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,Tamil Nadu.

MCA (Master of Computer Applications)-Course Structure under CBCS

(For the Candidates Admitted From the Academic Year 2020-2021 Onwards)

Semester	Part	Course	Course Title	Course. Code	Instru.Periods/ Week	Credit	Exam Hours	Marks		Total
								Intl	Extrn	
I	I	Core Course – I	Programming in Java	20PCA1C1	5	4	3	25	75	100
		Core Course – II	Digital Computer Fundamentals	20PCA1C2	5	4	3	25	75	100
		Core Course – III	Operating Systems	20PCA1C3	4	4	3	25	75	100
		Core Course – IV	Java Programming Lab	20PCA1C4P	4	3	3	40	60	100
		Core Course – V	Operating System Lab	20PCA1C5P	4	3	3	40	60	100
		Elective Course-I	Computer Networks/ Pervasive Computing/ Computer Simulation and Modelling	20PCA1E1A/ 20PCA1E1B/ 20PCA1E1C	4	4	3	25	75	100
		Application Oriented Course-I	Mathematical Foundation for Computer Applications	20PCA1A1	4	3	3	25	75	100
		TOTAL			**30**	**25**				**700**
II	I	Core Course – VI	Web Technologies	20PCA2C6	5	4	3	25	75	100
		Core Course – VII	Operation Research And Numerical Methods	20PCA2C7	5	4	3	25	75	100
		Core Course – VIII	Accounting & Financial Management	20PCA2C8	4	4	3	25	75	100
		Core Course-IX	Web Technologies Lab	20PCA2C9P	4	3	3	40	60	100
		Core Course – X	Accounting & Financial Management Lab	20PCA2C10P	4	3	3	40	60	100
		Elective Course –II	Data Science / Compiler design / Microprocessors, Interfacing and Applications	20PCA2E2A/ 20PCA2E2B/ 20PCA2E2C	4	4	3	25	75	100
		Application Oriented Course-II	Cyber Crime Technology	20PCA2A2	4	3	3	25	75	100
		TOTAL			**30**	**25**				**700**
III	I	Core Course – XI	Python Programming	20PCA3C11	5	4	3	25	75	100
		Core Course-XII	Mobile Computing	20PCA3C12	5	4	3	25	75	100
		Core Course-XIII	Artificial Intelligence	20PCA3C13	5	4	3	25	75	100
		Core course-XIV	Python Programming Lab	20PCA3C14P	4	3	3	40	60	100
		Core Course-XV	Mobile Computing Lab	20PCA3C15P	4	3	3	40	60	100
		Elective Course-III	Digital Image Processing / IoT / Cloud Computing	20PCA3E3A /20PCA3E3B/ 20PCA3E3C	5	4	3	25	75	100
		Skill Development Course	Skill Development Course	20PCA3SD1	2	2	3	25	75	100
		TOTAL			**30**	**24**				**700**

IV	**I**	Major Project	Project	20PCA4PW		16	-	-	-	100
	TOTAL				**-**	**16**				**100**
Grand Total					**90**	**90**	-	-	-	**2200**

Course Type	Course	Credits	Total Credits
Core (Theory)	09	4	36
Core (Practical)	06	3	18
Core (Major Project)	1	16	16
Elective	3	4	12
Skill Development	1	2	2
Application Oriented	2	3	06
Total			**90**

Mandatory Bridge Courses for Non-Computer Science Stream Students- 20 Credits

Sem	Subject Code	Course	Subject Title	Hrs/ Week	Credit	Int. Mark	Ext.Mark	Mark
I	20MCA1AD1	ADDL.Core I	C Prgramming **	-	5	100	-	100
	20MCA1AD2	ADDL.Core II	C Programming Lab **	-	5	100	-	100
TOTAL				-	**10**	**200**	-	**200**
II	20MCA2AD3	ADDL.Core III	Scripting Languages **	-	5	100	-	100
	20MCA2AD4	ADDL Core IV	Scripting Languages Lab**	-	5	100	-	100
TOTAL				-	**10**	**200**	-	**200**

**** Paper Fully Internal and in Self Study Mode**

Total Credits	90
Total Credits(For Non - Computer Science Students)	110 (90 + 20)

1.University Representative : Dr.L.Arokiam

2.Subject Expert : Dr.V.Anita sofia

3.Industry Corporate Sector/Allied Area Representative : Mr.M.Manoharan

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

5.Chair Person : Dr.M.Chandrasekaran

Members :

1.Mrs.S.Gowri :

2.Mrs.M.Kamarunisha

3.Mrs.A.Sivasankari

4. Mrs.R.Kayalvizhi

5. Mrs.R.Jothi

6.Ms.P.Anitha

7.Mrs.G.Mahalakshmi

List of Elective Courses

Elective I

1.Computer Networks

2.Pervasive Computing

3. Computer Simulation and Modelling

Elective II

1. Data Science

2. Compiler Design

3. Microprocessors, Interfacing and Applications

Elective III

1. Digital Image Processing

2. IoT

3. Cloud Computing

CORE COURSE – I

PROGRAMMING IN JAVA

Semester: I **Max.Marks:75**
Course Code: 20PCA1C1 **Credit :4**
Total Periods: 75 **Exam Hrs :3**

Objectives:

To introduce the basics of Java Programming

To prepare them to learn advanced Java Programming

Unit-I **(15 Periods)**

An overview of Java – Java Buzzwords – Console input/ output - Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The this keyword – Garbage Collection – Overloading Methods – Argument Passing – Recursion – Access Control-Understanding static – final -Nested and Inner classes. Inheritance: Inheritance Basics – Using super – Method overriding – Dynamic Method Dispatch - Using Abstract Classes- Final with Inheritance- Object class.

