	2.2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	3	2	3	2	2	3	2	2	3	2	2.4
Mean overall score											**2.2 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	24PCA2C5	**PROBABILITY AND RANDOM PROCESS**	5	4

Objectives

To learn the basic concepts of discrete continuous distribution and learn the test of significance

UNIT I: (12 Periods)

Probability: The meaning of Probability – Introduction – Definition – Probability and Induction – Casuality versus Random number – The Axiom of Probability – Set Theory – Probability space – Conditional Probability – Problems Only.

UNIT II: (12 Periods)

The Concept of a Random variable – Introduction – Distribution and Deming functions – Specific Random variables – Conditional Distributions – Asymptotic Approximation for Binomial Random variable – Problems

UNIT III: (12 Periods)

Functions of one Random variable – The Random variable g(x) – The Distribution of g(x) – Mean and Variance – Moments – Characteristic function problem.

UNIT IV: (12 Periods)

Dicrete Random Variables X and Y: Joint Probability Mass Function of (X, Y), Marginal Probabilty Distribution - Condition Probability Distribution – **Continuous Random Variables X and Y:** Joint Probability Density Function – Cumulative Distributive Function – Marginal Probability Distribution – Conditional Probability Function – Independent Random Variables – Regression – Rank Correlation.

UNIT V: (12 Periods)

Hypothesis Testing and Applications – Introduction – Framing a Hypothesis – Type I and Type II Errors – Rejection Regions – Guidelines for Hypothesis Testing – Hypothesis Test about a Population Mean – Tests of Population means using small samples – t -test – Hypothesis Test of Population Proportions.

UNIT VI (Advanced topics only for discussion)

Current contours:

Multivariate Analysis

TEXT BOOKS:

1. Probability Random Variables and Stochastic Process, T. Anthansios Papoulis, S. Unnikrishna Pillai, TATA, McGraw Hill, Edition, 2002
2. Probability and Random Process, S. Palaniammal, PHI Learning Pvt, Ltd, 2012.
3. Business statistics and Operation Research Dr.D. Joseph Anbarsu, Leastech Press, 2006.

Unit I: Chapter 1 & 2 [1]

Unit II: Chapter 4 [1]

Unit III: Chapter 5 [1]

Unit IV: Chapter 5: 5.1.1, 5.1.3, 5.1.5, 5.2.1 to 5.2.5, 5.5, 5.6 [2]

Unit V**:** Chapter 13, Section 1 to 8 [3]

Reference Book:

1. Gupta S.C. and Kapoor V.K. Fundamental of Mathematical Statistics Sultan Chand & sons

Outcomes:

CO Number	CO STATEMENT On the Successful completion of the the students would be able to	KNOWLEDGE LEVEL
CO 1	Know the concepts of probability	K3
CO 2	Understand the distribution and demanding functions	K4
CO 3	Compare random events and random variables	K4
CO 4	Know the concepts of Discrete Random Variables	K6
CO 5	Understanding the concepts of Hypothesis Testing and Applications	K6

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the								Hours	Credits
II	24PCA2C5	PROBABILITY AND RANDOM PROCESS								5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	1	3	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	3	2	3	2	3	2	2.2
CO-3	2	2	1	2	3	2	3	2	2	2	2.1
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	2	3	2	2	3	2	2.2
Mean overall score											2.2 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	**24PCA2C6**	**CC-VI: PYTHON PROGRAMMING**	**5**	**4**

Objective:

1.Overview of Python

2.Introduction to Exceptions and Error Handling

3.Introduction to Modules and Packages

4.Understanding a Data Structures concept

5.Exception Handling in File Operations Advanced Features

UNIT I **(15 Periods)**

Introduction to Python- Overview of Python- Installation of Python and IDEs (Anaconda, PyCharm, Jupyter Notebook) - Python Syntax, Variables, and Data Types- Basic Input and Output- Comments in Python Object-Oriented Programming in Python- Introduction to OOP concepts- Classes and Objects-AttributesandMethods-Inheritance:Single,Multiple,andMultilevel-PolymorphismandEncapsulation

UNIT II **(15 Periods)**

Control Structures- Conditional Statements (if, elif, else)- Looping Constructs (for, while)- Break and Continue Statements - Introduction to Exceptions and Error Handling

UNIT III **(15 Periods)**

Functions and Modules- Defining Functions- Function Arguments (default, keyword, variable-length)- Return Values and Scope of Variables - Introduction to Modules and Packages

UNIT IV **(15 Periods)**

Data Structures- Lists: Creating, accessing, and manipulating- Tuples: Immutability and tuple packing/unpacking- Dictionaries: Key-value pairs, methods- Sets: Properties and operations

UNIT V **(15 Periods)**

File Handling- Reading files - Writing to files - Working with different file formats (text, CSV)-Exception Handling in File Operations Advanced Features- Lambda Functions- List Comprehensions and Generator Expressions - Decorators and Iterators - Context Managers

TEXTBOOK(S):

1.Aryasri: Accounting And Financial Management,,TMH,2009

2.Van Horne, James, C:Financial Management and Policy, Pearson, 2009

REFERENCE BOOK(S):

1.Dr.G.Vidyanath G. Lakshmi Accounting and Financial Management.

2.Prasanna Chandra, Financial Management,TMH,2009

3.S.N.Maheshwari,FinancialAccounting,SultanChand,2009.

Outcomes

CO Number	CO Statement After successful completion of the ,Student shall be able to	Knowledge Level K-Levels
CO1	Overview of Python	**K1**
CO2	Introduction to Exceptions and Error Handling	**K2**
CO3	Introduction to Modules and Packages	**K3**
CO4	Understanding a Data Structures concept	**K3**
CO5	Exception Handling in File Operations Advanced Features	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
II	**24PCA2C6**		**CC-VI: PYTHON PROGRAMMING**							**5**	**4**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	3	1	2	3	2	3	1	2.3
CO-2	3	3	3	3	2	2	3	2	3	2	2.6
CO-3	3	3	3	2	2	2	3	2	3	2	2.5
CO-4	3	3	3	2	1	3	2	3	2	1	2.3
CO-5	3	2	3	3	1	3	2	2	3	1	2.3
Mean overall score											**2.4 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	**24PCA2C3P**	**CP-III: WEB TECHNOLOGIES LAB**	**4**	**3**

Objective:

Together and son experience in developing web based applications.

1.Create a simple Web Service that converts the temperature from Fahrenheit to Celsius and vice **(4 Periods)**

2.Usethe above Web Service on a webpage and execute to fetch the results **(4 Periods)**

3.Create a Web Services provider and make it available on the Internet or intranet**(4 Periods)**

4.Create a web-based Consumer of an existing webservice. **(4 Periods)**

5.Create a Windows application-based consumer of an existing webservice **(4 Periods)**

6.Write an application that simulates sending a SOAP message as are quest and receiving Another as a response. **(4 Periods)**

7.Develop a Web Service that provides images as responses. **(4 Periods)**

8.Develop a webservice that access table contents of a database. **(4 Periods)**

9.Develop a console-based Web Service Client. **(4 Periods)**

10.Develop a Web intranet/internet-based Web Service Client. **(4 Periods)**

Outcomes

CO Number	**CO Statement** After successful completion of the ,Student shall be able to	**Knowlede Level K-Levels**
CO1	Design and implement dynamic web sites with good aesthetic Sense of designing and latest technical know-how's.	**K1**
CO2	Have a Good grounding of Web Application Terminologies, Internet Tools–Commerce and other webservices	**K2**
CO3	Get introduced in the area of Online Game programming.	**K3**
CO4	Simulates sending a SOAP message as are quest and receiving another as a response.	**K3**
CO5	Develop a Web intranet/internet-based Web Service Client	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
II	24PCA2C3P		CP-III: WEB TECHNOLOGIES LAB							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	3	1	2	3	2	3	1	2.3
CO-2	3	3	3	3	2	2	3	2	3	2	2.6
CO-3	3	3	3	2	1	2	3	2	3	1	2.3
CO-4	3	3	3	3	2	3	2	3	2	2	2.6
CO-5	3	2	3	3	2	3	2	2	3	2	2.5
Mean overall score											2.5 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	**24PCA2C4P**	**CP-IV: PYTHON PROGRAMMING LAB**	**4**	**3**

LIST OF EXPERIMENTS:

1.Implement a sequential search. **(5 Periods)**

2.Create a calculator program **(5 Periods)**

3.Explore string functions. **(5 Periods)**

4.Implement Selection Sort. **(5 Periods)**

5.Implement Stack. **(5 Periods)**

6.Read and write into a file. **(4 Periods)**

7.Demonstrate usage of basic regular expression **(4 Periods)**

8.Demonstrate use of advanced regular expressions for data validation. **(4 Periods)**

9.Demonstrate use of List **(4 Periods)**

10.Demonstrate use of Dictionaries **(4 Periods)**

Outcomes

CO Number	**CO Statement** After successful completion of the ,Student shall be able to	**Knowledge Level K-Levels**
CO1	Createacalculatorprogram	**K1**
CO2	Implement Selection Sort	**K2**
CO3	Read and write into a file	**K3**
CO4	Demonstrate use of advanced regular expressions for data validation	**K3**
CO5	Demonstrate use of List	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

II	**24PCA2C4P**		**CP-IV:PYTHON PROGRAMMING LAB**							**4**	**3**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	2	2	3	2	3	2	2.6
CO-2	3	2	3	2	1	2	3	2	3	1	2.2
CO-3	3	2	3	2	2	2	3	2	3	2	2.4
CO-4	3	2	3	3	2	3	2	3	2	2	2.5
CO-5	3	2	3	2	1	3	2	2	3	1	2.2
Mean overall score											**2.4 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	**24PCA2E2A**	**CE-II: CLOUD COMPUTING**	**4**	**3**

OBJECTIVES:

To Introduce the Fundamentals of Cloud Computing.

To be Familiar with the Cloud Architecture

To Understand about Cloud Service Models and to Know the Concept of Virtualization in Cloud Computing

UNIT–I COMPUTING PARADIGMS: (15 periods)

High-performance computing, parallel computing, distributed computing, cluster computing, grid computing, cloud computing, bio-computing, mobile computing quantum computing, and optical computing. Nano-computing.

UNIT–II CLOUD COMPUTING FUNDAMENTALS: (15 periods)

Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

UNIT–III CLOUD COMPUTING ARCHITECTURE AND MANAGEMENT:

(15 periods)

Cloud architecture, Layer, Anatomy of the Cloud Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud application, Migrating, Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT–IV CLOUD SERVICE MODELS: (15 periods)

Infrastructure as a Service, Characteristics of IaaS, Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers. Other Cloud Service Models.

UNIT–V CLOUD SERVICE PROVIDERS (15 periods)

EMC, EMCIT, Captiva Cloud Toolkit, Google Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue, Service, Microsoft Windows Azure, Microsoft Assessment and Planning Tool kit, Share Point, IBM Cloud Models.

Reference Book(s)

1.Essentials of Cloud Computing: K. Chandrasekaran, CRCpress,2014

2.Cloud Computing: Principles and Paradigms by Rajkumar Buvya, James Broberg and Andrzej M. Goscinski, Wiley,2011.

3.Distributed and Cloud Computing , Kai Hwang, Geoffery C.Fox, Jack J.Dongarra,Elsevier,2012.

4.https://developer.ibm.com/components/cloud-ibm/tuto

Outcomes

CO Number	CO Statement After successful completion of the ,Student shall be able to:	Knowledge Level K-Levels
CO1	Understand the common terms and definitions of Virtualization and cloud computing	**K1**
CO2	Comprehend the technical capabilities and business Benefits of virtualization and cloud computing.	**K2**
CO3	Describe the landscape of different types of Virtualization	**K3**
CO4	Illustrate how key application feature scan be delivered more Easily on virtual infrastructures.	**K3**
CO5	Familiarize and apply Cloud deployment tools in real time Applications	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
II	24PCA2E2A		CE-II: CLOUD COMPUTING							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	1	2	3	2	3	1	2.4
CO-2	3	2	3	2	2	2	2	2	3	2	2.3
CO-3	3	2	3	2	1	2	3	2	3	1	2.2
CO-4	3	2	3	3	2	3	2	3	2	2	2.5
CO-5	3	2	3	2	1	3	2	2	2	1	2.1
Mean overall score											2.3(High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	**24PCA2E2B**	**CE-II: MONGO DB**	**4**	**3**

OBJECTIVES:

Conceptualization and summarization of bigdata and machine learning, trivial data versus bigdata, bigdata computing technologies, machine learning techniques, and scaling up machine learning approaches.

UNIT-I **(12 Periods)**

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications

UNIT-II **(12 Periods)**

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage ,using multiple data sources

UNIT-III **(12 Periods)**

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

UNIT-IV **(12 Periods)**

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, mapping variables to encodings, Visual encodings.

UNIT-V **(12 Periods)**

Applications of Data Science, Technologies for visualization, Bokeh(Python),recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

Text Book(s):

Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from the Frontline, O'Reilly, 2013.

Reference Book:

1.Jure Leskovek, Anand Rajaraman, Jeffrey Ullman, Mining of Massive Datasets. v2.1, Cambridge University Press, 2014.