Unit- II **(15 Periods)**

Packages and Interfaces: Defining a Package-Packages and Member Access– Importing Packages – Defining, Implementing, Applying Interfaces - Interfaces Can Be Extended - Default Interface Methods - Use static Methods in an Interface- Exception Handling: Exception-Handling Fundamentals - Exception Types – Using try and catch -Multiple catch Clauses - Nested try Statements– throw – throws – finally – Java's Built-in Exceptions- Creating User-defined Exceptions. Multithreaded Programming: The Java Thread Model – Creating a Thread –Creating Multiple Threads-Thread Priorities- Synchronization – Inter-thread communication.

Unit -III **(15 Periods)**

Enumerations- Type Wrappers- Autoboxing - Generics - A Simple Generics Example - String Handling- The Collection Interfaces and Collection Classes: List, Set, Map, Enumeration and Iterator interfaces-The Legacy Classes - ArrayList, LinkedList, Vector, Stack, Properties, HashTable - StringTokenizer- Date - calender - Random - Scanner classes. The I/O Classes and Interfaces - File - The Stream Classes - The Byte Streams - InputStream - OutputStream - FileInputStream - FileOutputStream - Buffered Byte Streams - BufferedInputStream - BufferedOutputStream - PrintStream - DataOutputStream - DataInputStream - Reader - Writer - FileReader - FileWriter - BufferedReader - BufferedWriter - - PrintWriter - Serialization.

Unit- IV **(18 Periods)**

Networking - Networking Basics - Networking Classes and Interfaces - InetAddress- InetAddress class - TCP/IP Client and Server sockets – Datagrams – URL and URLConnection classes. Java Database Connectivity: Establishing a connection – Creation of data tables – Entering data into table – Table Updating – Use of PreparedStatement – Obtaining metadata.

Unit-V **(12 Periods)**

Introducing - The Origins of Swing -Two Key Swing Features - The MVC Connection - Components and Containers - The Swing Packages - A Simple Swing Application -Event Handling: Event Model – Event Classes – Event Listeners and Interfaces - Working with Graphics, Color and Font classes - Swing Component classes: JLabel and ImageIcon -JTextField -JButton -JTabbedPane -JScrollPane - JList - JComboBox - Layout Managers.

Text Book(s):

1. Herbert Schildt, Java The Complete Reference , Eleventh Edition, McGraw-Hill Education,2019 .

2. C. Muthu, Programming with Java, Vijay Nicole imprints private Limited, 2004(for JDBC only).

Reference Books:

1.Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press, 2018.

2.Introduction to Java Programming , Daniel Liang, Tenth Edition, Pearson, 2015.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Knowledge of the structure and model of the Java programming language.	**K1**
CO2	Use the Java programming language for various programming technologies .	**K2**
CO3	Develop desktop application using multi-threading, IOconcepts, GUI to solve real-time problems and design distributed applications	**K3**
CO4	Classify the multitasking application using exception handling concepts	**K3**
CO5	Apply GUI concepts	**K3**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	M	S	S
CO2	S	S	S	S
CO3	S	S	S	M
CO4	S	S	S	S
CO5	S	M	S	S

S–Strong; M–Medium; L -Low

CORE COURSE – II

DIGITAL COMPUTER FUNDAMENTALS

Semester : I **Exam Hrs:3**
Course Code : 20PCA1C2 **Max.Marks:75**
Total Periods :75 **Credit :4**

Objectives:
On successful completion of the course, the students should have:

- Understood computer architecture
- Understood number systems, I/O, Registers and memory

Unit- I **(15 Periods)**

Number System: Binary, Decimal, Octal, and Hexadecimal – Conversion from one to other–Number Representations: Signed Magnitude, 1's Complement, 2's Complement – Logic Gates: Basic, Universal, Exclusive gates – Boolean Theorems - Boolean algebra – Sum of Products – Product of Sums – Karnaugh map – Don't Care Conditions.

Unit- II **(15 Periods)**

Combinational Logic Circuit Design: Decoders: 2 to 4 decoder, 3 to 8 decoder, 4 to 16 decoder – Encoders: Octal Encoder – Decimal Encoder - Hexadecimal Encoder – Multiplexers – De-multiplexers – Half Adder – Full Adder– Combined Adder/ Subractor.

Unit- III **(15 Periods)**

Flip-flops: RS, Clocked-RS, Edge Triggered RS, JK, D, T-Flip Flops – Registers: Shift Registers: Left Shift, Right Shift, Bidirectional Shift registers – Asynchronous Counters: Ripple counters:Octal counter, Decimal counter, Modulo N Counter.

Unit- IV **(18 Periods)**

Input–Output organization: Input–Output interface – I/O Bus & Interface Module – I/O versus Memory Bus – Isolated versus Memory Mapped I/O – Example of I/O Interface -Asynchronous Data Transfer: Strobe Control - Handshaking Method – Asynchronous Serial Transfer – Asynchronous Communication Interface.

Unit- V **(12 Periods)**

Modes of Transfer: Example of Programmed I/O – Interrupt Initiated I/O – Priority Interrupt: Daisy Chain Priority – DMA: DMA Controller, DMA Transfer – I/O Processor: CPU-IOP communication.

Text Book(s):

1. R. K. Gaur, "Digital Computer Fundamentals", BhanpatRai Publications, 3rd Edition.
2. M. Morris Mano, "Computer System Architecture", Prentice Hall of India, Third Edition.

Reference Books:

1. Albert Paul Malvino, Donald P. Leach, "Digital Principles and Applications", Tata McGraw Hill Pub. Company Ltd, Sixth Edition, 2008.
2. J.P.Hayes, "Computer Architecture and Organization" Tata McGraw Hill Pub. Company Ltd, 3rd Edition 1998.