Outcomes

CO Number	CO Statement After successful completion of this , the students should be able to	Knowledge Level K-Levels
CO1	Student will be capable to understand basics of Data Science concepts.	**K1**
CO2	Student will be capable to understand basics of Machine learning including Supervised Learning Unsupervised Learning, Ensemble Learning, Reinforcement Learning concepts.	**K2**
CO3	Student may be capable to get the concept of Attribute oriented analysis and implement them to solve various problem.	**K3**
CO4	Students will be introduced with feature selection, dimension reduction and associated computing techniques for various applications.	**K3**
CO5	Students may be exposed to Ensemble learning and Application in data science in software industry.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the					Hours	Credits
II	**24PCA2E2B**		**CE-II: MONGO DB**					**4**	**3**
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	2	2	3	2	3	2	2.6
CO-2	3	2	3	2	1	2	3	2	3	1	2.2
CO-3	3	2	3	2	2	2	3	2	3	2	2.4
CO-4	3	2	3	3	1	3	2	2	2	1	2.2
CO-5	3	2	3	2	2	3	2	2	3	2	2.4
Mean overall score											**2.4(High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	24PCA2N1A	NME-I: FUNTAMENTALS OF INFORMATION TECHNOLOGY	3	2

OBJECTIVES:

To understand the revolution in computers and communications

To know about various application software

To understand the information systems and software development

UNIT- I: **(12 Periods)**

Information Technology: Introduction – Information systems – Definition of computer and system – Software and Data - IT in business and Industry – IT in the Home and at Play – It in Education and Training – IT in Entertainment and the Arts – IT in Science, Engineering, and Mathematics – Global Positioning System.

UNIT-II: **(12 Periods)**

Introduction to Computers - History of computers, Types of computers, Characteristics of computers, Basic Anatomy of a computer, Applications of computer – Memory – Memory types.

UNIT-III: **(12 Periods)**

Software-Kinds of Software - The five types of Applications software – Word processing – Spreadsheets - Database software, Presentation graphics software -Communications software System Software – Operating system - functions

UNIT–IV: **(12 Periods)**

Computer Networks: Introduction – Definition Computer Networks - Types of Networks – LocalArea Network – Metropolitan Area Network - Wide Area Network – Personal Area Network - internet – Intranet – firewalls - Network Topology – Bus – Ring – Hybrid – Star

UNIT-V: **(12 Periods)**

Basic Internet Concepts :– Analog and Digital Signals - modems and communication Software, ISDN lines, and Cable Modems - Definition of Internet - The World Wide Web - Connecting to the Internet – Browsing the web – Web browser – Uniform Resource Locator (URL) – E-mail communication.

UNIT–VI CURRENT CONTOURS(For continuous internal assessment only): Contemporary Developments Related to the during the Semester Concerned.

REFERENCES:

1.Dennis P.Curtin, Kimdolwy, Kun LAWN, Xrhleen morin, Information Technology, the breaking wave, TMH 2000.

2.StaceyCSawyer, Brain K Williams, Sarah E Hutchinson Using Information Technology –Brief Version

3.A Practical Introduction to Computer and Communications Third Edition, McGraw Hill Companies 2011

4.JamesO‟Brien–Introduction to Information systems. 16thedition, 2005.

5.The Internet Book: Everything You Need to Know About Computer Networking and How the Internet Works, Douglas E. Comer, Pearson, 2000

6.https://www.javatpoint.com/internet

7.http://www.steves-internet-guide.com/networking/

OUTCOMES:

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	To know the latest trends in information technology	**K1**
CO2	To understand the fundamentals of computers	**K2**
CO3	To gain knowledge about networks	**K3**
CO4	To acquire knowledge about different software	**K3**
CO5	To understand Internet basics.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
II	**24PCA2N1A**		**NME-I: FUNTAMENTALS OF INFORMATION TECHNOLOGY**							**3**	**2**
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	2	2	3	2	3	2	2.6
CO-2	3	3	3	3	2	2	3	2	3	2	2.6
CO-3	3	3	3	2	1	2	3	2	2	1	2.2
CO-4	3	3	3	2	1	3	2	3	2	1	2.3
CO-5	3	2	3	2	2	3	2	2	3	2	2.4
Mean overall score											**2.4 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
II	24PCA2N1B	NME-I: INTERNET APPLICATIONS	3	2

Objective:

This is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing

UNIT-I BUILDING RICH INTERNET APPLICATIONS WITH AJAX-1: (12 Periods)

Building Rich Internet Applications with AJAX: Limitations of Classic Web application Model, AJAX principles, Technologies behind AJAX, Examples of usage of AJAX, Dynamic web applications through Hidden frames for both GET and POST methods.

UNIT-II BUILDING RICH INTERNET APPLICATIONS WITH AJAX-2: (12 Periods)

Frames, Asynchronous communication and AJAX application model, XMLHTTP Object – properties and methods, handling different browser implementations of XMLHTTP, The same origin policy,Cache control, AJAX Patterns (Only algorithms–examples not required):Predictive fetch pattern, Submission throttling pattern, Periodic refresh, Multi stage download, Fall back patterns.

UNIT-III BUILDING RICH INTERNET APPLICATIONS WITH FLEX-1: (12 Periods)

Flash player, Flex framework, MXML and ActionScript, Working with Data services, Understanding differences between HTML and Flex applications, Understanding how Flex applications work, Understanding Flex and Flash authoring, MXML language, a simple example.

UNIT-IV BUILDING RICH INTERNET APPLICATIONS WITH FLEX-3: (12 Periods)

Framework fundamentals, understanding application life cycle, loading one flex application in to another, understanding application domains, Understanding the preloaded. Managing layout, Flex layout overview, working with children, Container types, Layout rules, Padding, Borders and gaps, nesting containers, Making fluid interfaces.

UNIT-V BUILDING ADVANCED WEB2.0 APPLICATIONS: (12 Periods)

Definition of mash up applications, Mash up Techniques, Building a simple mash up application with AJAX, Remote data communication, strategies for data communication, Simple HTTP Services, URLLoader in Flex, Web Services in Flex, Examples: Building an RSS reader with AJAX, Building an RSSreader with Flex.

TEXT BOOKS

1. Professional AJAX–Nicholas CZakaset al,Wrox publications,2006.
2. ProgrammingFlex2–Chafic Kazoun,O'Reilly publications,2007.
3. Mashups–Francis Shanahan,Wrox,2007.

REFERENCEBOOKS:

1. Ajax: The Complete Reference–Thomas A.Powel,McGrawHill,2008.
2. Unleashing Web 2.0: From Concepts to Creativity – Gottfried Vossen, Stephan Hagemann, Elsevier, 2007.
3. EssentialActionscript3.0–Colin Moock, O'Reilly Publications,2007.
4. Ajax Bible- Steven Holzner, WileyIndia,2007.
5. AWeb2.0PrimerPragmaticAjax–Justin Gehtl and etal, SPD Publications,2006.

Outcomes

CO Number	**CO Statement** After completion of the , student shall be able to	**Knowledge Level K-Levels**
CO1	Analyze a web page and identify it elements and attributes.	**K1**
CO2	Create web pages using XHTML and Cascading Style Sheets.	**K2**
CO3	Build dynamic web pages using JavaScript (Client side programming).	**K3**
CO4	Build interactive web applications using AJAX.	**K3**
CO5	Students to the basic tools and applications used in Web publishing	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the								Hours	Credits
II	24PCA2N1B	NME-I: INTERNET APPLICATIONS								3	2
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	1	2	3	2	3	1	2.4
CO-2	3	3	2	3	2	2	3	2	3	2	2.5
CO-3	3	3	3	2	2	2	3	2	3	2	2.5
CO-4	3	3	3	3	2	3	2	3	2	2	2.6
CO-5	3	2	3	3	1	3	2	2	2	1	2.2
Mean overall score											2.4 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	24PCA3C7	CC-VII: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	5	4

OBJECTIVES:

To understand the various categories of Machine Learning algorithms.

To learn to represent knowledge in solving real time problems.

To know the various applications of Machine Learning.

To provide the knowledge of problem-solving using AI techniques, knowledge representations, expert system development process and tools

UNIT–I INTRODUCTION TO MACHINE LEARNING: (15 periods)

Introduction, Components of Learning, Learning Models, Geometric Models, Probabilistic Models, Logic Models, Grouping and Grading, designing a Learning System, Types of Learning, Supervised, Unsupervised, Reinforcement, Perspectives and Issues, Version Spaces, PAC Learning, VC Dimension.

UNIT–II SUPERVISED AND UNSUPERVISED LEARNING: (15 periods)

Decision Trees: ID3, Classification and Regression Trees, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression, Neural Networks: Introduction, Perception, Multilayer Perception, Support Vector Machines: Linear and Non-Linear, Kernel Functions, K Nearest Neighbors. Introduction to clustering, K-means clustering, K-Mode Clustering.

UNIT-III (10 periods)

Definition of AI –AI problem–underlying Assumption–AI technique–Level of the Model- Criteria for Success. Problems, Problem Spaces, Search: Defining the problem as State Space Search-production systems-problem characteristics-Production System Characteristics.

UNIT–IV (10 periods)

AI Techniques 12AI techniques-search knowledge, abstraction- natural language processing-vision and speech processing- Games-theorem proving- robotics - expert systems.

UNIT-V (10 periods)

Expert Systems 12 Concept of learning-learning automation-genetic algorithm- learning by induction-neural nets back propagation-Need and justification for expert systems- Knowledge acquisition-Case studies: MYCIN, RI.

References book(s):

1. Christopher Bishop,"PatternRecognitionandMachineLearning"Springer,2007.
2. Kevin P.Murphy,"MachineLearning:AProbabilisticPerspective",MITPress,2012.
3. Ethem Alpaydin,"IntroductiontoMachineLearning",MITPress,ThirdEdition,2014

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Solve basic AI based problems, Define the concept of Artificial Intelligence	**K1**
CO2	Apply AI techniques to real-world problems to develop Intelligent systems.	**K2**
CO3	Develop an understanding what is involved in learning models From data	**K3**
CO4	Understand a wide variety of learning algorithms.	**K3**
CO5	Apply principles and algorithms to evaluate models generated From data.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the					Hours	Credits			
III	**24PCA3C7**	**CC-VII: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**					**5**	**4**			
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	2	2	3	2	3	2	2.6
CO-2	3	3	2	3	1	2	3	2	3	1	2.3
CO-3	3	2	3	3	2	2	3	2	3	2	2.5
CO-4	3	3	3	3	1	3	2	3	2	1	2.4
CO-5	3	2	3	3	1	3	2	2	3	1	2.3
Mean overall score											**2.4 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	**24PCA3C8**	**CC-VIII CYBER SECURITY**	**5**	**4**

OBJECTIVES:

Protect critical assets, which can include infrastructure, systems, data, intellectual property, and business continuity.

Protect the privacy of customer data.

Minimized is eruption to on going operations.

Demonstrate externally.

Maintain compliance with regulations.

UNIT - I **(15 periods)**

Introduction to Cyber Security- Overview of Cyber Security- Importance of Cyber Security- Types of Cyber Threats- Cyber Security Terminology .**Cyber Security Policy and Governance**- Information Security Policies- Risk Management and Compliance- Incident Response and Management- Cyber Security Standards and Frameworks (e.g., NIST, ISO 27001)

UNIT – II **(15 periods)**

Networking and Security- Computer Networks Basics- Network Protocols and Security- Firewalls, VPNs, and IDS/IPS - Wireless Security . **Cryptography and Its Applications**- Introduction to Cryptography- Symmetric. Asymmetric Encryption- Hash Functions and Digital Signatures- Applications of Cryptography in Cyber Security

UNIT – III **(10 periods)**

Operating Systems Security- OS Security Fundamentals- Secure OS Configurations- Malware Analysis and Prevention - Virtualization Security

UNIT – IV **(10 periods)**

Ethical Hacking and Penetration Testing- Overview of Ethical Hacking- Penetration Testing Methodologies- Vulnerability Assessment Tools- Reporting and Remediation

UNIT-V **(10 periods)**

Digital Forensics-Digital Forensics Fundamentals-Evidence Collection and Preservation- Forensic Analysis Techniques - Legal and Ethical Issues in Digital Forensics.

Text book(s)

1.BruceSchneier-Knownfor"Applied Cryptography " and "Data and Goliath".

2.KevinMitnick-Author of "Ghost in the Wires" and "The Art of Intrusion".

3.DanKaminsky -Wrote "Exploiting Software: How to Break Code".

References book(s)

1.StephenNorthcutt-Co-authored"IntrusionDetectionand Prevention".

2.EdSkoudis-Authored"CounterHack"and"Malware: Fighting Malicious Code".

3.MarkRussinovich-Wrote"WindowsInternals"and"ZeroDay".

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Understand introduction to cyber security	**K1**
CO2	Understand Networking security and Cryptography And its Applications	**K2**
CO3	Understand Operating System Security	**K3**
CO4	Understand Ethical Hacking and Penetration Testing	**K3**
CO5	Understand Digital Forensics	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
III	24PCA3C8		CC-VIII CYBER SECURITY							5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	2	2	3	2	2
CO-3	3	2	1	2	3	2	3	2	1	2	2.1
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	2	2	2	3	2	2	3	2	2.2
Mean overall score											2.1(High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	**24PCA3C9**	**CC-IX: MOBILE APPLICATION DEVELOPMENT**	**5**	**4**

OBJECTIVES:

Understand the Android OS and application architecture and its installation.

Build user interfaces with Layout, Form widgets and enhance the application with fragments. Understand the principles of graphics, messaging, sound and video and give an exposure to generating signed APK and Publishing it.

UNIT–I ANDROID INTRODUCTION: **(15 periods)**

An Open Platform for Mobile Development – Native Android applications –Android SDK features – Evolution- development of android for mobile –Development framework.