Course Outcomes

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain and implement the basic concepts of logic gates and simply the Boolean functions using K- MAP	K1
CO2	Differentiate and formulate the functions of Multiplexer and Demultiplexer, Encoder and Decoder, and perform conversion among different number systems used in Digital Computer	K1
CO3	Design basic electronic Circuits(combinational circuits) .	K2
CO4	Use of Isolated versus Memory Mapped I/O and Handshaking Method	K2
CO5	Identify and Compare the DMA Controller and DMA Transfer	K3

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	S	M
CO3	M	S	S	S
CO4	S	S	M	S
CO5	S	S	S	S

S – Strong; M – Medium; L – Low

CORE COURSE – III

OPERATING SYSTEMS

Semester : I **Exam Hrs :3**
Course Code : 20PCA1C3 **Max.Marks:75**
Total Periods : 60 **Credit :4**

Objectives :

1. To learn the basic concepts of operating systems.
2. To understand the operating system functionalities like memory, processor, and scheduler.

Unit – I **[12 Periods]**

Operating System Overview: Operating System Objectives and Functions – The Evolution of Operating Systems – Major Achievements – Developments Leading to Modern Operating Systems – Virtual Machines – OS Design Considerations for Multiprocessor and Multicore – Microsoft Windows Overview – Traditional UNIX Systems – Modern UNIX Systems.

Unit – II **[12 Periods]**

Process:Process Descriptions & Control: What is a Process? Process States – Process Description – Process Control – Execution of the Operating System. Threads: Processes and Threads – Types of Threads – Multicore and Multithreading. Concurrency: Mutual Exclusion and Synchronization – Concurrency: Deadlock and Starvation.

Unit – III **[12 Periods]**

Memory:Memory Management: Memory Management Requirements – Memory Partitioning – Paging – Segmentation – Security Issues. Virtual Memory: Hardware and Control Structures – Operating System Software.

Unit – IV **[12 Periods]**

Scheduling: Uniprocessor Scheduling: Types of Scheduling – Scheduling Algorithms. Multiprocessor and Real Time Scheduling: Multiprocessor Scheduling – Real time scheduling – Linux Scheduling – UNIX FreeBSD Scheduling Windows 7 Scheduling.

Unit – V **[12 Periods]**

Input/Output and Files:I/O Management and Disk Scheduling: I/O Devices – Organization of the I/O Function – Operating System Design Issues – I/O Buffering – Disk Scheduling – RAID – Disk Cache – UNIX FreeBSD I/O – Windows 7 I/O. File Management: Overview – File Organization and Access – File Directories – File Sharing – Record Blocking – Secondary Storage Management – File System Security – UNIX File Management – Linux File Management – Windows 7 File System.

Text Book(s) :

1. Willam Stallings, Operating Systems, Pearson Education, Seventh Edition, 2003.

Reference Books :

1. Deital H.M, An Introduction to Operating Systems, Addison Wesley Publishing Co., 1984.
2. Silberschartz A, PetersonJ.L., Galvin P, Operating System Concepts, Addison Wesley publishing co., 1998.

Course Outcomes

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	State the types of Operating System and its Structure	K1
CO2	Describe Process Management & Synchronization	K1
CO3	Explain various Scheduling and deadlock	K2
CO4	Discuss Memory Management & Mass Storage	K2
CO5	Illustrate File Systems	K3

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	M	M
CO3	M	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S – Strong; M – Medium; L – Low

CORE COURSE – IV

JAVA PROGRAMMING LAB

Semester: I **Exam Hrs:3**
Course Code : 20PCA1C4P **Max.Marks:60**
Total Periods: 40 **Credit: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.

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

Course Outcomes :

CO Number	CO Statement	Knowledge Level
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 handlethe events by using AWT components	**K3**

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4
CO1	S	M	S	S
CO2	S	S	S	S
CO3	S	S	S	M
CO4	S	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE – V

OPERATING SYSTEMS LAB

Semester: I **Max.Marks:60**
Course Code : 20PCA1C5P **Credit :3**
Total Periods: 40 **Exam Hrs :3**

Objective:

To Impart Practical Training in operating System.

Write Shell Programming to implement the following:

1. Mark list preparation (4 Periods)
2. Menu Creation (4 Periods)
3. Login Greetings Script (4 Periods)
4. Copying files (4 Periods)
5. Searching a word in a file (4 Periods)
6. Compression techniques (4 Periods)
7. Paragraph formatting (4 Periods)
8. User Creation (4 Periods)
9. Group Creation (4 Periods)
10. Cron Scheduling. (4 Periods)

Course Outcomes :

CO Number	CO Statement	Knowledge Level
CO1	Able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).	**K1**
CO2	To Execute shell programming on UNIX OS.	**K2**
CO3	To understand and handle UNIX system calls.	**K3**
CO4	To Create User and Group	**K3**

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	M	S	S
CO2	S	S	S	S
CO3	S	S	M	S
CO4	S	S	S	M

S –Strong; M–Medium; L – Low

ELECTIVE COURSE-I

COMPUTER NETWORKS

Semester: I **Exam Hrs:3**
Course Code : 20PCA1E1A **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective:

To provide an overall knowledge in computer communication networks concepts and its implementation details in the Internet.

Unit- I **(12 Periods)**

Introduction – Uses of Computer Networks – Network Hardware: LAN-MAN-WAN –Networks Software: Protocol Hierarchies – Reference models: OSI - TCP/IP.The Physical Layer: Guided Transmission Media - The Public Switched Telephone Network:Structure of the Telephone System – Switching.

Unit- II **(12 Periods)**

The Data Link Layer: Design Issues –Error Detection and Correction – Elementary DataLink Protocol – Sliding Window Protocol – HDLC.The Medium Access Control Sub Layer: Multiple Access Protocol: CSMA Protocol – CollisionFree Protocol – Data Link Layer Switching: Repeaters, Hub, Bridges, Switches, Router, andGateways -Bluetooth.

Unit- III **(12 Periods)**

The Network Layer: Design Issues – Routing Algorithms: Optimality Principle –Shortestpath – Distance Vector – Link State – Hierarchal – Broadcasting –Congestion Controlalgorithm s– The network layer in internet: IP protocol – IP address.