UNIT–II ANDROID APPLICATION DEVELOPMENT: (15 periods)

Installation – Creating application – Types of Applications – Android development tools. Creating Applications and activities: Application Manifest file – Manifest editor – Externalizing the resources – Android application life cycle – Android application class- android activities.

UNIT–III BUILDING USER INTERFACES: **(10 periods)**

Fundamental UI Design – Layouts – Fragments – Widget Tool box – Creating new views – introducing adapters.

UNIT–IV DATABASES AND CONTENT PROVIDERS: (10 periods)

Android databases – working with SQLite databases – Creating content providers – Native android content providers-Introducing the Action Bar–Creating and Using Menus and Action bar action items – Introducing Dialogs – Introducing notifications.

UNIT–V SUPPORTING AND OPTIMIZING FOR DIFFERENT SCREEN SIZES: (10 periods)

Creating scalable graphic assets–Working with animations-Audio, Video and using the Camera-introducing SMS and MMS – signing and publishing application.

Reference Book(s):

1. Reto Meier, “Professional Android 4 Application Development”, WROX Publication – Wiley–India, 2012
2. Pradeep Kothari & Kogent Learning Solutions Inc, “Android Application Development
3. Black Book ”,Dream tech Press,Edition2014,ISBN:978–93–5119–409–5.

4. W.Frank Ableson,RobiSen, ChrisKing, C.Enrique Ortiz, “Android in Action”, Manning
5. Publications Co, Third Edition,ISBN9781617290508

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Understand Android Applications	**K1**
CO2	Understand Android Applications Development	**K2**
CO3	Understand Building User Interfaces	**K3**
CO4	Understand Databases and content Providers	**K3**
CO5	Supporting And Optimizing For Different Screen Sizes	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the	Hours	Credits
III	**24PCA3C9**	**CC-IX: MOBILE APPLICATION DEVELOPMENT**	**5**	**4**

Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	3	2	1	2	3	2	3	2	3	2	2.3
CO-4	2	2	2	2	2	3	2	3	2	2	2.2
CO-5	2	2	3	2	3	3	2	2	3	2	2.4
Mean overall score											**2.2 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	**24PCA3C5P**	**CP-V: AI & ML LAB**	**4**	**3**

LIST OF EXPERIMENTS:

1.Implementation of a*algorithm **(4 Periods)**

2.Implementation of ao*algorithm **(4 Periods)**

3.Write a program to demonstrate the working of the decision tree based id3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample. **(4 Periods)**

4.Build an artificial neural network by implementing the backpropagation algorithm and test the same using appropriate data sets. **(4 Periods)**

5.Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a.csv file. Compute the accuracy of the classifier, considering few test data sets. **(4 Periods)**

6.Assuming a set of documents that need to be classified, use the naïve bayesian classifier model to perform this task. Built-in java classes/api can be used to write the program. Calculate the accuracy, precision, and recall for your data set. **(5 Periods)**

7.Write a program to construct an a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard heart disease data set. You can use java/python ml library classes/api. **(6 Periods)**

8.Apply me algorithm to cluster a set of data stored in a .csv file. Use the same data set for clustering using k-means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add java/python ml library classes/api in the program. **(6 Periods)**

9.Write a program to implement k-nearest neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/python ml library classes can be used for this problem. **(4 Periods)**

10.Implement the non-parametric locally weighted **regression algorithm** in order to fit data points. Select the appropriate data set for your experiment and draw graphs. **(4 Periods)**

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Understand A* Algorithm	**K1**
CO2	Understand AO* Algorithm	**K2**
CO3	Understand K-means Algorithm	**K3**
CO4	Understand K-nearest nighbour Algorithm	**K3**
CO5	Understand Regression Algorithm	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the	Hours	Credits
III	**24PCA3C5P**	**CP-V: AI & ML LAB**	**4**	**3**

Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	2	2	1	2	2
CO-2	2	1	2	2	2	2	2	2	3	2	2
CO-3	3	2	1	2	3	2	3	2	2	2	2.2
CO-4	2	2	2	2	2	3	2	2	2	2	2.1
CO-5	2	2	3	2	3	3	2	2	3	2	2.4
Mean overall score											**2.1 (High)**

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	**24PCA3C6P**	**CP-VI: MOBILE APPLICATION DEVELOPMENT LAB**	**4**	**3**

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours. **(5 Periods)**
2. Develop an application that uses Layout Managers and event listeners. **(5 Periods)**
3. Develop an active calculator application. **(5 Periods)**
4. Write an application that draws basic graphical primitives on the screen. **(5 Periods)**
5. Develop an application that makes use of database.. **(5 Periods)**
6. Implement an application that implements Multithreading.. **(5 Periods)**
7. Develop an active application that uses GPS location information. **(4 Periods)**
8. Implement an application that writes data to the SD card **(4 Periods)**
9. Implement an application that creates an alert upon receiving a message. **(4 Periods)**
10. Write a mobile application that creates alarm clock. **(4 Periods)**

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	Develop an application that uses GUI components, Font And Colours.	**K1**
CO2	Develop a native calculator application.	**K2**
CO3	Develop an application that makes use of database.	**K3**
CO4	Implement an application that writes data to the SD card	**K3**
CO5	Implement an application that creates an alert upon Receiving a message.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
III	24PCA3C6P		CP-VI: MOBILE APPLICATION DEVELOPMENT LAB							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	2	2	3	2	2.2
CO-2	2	1	2	2	2	2	3	2	2	2	2
CO-3	3	2	1	2	3	2	2	2	3	2	2.2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	3	2	3	1	2	2	2	2	2.1
Mean overall score											2.12 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	24PCA3E3A	CE-III: NATURAL LANGUAGE PROCESSING	4	3

OBJECTIVES:

To familiarize the concepts and techniques of Natural language Processing for analyzing words based on Morphology and CORPUS.

To relate mathematical foundations, Probability theory with Linguistic essentials such as syntactic and semantic analysis of text.

To apply the Statistical learning methods and cutting-edge research models from deep learning.

UNIT–I INTRODUCTION TO NLP: (15 periods)

Various stages of NLP –The Ambiguity of Language: Why NLP Is Difficult- Parts of Speech: Nouns and Pronouns, Words: Determiners and adjectives, verbs, Phrase Structure. Statistics Essential Information Theory: Entropy, perplexity, The relation to language, Cross entropy

UNIT–II TEXT PREPROCESSING AND MORPHOLOGY: (15 periods)

Character Encoding, Word Segmentation, Sentence Segmentation, Introduction to Corpora, Corpora Analysis. Inflectional and Derivation Morphology, Morphological analysis and generation using Finite State Automata and Finite State transducer.