Unit -IV **(12 Periods)**

The Transport Layer: The Transport Service: Service provided to the Upper Layer –Transport Service Primitives – Berkeley Sockets - Elements of Transport Protocols –The Internet Transport Protocol: UDP: Introduction – TCP: Service Model – TCP Segment Header.The Application Layer: DNS – E-Mail: Architecture and Services – Message Formats.

Unit -V **(12 Periods)**

Network Security: Cryptography: introduction – Substitution and Transposition Cipher –Symmetric-key Algorithm: DES – Public-key Algorithms: RSA – Digital Signature:Symmetricand Public key Signature – Communication Security: Firewalls – VPN.Authentication Protocol:Authentication based on shared key – Diffie-Hellman key Exchange.

Text Book(s):

1. Andrew S. Tanenbaum, *Computer Networks***,** PHI, Fourth Edition, 2003.
Unit: I: Chapter 1 (1.1, 1.2(1.2.1 to 1.2.3), 1.3(1.3.1), 1.4(1.4.1, 1.4.2)Chapter 2 (2.2,2.5(2.5.1,.5.5)
Unit: II: Chapter 3(3.1, 3.2, 3.3, 3.4, 3.6.1), Chapter 4(4.2.2, 4.2.3, 4.6, 4.7.5)
Unit: III: Chapter 5 (5.1, 5.2(5.2.1, 5.2.2, 5.2.4, 5.2.5, 5.2.6, 5.2.7), 5.3, 5.6(5.6.1, 5.6.2)
Unit: IV: Chapter 6 (6.1(6.1.1 to 6.1.3), 6.2, 6.4.1, 6.4.2, 6.5.2, 6.5.4.Chapter 7 (7.1, 7.2.1,7.2.3)
Unit: V: Chapter 8 (8.1.1, 8.1.2, 8.1.3, 8.2.1, 8.3.1, 8.4.1, 8.4.2, 8.6.2, 8.6.3, 8.7.1, 8.7.2)

Reference Books:

1. William Stallings, *Data and Computer Communication*, PHI, 10th Edition, 2014
2. Behrouz A. Forouzan, *Data Communications and Networking*, Third Edition, TataMcGraw Hill, 2003.

Course Outcomes

At the end of the Course the students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Recognize the technological trends of Computer Networking	**K1**
CO2	Discuss the key technological components of the Network. And Explore OSI Model	**K2**
CO3	Evaluate the challenges in building networks and solutions to those. and Explore Transmission Media	**K3**
CO4	Explore TCP Service Model	**K3**
CO5	Implement different Algorithms	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	M	M
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE-I

PERVASIVE COMPUTING

Semester: I **Exam Hrs:3**
Course Code : **20PCA1E1B** **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective :

To understand about pervasive computing through pervasive devices and PDA.

Unit -I **(12 Periods)**

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care –Car information system – E-mail access via WAP and voice.

Unit- II **(12 Periods)**

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

Unit- III **(12 Periods)**

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

Unit- IV **(12 Periods)**

WAP and Beyond: Components of the WAP architecture – WAP infrastructure – WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

Unit -V **(12 Periods)**

PDA: Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

Text Book(s):

Pervasive Computing, Technology and Architecture of Mobile Internet Applications , JochenBurkhardt , Horst Henn , Stefan Hepper , Thomas Schaech & Klaus Rindtorff,Pearson Education, 2006.

Reference Books:

1. Pervasive Computing and Networking,Mohammad S. Obaidat, Mieso Denko, Isaac Woungang, Wiley 2011.
2. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To discover the characteristics of pervasive computing applications including the major system components and architectures of the systems	**K1**
CO2	To analyse the strengths and limitations of the tools and devices for development of pervasive computing systems	**K2**
CO3	To explore the characteristics of different types of mobile networks on the performance of a pervasive computing system	**K3**
CO4	To analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications	**K3**
CO5	To develop an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	M	S
CO3	S	S	S	S
CO4	S	S	S	M
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE-I

COMPUTER SIMULATION AND MODELLING

Semester: I **Exam Hrs:3**
Course Code : 20PCA1E1C **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective :

To impart knowledge in real time modeling process and the simulation of any system using the real time mode.

Unit- I **(12 Periods)**

Introduction to Simulation: When Simulation is the Appropriate Tool- When Simulation is not Appropriate- Advantages and Disadvantages of Simulation- Areas of Application- Systems and System Environment- Components of a System- Discrete and Continuous Systems- Model of aSystem- Types of Models- Discrete-Event System Simulation –Steps in a simulation study.Simulation Examples: Simulation of Queuing Systems, Simulation of Inventory Systems.

Unit- II **(12 Periods)**

Simulation Software: History of Simulation Software- Selection of Simulation Software-Simulation in JAVA, Simulation in GPSS, Simulation in SSF- Simulation software –Experimentation and Statistical and analysis tools .

Unit- III **(12 Periods)**

Statistical Models in Simulation: Review of Terminology and Concepts- Useful Statistical Models-Discrete Distributions- Continuous Distributions- Poisson process.Queuing models- Characteristics of queuing systems.

Unit- IV **(12 Periods)**

Random-Number Generation: Properties of Random Numbers-Generation of Pseudo-Random Numbers-Techniques for Generating Random Numbers-Linear congruential Method- Random number streams -Tests for random numbers-Frequency tests – Test for Autocorrelation.Random-Variate Generation: Inverse Transform Technique-Exponential Distribution-Uniform Distribution-Weibull Distribution.

Unit -V **(12 Periods)**

Input Modeling: Data Collection - Identifying the Distribution with Data- parameter estimation-goodness of fit tests. Verification and Validation of Simulation Models:Model Building, Verification, and Validation-Verification of Simulation Models-Calibration and Validation of Models.

Text Book(s):

1. Jerry Banks, John S. Carson, II Barry L. Nelson., *Discrete-Event System Simulation*,FourthEdition, PHI Edition, 2009. Unit:I :Chapter 1 Sections (1.1-1.11), Chapter 2 Sections (2.1, 2.2),Unit:II :Chapter 4 Sections (4.1, 4.2, 4.4-4.7),Unit:III :Chapter 5 Sections (5.1-5.5), Chapter 6 Sections (6.1),Unit:IV :Chapter 7 Sections (7.1, 7.2, 7.3.1, 7.3.3, 7.4), Chapter 8 Sections (8.1.1-8.1.3),Unit:V :Chapter 9 Sections (9.1-9.4), Chapter 10 Sections (10.1-10.3)

Reference Books:

E.Winsberg, Science in the age of computer simulation, Chicago: University Press,2010.

Course Outcomes

After the completion of the course, the students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the technique of simulation and different types of system models	**K1**
CO2	Understand the probability concepts in simulation and study different random number generator techniques along with standard tests for random numbers.	**K2**
CO3	Study discrete system simulation like the simulation of a telephone system.	**K3**
CO4	Study GPSS language and various GPSS programs.	**K3**
CO5	Study computer models of queueing, inventory and scheduling systems, Variance Reduction techniques and analysis of simulation output.	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	S	S
CO3	S	S	S	S
CO4	S	S	S	M
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

APPLICATION ORIENTED COURSE-I

MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Semester : I **Max. Marks: 75**
Course Code: 20PCA1A1 **Credit: 3**
Total Periods: 60 **Exam Hours: 03**

Objective:

To enlighten the Discrete Mathematical Structures with Applications to Computer Science

Unit- I **(12 Periods)**

Mathematical Logic : Connectives , Conditional and Bi-conditional Statement. Well-formed Formulas, tautologies - Equivalence of Formulas - Duality Law. Set Theory: Definition of set - Empty set -Inclusion and Equality of set - Power set - Proper subset - Union and Intersection of Sets - Disjoint Sets - Mutually disjoint - Complement of set - Relative and Absolute complement - Venn diagram – De Morgan's law - Cartesian Products

Unit- II **(12 Periods)**

Binary Relations: Binary relation Properties of Binary relations in a Set - Relations Matrix and Graph of a Relation - Equivalence relations ,Compatibility relations and composition of relation. Functions: Definition of function, into, onto, one-to-one and one-to-one correspondence mapping. Composition of functions and Inverse functions.

Unit- III **(12 Periods)**

Algebraic Structure : Semi group and Monodies - Definitions and Examples - Homomorphism of Semi group and Monodies - Sub semi group and Sub monodies. Grammars and Language : Definition of Grammar and types of Grammars. Notions of Syntax analysis Groups: Definition and Example - Simple problems - Cosets and Lagrange's theorem.

Unit- IV **(12 Periods)**

Lattices : Definition and Examples. Some properties of Lattices. Theorems related to Isotonicity , Distributive inequalities and Modular inequality. Boolean Forms and Free Boolean Algebra - Values of Boolean Expressions and Functions. Representation and Minimization of Boolean Functions.

Unit- V **(12 Periods)**

Graph Theory: Basic Concepts of Graph theory - Basic Definitions - Path - Reach ability - Connectedness - Matrix Representation of Graphs - Trees - Basic Definitions – Different types of Trees . Storage representation and Manipulation of graphs.

Text Book(s):

1. Discrete Mathematical Structures with Applications to Computer Science – J.P.Tremblay, R.Manohar McGraw-Hill

Reference Books:

1. Discrete Mathematics - Johnson Baugh McGraw-Hill
2. Discrete Computational Structures - KorfhafeRr Academic Press
3. Graph theory and Applications – NarasinghDeo

COURSE OUTCOMES

After successful completion of the course, student shall be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the complexity of computational problems	**K1**
CO2	Think about the design of formal language which would be able to address any real time problem and improve the working flow of computational models	**K2**
CO3	Use tree and graph algorithms to solve problems	**K3**
CO4	Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra	**K3**
CO5	Solve mathematical problems, apply various methods of mathematical proof and communicate solutions in writing.	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M
CO2	S	S	M	S
CO3	S	M	S	S
CO4	S	S	S	M
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE – VI

WEB TECHNOLOGIES

Semester: II **Max.Marks:75**
Course Code : 20PCA2C6 **Credit :4**
Total Periods: 75 **Exam Hrs :3**

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-Why Web Services are important ? – The evolution of web applications Not just another distributed computing platform – 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, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH

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- Usingalternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC and SOAP Document Literal, SOAP web services and the REST Architecture-Looking back to SOAP 1.1 Syntactic differences between SOAP 1.2 and SOAP1.1-Changes to SOAP-RPC- SOAP Encoding .WSDL structure, The stock quoteWSDL interface, definitions, The typeelement, bindings, services, managingWSDL 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 – The Bar scenario conversations – 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. KarthickAnandBabu "Web programming using PHP and MySQL" Himalaya Publishing House – 2011. (for Unit 1 and Unit 2)

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

Course Outcomes

After successful completion of the course, Student shall be able to:

CO Number	CO Statement	Knowledge Level
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 / valid XML 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

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M
CO2	S	S	S	S
CO3	M	S	S	S
CO4	S	M	S	M
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE-VII

OPERATION RESEARCH AND NUMERICAL METHODS

Semester : II **Max. Marks: 75**
Course Code: 20PCA2C7 **Credit : 04**
Total Periods: 75 **Exam Hours: 03**

Objectives :

Understand main components of graph theory.

Unit -I (15 Periods)

Linear Programming - Formulation of Problems – Graphical Method – Simplex Method.

Unit-II (15 Periods)

Transportation problem – Initial Basic Feasible Solution – North West Corner Method – Least Cost Method – Vogel's Approximation Method – Assignment problem.

Unit -III (15 Periods)

Solution of system of linear equations: Gauss- Elimination method, Gauss Jordan method, Gauss-Seidal method, Crout method.