UNIT–III LANGUAGE MODELLING: (10 periods)

Words - Collocations- Frequency-Mean and Variance –Hypothesis testing: The t test, Hypothesis testing of differences, Pearson's chi-square test, Likelihood ratios. Statistical Inference: n -gram Models over Sparse Data: Bins: Forming Equivalence Classes- N gram model - Statistical Estimators- Combining Estimators

UNIT – IV WORD SENSE DISAMBIGUATION: (10 periods)

Methodological Preliminaries, Supervised Disambiguation: Bayesian classification, An information-theoretic approach, Dictionary-Based Disambiguation: Disambiguation based on sense, Thesaurus- based disambiguation, Disambiguation based on translations in a second-language corpus.

UNIT–V SYNTAX AND SEMANTICS: (10 periods)

Shallow Parsing and Chunking, Shallow Parsing with Conditional Random Fields (CRF), Lexical Semantics, WordNet, Thematic Roles, Semantic Role Labelling with CRFs. Statistical Alignment and Machine Translation, Text alignment, Word alignment, Information extraction, Text mining, Information Retrieval, NL interfaces, Sentimental Analysis, Question Answering Systems, Social network analysis.

UNIT - VI CURRENT CONTOURS(For continuous internal assessment only):Contemporary Developments Related to the during the Semester Concerned

REFERENCES:

1.Christopher D.Manning and Hinrich Schutze, "Foundations of Natural LanguageProcessing",6thEdition, The MIT Press Cambridge, Massachusetts London, England, 2003

2.Daniel Jurafsky and James H.Martin "Speech and Language Processing" , 3rd edition, Prentice Hall,2009.

3.Nitin Indurkhya, Fred J. Damerau "Handbook of Natural Language Processing", Second Edition, CRC Press, 2010.

4.James Allen "Natural Language Understanding ", Pearson Publication 8th Edition.2012.

5.Chris Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing" , 2nd edition, MIT Press Cambridge, MA, 2003. 6. Hobson lane, Cole Howard, Hannes Hapke, "Natural language processing in action" MANNING Publications, 2019.

6.Alexander Clark, Chris Fox, Shalom Lappin, "The Handbook of Computational Linguistics and Natural Language Processing", Wiley-Blackwell, 2012

7.Rajesh Arumugam, Rajalingappa Shanmugamani "Hands-on natural language processing with python: A practical guide to applying deep learning architectures to your NLP application". PACKT publisher, 2018.

OUTCOMES:

CO Number	**CO Statement** After completion of the , student shall be able to	**Knowledge Level K-Levels**
CO1	Apply the principles and Process of Human Languages such as English and other Indian Languages using computers.	**K1**
CO2	Realize semantics and pragmatics of English language for text processing	**K2**
CO3	Understand the Language Modelling	**K3**
CO4	Demonstrate the state-of-the art algorithms and techniques for text-based processing of natural language with respect to morphology.	**K3**
CO5	Understand text preprocessing techniques.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
III	24PCA3E3A		CE-III: NATURAL LANGUAGE PROCESSING							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	2	2	2.2
CO-2	2	1	2	2	2	2	2	2	3	2	2
CO-3	3	2	1	2	3	2	1	2	2	2	2
CO-4	2	2	2	2	2	3	2	3	2	2	2.2
CO-5	2	2	3	2	3	1	2	2	2	2	2.1
Mean overall score											2.1 (High)

Prepared By **Verified By** **HOD**

Semester	code	Title of the	Hours	Credits
III	24PCA3E3B	CE-III: IMAGE PROCESSING	4	3

OBJECTIVES:

To study the various concepts, methods and algorithms of digital image processing

To study image transformation, image enhancement, image restoration and image compression techniques.

To study image compression techniques.

UNIT–I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS: (15 Periods)

Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Image Processing Problems and Applications, Vision Camera, Digital processing System, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd Max Quantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, Z Transform, Matrix Theory Results, Block Matrices and Kronecker Products.

UNIT–II IMAGE TRANSFORMS: **(15 Periods)**

2-D orthogonal and Unitary transforms, 1-D and 2-DDFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, Singular value Decomposition transforms.

UNIT–III IMAGE ENHANCEMENT: (10 Periods)

Point operations-contrast stretching, clipping and thresholding density slicing, Histograme qualization, modification and specification, spatial operations – spatial averaging, low pass, high pass, bandpass filtering, direction smoothing, medium filtering, generalized cepstrum and homomorphic filtering, edge enhancement using2-D IIR and FIR filters, color image enhancement.

UNIT–IV IMAGE RESTORATION: (10 Periods)

Image observation models, sources of degradation, inverse and Wiener filtering, geometric mean filter, non linear filters, smoothing splines and interpolation, constrained least squares restoration.

UNIT–V IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS: (10 Periods)

Image data rates, pixel coding, predictive techniques transform coding and vector DPCM, Block truncation coding, wavelet transform coding of images, color image coding. Random transform, back projection operator, inverse random transform, back projection algorithm, fan beam and algebraic restoration techniques.

UNIT–VI CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the during the Semester Concerned

REFERENCES:

1.AnilK.Jain, "Fundamentals of Digital Image Processing", PHI, 1995.

2.Sid Ahmed M.A., "Image Processing" , McGraw Hill Inc,1995.

3.GonzalazR.and WintzP.,"Digital Image Processing",AddisonWesley,2ndEd,1987

4.https://www.tutorialspoint.com/dip/index.htm

4.https://en.wikipedia.org/wiki/Digital_image_processing

5.https://www.javatpoint.com/digital-image-processing-tutorial

OUTCOMES:

CO Number	**CO Statement** After completion of the , student shall be able to	**Knowledge Level K-Levels**
CO1	Review the fundamental concepts of a digital image processing system	**K1**
CO2	Analyze images in the frequency domain using various transforms.	**K2**
CO3	Evaluate the techniques for image enhancement and image restoration. Categorize various compression techniques.	**K3**
CO4	Interpret Image compression standards, and Interpret image Segmentation and representation techniques.	**K3**
CO5	Gain idea to process various image used in various fields such as weather forecasting, Diagnosis of various disease using image Such as tumour, cancer etc.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
III	24PCA3E3B		CE-III: IMAGE PROCESSING							4	3
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	3	2	1	2	3	2	3	2	3	2	2.3
CO-4	2	2	2	2	2	3	2	3	2	2	2.2
CO-5	2	2	3	2	3	3	2	2	3	2	2.4
Mean overall score											2.2 (High)

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Semester	code	Title of the	Hours	Credits
III	24PCA3N2A	NME-II: HTML AND XML	3	2

OBJECTIVES:

After Studying that subject student would have capability to make own web site and host their own web site on internet. Also, students would have enough knowledge about what are the technologies used in internet.

UNIT -I **(12 Periods)**

Introduction to WWW : Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP .Web Design: Web site design principles, planning the site and navigation.

UNIT-II **(12 Periods)**

Introduction to HTML : The development process, Html tags and simple HTML forms, web site structure **Introduction to XHTML** : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.

UNIT -III **(12 Periods)**

Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2

UNIT-IV **(12 Periods)**

Javascript : Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML : Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages & disadvantages ,Purpose of it ,ajax based web application, alternatives of ajax

UNIT-V **(12 Periods)**

XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT.

References:

1. Steven Holzner,"HTML Black Book", Dremtech press.
2. Web Technologies, Black Book, Dreamtech Press
3. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level
CO1	Structure and implement HTML/CSS.	**K1**
CO2	Apply intermediate and advanced web development practices.	**K2**
CO3	Develop a fully functioning website and deploy on a web server.	**K3**
CO4	Learning rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.	**K3**
CO5	Learning to display XML documents using CSS.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the					Hours	Credits			
III	**24PCA3N2A**	**NME-II: HTML AND XML**					**3**	**2**			
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	1	2	3	2	3	1	2.4
CO-2	3	3	2	3	2	2	3	2	3	2	2.5
CO-3	3	3	3	2	2	2	3	2	3	2	2.5
CO-4	3	3	3	3	2	3	2	3	2	2	2.6
CO-5	3	2	3	3	1	3	2	2	2	1	2.2
Mean overall score											**2.4 (High)**

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Semester	code	Title of the	Hours	Credits
III	24PCA3N2B	NME-II: WEB DESIGN	3	2

OBJECTIVES:

- To understand the basic concepts of Internet; identify the features of HTML tags
- To design the HTML tables, frames and forms
- To design applications with JavaScript Programming

UNIT – I: (12 Periods)

Networking Concepts: INTERNET - History - Applications-Users – Protocols -Host Machines and Host Names - Internet Architecture and Packet Switching,Client Server Model - Band width and Asynchronous Communication. Connection: Dial-up Access-Direct and Dedicated Connections - shell or TCP/ IP accounts - Domains and Addresses – IP addresses.

UNIT – II: (12 Periods)

HTML: Introduction to HTML Tags - Document Layout - Comments – Headings-Paragraphs - Breaks - Texts - Lists - Special Characters.

UNIT – III: (12 Periods)

HTML: Tables - Linking documents - Frames - Form and its elements.

UNIT – IV: (12 Periods)

JavaScript: Introduction to JavaScript - JavaScript in web pages-writing JavaScript with HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions -dialog boxes.

UNIT – V: (12 Periods)

JavaScript: JavaScript DOM: JSS DOM - understanding objects in HTML -browser objects - web page object hierarchy - Handling events - The form object -built-in objects-user defined objects - cookies - setting a cookie.

REFERENCES:

1. Wendy G. Lehnert, “Internet 101 - A Beginners Guide To The Internet And The World Wide Web”, Addison-Wesley, 1999 (Unit-I).

2. Ivan N. Bayross, “Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP”, 4th Revised Edition, BPB Publications, New Delhi, 2010.(Units-II, III, IV, V)

3. Chuck Musciano & Bill Kennedy, “HTML - The Definitive Guide”, Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level
CO1	Structure and implement HTML/CSS.	**K1**
CO2	Apply intermediate and advanced web development practices.	**K2**
CO3	Develop a fully functioning website and deploy on a web server.	**K3**
CO4	Learning rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.	**K3**
CO5	To design applications with JavaScript Programming	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the				Hours	Credits				
III	**24PCA3N2B**	**NME-II: WEB DESIGN**				**3**	**2**				
Course outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	1	2	3	2	3	1	2.4
CO-2	3	3	2	3	2	2	3	2	3	2	2.5
CO-3	3	3	3	2	2	2	3	2	3	2	2.5
CO-4	3	3	3	3	2	3	2	3	2	2	2.6
CO-5	3	2	3	3	1	3	2	2	2	1	2.2
Mean overall score											**2.4 (High)**

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Semester	code	Title of the	Hours	Credits
IV	24PCA4C10	CC-X: DATA MINING AND DATA WAREHOUSING	5	4

Objectives:

To understand the principles of Data warehousing and Data Mining.

To be familiar with the Data warehouse architecture and its Implementation.

To know the Architecture of a Data Mining system.

To understand the various Data preprocessing Methods.

To perform classification and prediction of data.

UNIT - I **(15 periods)**

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Datawarehouse–Data Warehouse Architecture–DBMS Schemas for Decision Support–Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT – II **(15 periods)**

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation–Data Reduction–Data Discretization and Concept Hierarchy Generation- Architecture of A Typical Data Mining Systems- Classification of Data Mining Systems.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT – III **(15 periods)**

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification– Classification by Back propagation– Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor –Ensemble Methods – Model Section.

UNIT – IV **(15 periods)**

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid- Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT – V **(15 periods)**

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining-Text Mining–Mining the World Wide Web.

TEXTBOOK(S):

1.Jiawei Han, Micheline Kamber and Jian Pei"Data Mining Concepts and Techniques", Third Edition, Elsevier, 2011.

2.Alex Berson, Stephen J.Smith, "Data warehousing Data mining and OLAP", Tata McGraw-Hill, 2nd Edition, 2007

Reference Book(s):

1.Data Mining Introductory and advanced topics-Margaret H Dunham. Pearson education. Data Mining Techniques - Arun K Pujari. University Press.

2.Data Warehousing in the Real World- Sam Aanhory & Dennis Murray Pearson in Edn Asia.. Data Warehousing Fundamentals-Paulraj Ponnaiah Wiley student Edition

3.The Data Warehouse Life Cycle Toolkit-RalphKimball Wiley student edition

Outcomes

CO Number	**CO Statement** After completion of the , student shall be able to	**Knowledge Level K-Levels**
CO1	Identify the scope and necessity of Data Mining & Warehousing for the society	**K1**
CO2	Describe the designing of Data Warehousing so that it can be able to solve the root problems.	**K2**
CO3	To understand various tools of Data Mining and their techniques to solve the real time problems..	**K3**
CO4	To develop ability to design various algorithms based on datamining tools.	**K3**
CO5	To develop further interest in research and design of new Data Mining techniques.	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
IV	24PCA4C10		CC-X: DATA MINING AND DATA WAREHOUSING							5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	2	2	2	2	2	2	2	2
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	3	2	1	2	3	2	2	2	1	2	2
CO-4	2	2	2	2	2	3	2	3	2	2	2.2
CO-5	2	2	3	2	3	2	2	2	3	2	2.3
Mean overall score											2.1(High)

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Semester	code	Title of the	Hours	Credits
IV	24PCA4C11	CC-XI: MANAGERIAL SKILLS	5	4

OBJECTIVES:

To enable the students to learn the art of getting things done in the modern business world by learning topics like lateral thinking, decision making, balancing work and life.

To understand the corporate social responsibility, and work ethics.

To Understand different types of Strategies.