Unit- IV (15 Periods)

Numerical differentiation, Numerical integration, Trapezoidal, Simpson's one third and three eight rules.

Unit - V (15 Periods)

Solution of ordinary differential (first order, second order and simultaneous) equations by euler's, Picard's and fourth-order Runge- Kutta methods

Text Book(S) :

1. S. Kalavathy, Operation research, Vikas Publishing House Private Ltd.,
2. Devi Prasad, An introduction to Numerical Analysis, Narosa Publication house, New Delhi 2006.

Reference Books :

1. T. Veerajan & T. Ramchandrandran, Theory & Problems in Numerical Methods, TMH, New Delhi, 2004

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the applications of Operations research	**K1**
CO2	Solve Linear Programming Problem by graphical Method and North West Corner Method	**K2**
CO3	Gauss- Elimination method and Gauss-Seidal method	**K3**
CO4	Trapezoidal, Simpson's one third and three eight rules.	**K3**
CO5	Solution of ordinary differential (first order, second order and simultaneous) equations by euler's	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M
CO2	S	S	S	S
CO3	S	S	M	S
CO4	S	M	S	S
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE – IX

WEB TECHNOLOGIES LAB

Semester: II **Exam Hrs:3**
Course Code : 20PCA2C9P **Max.Marks:60**
Total Hours:40 **Credit :3**

Objective:

To get hands on experience in developing web based applications.

1. Create a simple Web Service that converts the temperature from Farenheit to Celsius and vice **(4 Periods)**
2. Use the above Web Service on a web page 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 web service. **(4 Periods)**
5. Create a Windows application based consumer of an existing web service. **(4 Periods)**
6. Write an application that simulates sending a SOAP message as a request and receiving Another as a response. **(4 Periods)**
7. Develop a Web Service that provides images as responses. **(4 Periods)**
8. Develop a web service 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)**

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Design and implement dynamic websites with good aesthetic Sense of designing and latest technical know-how's.	**K1**
CO2	Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services	**K2**
CO3	Get introduced in the area of Online Game programming.	**K3**
CO4	Simulates sending a SOAP message as a request and receiving Another as a response.	**K3**
CO5	Develop a Web intranet/internet based Web Service Client	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	M	S	S	S
CO3	S	M	S	S
CO4	M	S	S	S
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE – II

DATA SCIENCE

Semester: II **Exam Hrs:3**
Course Code : 20PCA2E2A **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective:

Conceptualization and summarization of bigdata and machine learning, trivial data versus big data, big data 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 and management, 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 visualisation: Introduction, Types of data visualisation, Data for visualisation: Data types, Data encodings, Retinal variables, mapping variables to encodings, Visual encodings.

Unit- V **12 Periods**

Applications of Data Science, Technologies for visualisation, 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 Books :

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

Course Outcomes

After successful completion of this course, the students should be able to

CO Number	CO Statement	Knowledge Level
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

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	S	S	S	S
CO3	S	M	S	S
CO4	S	S	M	S
CO5	M	S	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE – II

COMPILER DESIGN

Semester: II **Exam Hrs:3**
Course Code : 20PCA2E2B **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective:

To understand the various phases of a compiler and to develop skills in designing a compiler.

Unit- I Introduction (12 Periods)

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

Unit -II Basic Data Structures (12 Periods)

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

Unit -III Advanced Data Structures (12 Periods)

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

Unit -IV Sorting & Searching Techniques (12 Periods)

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

Unit -V Files (12 Periods)

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

Text Book(S) :

1. Alfred Aho, Ravi Sethi, Jeffy D. Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia, 2003

Reference Books :

1. Torben Agidius Mogensen, ntroduction to Compiler Design, Springer, 2011.
2. HenkAlblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
3. Kenneth C. Louden, ≪Compi ler Construction : Principles and Practices, Thompson Learning, 2003

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Specify and analyse the lexical, syntactic and semantic structures Of advanced language features.	**K1**
CO2	Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation	**K2**
CO3	Design a parser, and semantic analyser without the aid of automatic generators	**K3**
CO4	Code optimization and instruction selection practices.	**K3**
CO5	Describe techniques for intermediate code and machine code optimization	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	S	S	S	S
CO3	S	S	S	S
CO4	S	M	S	S
CO5	S	S	M	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE – II

MICROPROCESSORS, INTERFACING AND APPLICATIONS

Semester: II **Exam Hrs:3**

Course Code : 20PCA2E2C **Max.Marks:75**

Total Hours: 60 **Credit:4**

Objectives:

1.To introduce 8085 architecture and programming in assembly language.

2.To introduce basic concepts of Interfacing memory and peripheral devices to a microprocessor.

Unit- I **(12Periods)**

Overview of Microcomputer Systems – Hardware - Addresses – General Operation of a Computer - Intel 8086 CPU Architecture – Internal Operation –Machine Language Instructions – Addressing Modes – Instruction Formats – Instruction Execution Timing – Pin Configuration of 8086: Minimum Mode, Maximum Mode.

Unit- II **(12Periods)**

Assembler Language Programming – Assembler Instruction Format – Data Transfer Instructions – Arithmetic Instructions – Branch Instructions – Loop Instructions – Flag Manipulation Instructions – Logical Instructions – Shift and Rotate Instructions – Stack Instructions – Call and Return Instructions – Macros – String Instructions – REP Prefix – IN and OUT Instructions.

Unit- III **(12 Periods)**

Assembly Language Programs – Addition, Subtraction, Multiplication and Division – Multibyte Addition and Subtraction – Complements – Assembly and Disassembly of a Word – Sum of a Series – Block Data Transfer – Finding the Smallest and the Biggest Number in an Array – Arranging a Series of Numbers in Descending and Ascending Order – Length of a String – Number of Occurrences of a Character in a String.

Unit- IV **(12 Periods)**

I/O Interfaces – Functions – Address Space Partitioning: Memory Mapped I/O Scheme, I/O Mapped I/O Scheme – Memory and I/O Interfacing – Data Transfer Schemes – I/O Ports – Programmable Peripheral Interface – Programmable DMA Controller.

Unit- V **(12 Periods)**

Microprocessor Applications – Delay Subroutines – Seven Segment Displays – Frequency Measurement – Temperature Measurement – Water Level Indicator and Controller – Traffic Lights Control.

Text Book(s):

1. Yu-cheng Liu and Glenn A. Gibson, Microcomputer Systems–The 8086/8088 Family – Architecture, Programming and Design, Prentice Hall of India, Second Edition, 2011
2. B. Ram, Fundamentals of Microprocessors and Microcontrollers, Dhanpat Rai Publications, Seventh Edition, 2011.

Reference Books :

Douglas V. Hall, Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill, Revised Second Edition, 2006.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.	**K1**
CO2	Identify a detailed s/w & h/w structure of the Microprocessor.	**K2**
CO3	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.	**K3**
CO4	Ddistinguish and analyze the properties of Microprocessors & Microcontrollers.	**K3**
CO5	Analyze the data transfer information through serial & parallel ports	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	S	M
CO3	S	M	S	S
CO4	S	S	M	S
CO5	M	M	S	S

S –Strong; M–Medium; L – Low

APPLICATION ORIENTED COURSE-II

CYBER CRIME TECHNOLOGY

Semester: II **Exam Hrs:3**
Course Code : 20PCA2A2 **Max.Marks:75**

Total Hours: 60 **Credit:3**

Objectives:

1. To know the nature and effects of cyber crimes.
2. To understand cyber challenges and technical skills.

Unit – I **(12 Periods)**
Sale of Illegal Articles – Online gambling – Intellectual Property Crimes – Email Spoofing – Forgery – Cyber Stalking – Web Defacement.

Unit – II **(12 Periods)**
Email Bombing – Data Diddling– Virus / Worm Attacks – Trojans and Keyloggers– Email Frauds – Computer Crime Technology – White Collar Computer Crime – Crime Victim.

Unit – III **(12 Periods)**
Fake Websites –Bank Fraud – Advance Fee Fraud – Identity Theft – Digital Privacy Cyber Security – Protecting Information Resources.

Unit – IV **(12 Periods)**
Corporate Reputation: Determinants and Effects – Rebuilding Corporate Reputation – Social Responsibility.

Unit – V **(12 Periods)**
Knowledge Resources – Entrepreneurship Capabilities – Information Sources – knowledge Categories – Crime Investigations.

Text Book(S) :
1. RohasNagpal, Evolution of Cyber Crimes, Asian School of Cyber Laws,2008.
2. Petter Gottschalk, Policing Cyber Crime, Petter Gottschalk and VentusPublishing Aps, 2010.

Reference Books :
1. Farooq Ahmad,Cyber Law in India Law on Internet, Fourth Edition,2011.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of information security and cyber laws.	**K1**
CO2	Understand the various applications of information security.	**K2**
CO3	Develop secure information systems.	**K3**
CO4	Understand the various security policies.	**K3**
CO5	Understand the various cyber laws and acts followed for information security.	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	M	S	S	S
CO3	S	M	M	S
CO4	M	S	S	S
CO5	S	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE – XI

PYTHON PROGRAMMING

Semester: III **Exam Hrs:3**
Course Code : 20PCA3C11 **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective:

To acquire Object Oriented Skills in Python.

Unit-I **(12 Periods)**

Introduction and overview

Introduction, What is Python, Origin, Comparison, Comments, Operators, Variables and Assignment, Numbers, Strings, Lists and Tuples, Dictionaries, if Statement, while Loop, for Loop and the range() Built-in Function, Files and the open() Built-in Function, Errors and Exceptions, Functions, Classes, Modules Syntax and Style Statements and Syntax, Variable Assignment, Identifiers, Basic Style Guidelines, Memory Management, Python Application Examples

Unit-II **(12 Periods)**

Python Objects

Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types. Numbers and Strings.Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions.Sequences: Strings, Lists, and Tuples, Sequences, Strings, Strings and Operators, String-only Operators, Built-in Functions, String Built-in Methods, Special Features of Strings

Unit-III **(12 Periods)**

Lists

Operators, Built-in Functions, List Type Built-in Methods, Special Features of Lists, Tuples, Tuple Operators and Built-in Functions, Special Features of Tuples. **Dictionaries:**Introduction to Dictionaries, Operators, Built-in Functions, Built-in Methods, Dictionary Keys, **Conditionals and Loops:** if statement, else Statement, elif Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement, else Statement

Unit-IV **(12 Periods)**

Files and Input/Output

File Objects, File Built-in Function, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules

Unit-V **(12 Periods)**

Regular Expressions: Introduction/Motivation, Special Symbols and Characters for REs, REs and Python.**Errors and Exceptions:** What Are Exceptions? Exceptions in Python, Detecting and Handling Exceptions, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions. **Functions:** Functions, Calling Functions, Creating Functions, Formal Arguments, Positional Arguments, Default Arguments, Why Default Arguments?, Default Function Object Argument Example, Variable-length Arguments, Non-keyword Variable Arguments (Tuple), Keyword Variable Arguments (Dictionary)

Text Book(S):

1.Chun, J Wesley, Core Python Programming, Second Edition, Pearson, 2007 Reprint 2010

Reference Books:

1. Barry, Paul, Head First Python, 2nd Edition, O Rielly, 2010

2. Lutz, Mark, Learning Python, 4th Edition, O Rielly, 2009

Course Outcomes

After completion of the course, Student will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain the basic principles of Python programming language	**K1**
CO2	Understand and implement modular approach using python	**K2**
CO3	Implement various data structures provided by python library	**K3**
CO4	Develop real-world applications using oops, files and exception handling provided by python	**K3**
CO5	Make their code robust by handling errors and exceptions properly	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	S	S
CO3	M	S	M	S
CO4	M	M	S	S
CO5	M	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE – XII

MOBILE COMPUTING

Semester: III **Exam Hrs:3**

Course Code : 20PCA3C12 **Max.Marks:75**

Total Hours: 60 **Credit:4**

Objective:

To impart fundamental concepts in the area of mobile computing, to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software, and to introduce selected topics of current research interest in the field.