UNIT–I THINKING STRATEGIES: (15 periods)

Strategic thinking – meaning – questions- things included in Strategic thinking –Process consideration in Strategic thinking–Strategic thinking competencies –importance of Strategic thinking – characteristics of Strategic Thinkers – Points to be kept in mind in Strategic thinking. Lateral Thinking–meaning – why Lateral Thinking – Benefits of Lateral Thinking –Techniques used in Lateral Thinking–Conventional Vs Lateral Leaders –Questions asked by Lateral Leaders

UNIT–II INTERPERSONAL STRATEGIES: (15 periods)

Conflict Resolution– meaning – points to be understood before studying conflict resolution – sources of conflict – common reactions to conflict – role of perception in conflict – steps for Conflict Resolution – Conflict handling matrix – Functional and Dysfunctional outcome of conflict. Negotiation skills – process – styles –outcome – principles involved –negotiation model.

UNIT–III IMPLEMENTATION STRATEGIES: (10 periods)

Facing changes – meaning – characteristics –why changes –pace of changes –impact of resistance –Reasons for resistance – types of people in facing changes –introducing change. Facing challenges – meaning – importance – path to facing challenges – benefits of facing challenges.

UNIT–IV ACTION BASED STRATEGIES: (10 periods)

Risk taking - meaning – factors determining Risk Taking – Risk management –users of Risk Management–StepsinRiskManagement.Effectivedecisionmaking–meaning–approaches methods – steps – Decision making at the work place.

UNIT–V BEHAVIOURAL STRATEGIES: (10 periods)

Motivation and Staying motivated – meaning – finding reason for being motivated – staying motivated at workplace–staying motivated in negative work environment–staying motivated during crisis. Balancing work and life – meaning – work satisfaction – gender differences – responsibility of the employers and employees – ways of balancing work and life.

REFERENCES BOOK(S):

1.Alex K. (2012) Soft Skills – Know Yourself & Know the World, S.Chand &Company LTD, Ram Nagar, New Delhi- 110 055.

2.Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills :A Road Map to Success), P.R. Publishers & Distributors,

3.EmotionalQuotient–Daniel Goleman

4.PowerofthePlusfactor–Norman Vincent Peale.

5.TheSevenHabitsofHighlyEffectivepeople–Stephen covey.

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	To enable the students to learn the art of getting things done in The modern business world by learning topics like lateral thinking, decision making, balancing work and life.	**K1**
CO2	To understand the corporate social responsibility, and work ethics. To Understand different types of Strategies.	**K2**
CO3	Benefits of facing challenges.	**K3**
CO4	Decision making at the workplace.	**K3**
CO5	Motivation and Staying motivated	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code	Title of the	Hours	Credits
IV	**24PCA4C11**	**CC-XI: MANAGERIAL SKILLS**	**5**	**4**

Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	2	2	3	2	2.2
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	3	2	1	2	3	2	2	2	3	2	2.2
CO-4	2	2	2	2	2	3	2	3	2	2	2.2
CO-5	2	2	3	2	3	2	2	2	3	2	2.3
Mean overall score											**2.2 (High)**

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Semester	code	Title of the	Hours	Credits
IV	24PCA4ES	TECHNOLOGY INNOVATIONS AND SUSTAINABLE ENTERPRISE	5	4

OBJECTIVES:

To Provide information, frameworks, and tools for identifying and pursuing sustainable business opportunities. Inform students of the changing dynamics of nature– human interdependencies globally. Examine examples of innovators implementing successful green strategies.

UNIT–I INNOVATION: (15 periods)

Need - Objectives of innovation - Technology innovation - its importance -Knowledge Management- need - Business strategies related to knowledge management - Knowledge Management Approaches-Transformation of an enterprise through Knowledge Management - Creating Knowledge Management System in Organization Establishing Knowledge Management through IT Organizational culture for Knowledge Management - Future of Knowledge Management.

UNIT–II TECHNOLOGY TRANSFER AND JOINT VENTURES: **(15 periods)**

Policy, Procedure & Practices-India's Technology base and Capabilities-Preference of Indian Technology-major Constraints and problems- Operational constraints Problems in Indian Business Environment Problems in Finalization of Agreement Major Problems in Technology transfer Collaboration Agreements - Patterns and Intellectual Property rights.

UNIT–III WEB MARKETING: (10 periods)

Meaning- Benefits of Web Marketing-Myths and Facts in Web Marketing Web Psychology: Understanding the Internet mind- The Internet and the Law: Copyright, Censorship, Privacy, Jurisdiction- Do's and Don'ts on Web

UNIT–IV WEB MARKETING STRATEGIES: (10 periods)

Choosingthestrategy-Onlinestorefronts-TargetMarketingAttractingCustomers-Web Advertising - E-Mail Marketing-Instant market research -Securities Issues

UNIT–V ENTERPRISE RESOURCE PLANNING: (10 periods)

The E- Business backbone -Meaning- ERP decision Enterprise Architecture Planning-ERP Implementation- The Future of ERP Applications- Procurement Business Blueprint Planning.

References book(s):

1.Knowledge Management for Competitive advantage-Harish Chandra Chaudharaty, Excel Books Publications, New Delhi

2.TechnologyTransferandJointVenturesAbroad-R.R.Azad,Deep&deepPublications, New Delhi Web Advertising and marketing thomas J Kuegler,Jr. #rdEdition-PrenticeHallofIndia, New Delhi

3.e-BusinessRoadmapforSuccess-Dr.ravi Kalakota – Perason Education

"Frontiers of Electronic Commerce", Ravi Kalakota, Andrew B. Whinston, Addition-Wesley,2000

4.The Lean Start up by Eric Republished :Eric Ries,2017

Outcomes

CO Number	CO Statement After completion of the , student shall be able to	Knowledge Level K-Levels
CO1	To Provide information, frameworks, and tools for identifying and Pursuing sustainable business opportunities. Inform students of the changing dynamics of nature	**K1**
CO2	Human interdependencies globally. Examine examples of innovators implementing successful green strategies.	**K2**
CO3	Myths and Facts in Web Marketing Web Psychology	**K3**
CO4	Web marketing strategies	**K3**
CO5	The E-Business back bone	**K3**

Mapping with Programme Outcomes:

Relationship matrix for outcomes, Programme outcomes/ Programme specific outcomes

Semester	code		Title of the							Hours	Credits
IV	24PCA4ES		TECHNOLOGY INNOVATIONS AND SUSTAINABLE ENTERPRISE							5	4
Course outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	2	2	2	2	2	2	2	2
CO-2	2	1	2	2	2	2	3	2	2	2	2
CO-3	3	2	1	2	3	2	2	2	3	2	2.2
CO-4	2	2	2	2	2	2	2	3	2	2	2.1
CO-5	2	2	3	2	3	2	2	2	3	2	2.3
Mean overall score											2.12 (High)

Prepared By **Verified By** **HOD**

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