Unit- I **(10 Periods)**

Getting to know Android – Android development environment – Android development environment for real applications – start up code, M J Android applications.

Unit- II **(14 Periods)**

Debugging Android applications – the ApiDemos Application – signing and publishing an applications

Unit- III **(12 Periods)**

SQLiteo databases and connect providers – locating and mapping

Unit-IV **(12 Periods)**

Building a view – A widget bestiary

Unit- V **(12 Periods)**

Drawing 2D and 3D graphics – simple phone calls

Text Book(S):

Chapters: 1 - 12 and 14

Android – Applications Development R. Roger, J Lombardo, Z Mednieks and B.Meike, O'Reilly, Shroft Publishers & Distributors Pvt Ltd, New Delhi, 2010.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Able to explain the basics of mobile computing system	**K1**
CO2	Able to develop mobile application using android	**K2**
CO3	Understand the Mobile Ad hoc networks and its routing	**K3**
CO4	Understand the different types of security features	**K3**
CO5	Aware about the concept of Network Security and Hacking	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	M	M	S	S
CO2	S	S	S	S
CO3	S	M	M	S
CO4	S	S	M	S
CO5	M	M	S	S

S –Strong; M–Medium; L – Low

CORE COURSE-XIII

ARTIFICIAL INTELLIGENCE

Semester: III **Exam Hrs:3**
Course Code : 20PCA3C13 **Max.Marks:75**
Total Hours: 60 **Credit:4**

Objective :

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

Unit -I **(12 Periods)**

What is Artificial Intelligence? The AI Problems – The Underlying Assumptions – What is an AI Techniques? Problems: Problems spaces and search – Defining the Problems as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics – Issues in the Design of Search Programmes.

Unit- II **(12 Periods)**

Generate – and-Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means – Ends – Analysis-Knowledge Representation issues: Representation and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem

Unit -III **(12 Periods)**

Using predicate logic – Representing Simple facts in Logic – Representing Instance and Is a relationships – Computable functions and Predicates – Resolutions – Natural Deductions – Representing Knowledge Using Rules: Procedural versus Declarative Knowledge – Forward versus Backward Reasoning – Matching – Control Knowledge

Unit- IV **(12 Periods)**

Symbolic Reasoning under uncertainty – Introduction to Non Monotonic Reasoning – Logics for Non Monotonic Reasoning – Implementation issues – Augmenting a Problem solver – Implementation :Deapth – First Search – Implementation : Breadth – First Search – Statistical reasoning – Bayesian Networks – Fuzzy Logic- Learning: What is learning? – Rote Learning – Learning by taking advice – Learning in Problem Solving

Unit -V **(12 Periods)**

Connectionist Models – Introduction – Hopfield Networks – Learning in Neural Networks – Applications of Neural Networks – Expert Systems – Representing and Using Domain Knowledge – Expert System Shells – Explanation – Knowledge acquisition

Text Book(S) :

Artificial Intelligence, Elaine Rich, Kevin Knight, 2/e, TataMcGraw Hill Publishing Ltd., - New Delhi, 1991 Chapters: 1.1 – 1.3, 2.3, 4.5, 6.7, 8.3 – 8.5, 17.1 – 17.4, 18.1 – 18.3 & 20

Reference Books :

1. Artificial Intelligence, A Modern Approach, Stuart J. Russell and Peter Norvig, Prentice, 2010.
2. Introduction to Artificial Intelligence and Expert Systems, Dan W.Patterson, PrenticeHall of India, New Delhi, 1992
3. Introduction to Expert Systems, 3/e, Peter Jackson, Pearson Education, Reprint 2003
4. Artificial Intelligence, A New Synthesis, Nils J. Nilsson Harcourt Asia Pvt. L d., 1998

Course Outcomes

After completion of the course, student shall be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.	**K1**
CO2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.	**K2**
CO3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.	**K3**
CO4	Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.	**K3**
CO5	Demonstrate proficiency in applying scientific method to models of machine learning.	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	S	M
CO3	S	M	S	S
CO4	S	S	M	S
CO5	M	S	S	S

S –Strong; M–Medium; L – Low

CORE COURSE-XIV

PYTHON PROGRAMMING LAB

Semester: III **Exam Hrs:3**

Course Code : 20PCA3C14P **Max.Marks:60**

Total Periods:45 **Credit:3**

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)

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Create a calculator program	**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

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	M	S	S	S
CO3	S	M	S	S
CO4	S	S	S	S
CO5	S	S	M	S

S –Strong; M–Medium; L – Low

CORE COURSE-XV

MOBILE COMPUTING LAB

Semester: III **Exam Hrs:3**

Course Code : 20PCA3C15P **Max.Marks:60**

Total Periods:45 **Credit:3**

Objective:

1. To introduce the fundamentals of mobile computing, Abstract concepts .

2. To create and use new, simple and complex within Android program

PROGRAMS

1. Create an Application which deals with the Android Content Providers.(5 Periods)

2. Create Application using Android Layouts, Views and Events(5 Periods)
3. Create an application which uses Files, Preferences and Notifications(5 Periods)
4. Create Application to Create, Modify and Query an SQLite Database(5 Periods)
5. Create an application for Querying web services and Parsing response(5 Periods)
6. Create Application which uses the concept of Services and Background Threats(4 Periods)
7. Creating Android Audio Video Application(4 Periods)
8. Create an Application which uses Map Activity and points the locations onto the Map Locations (4 Periods)
9. Create an Application with One-Time, Repeating Alarms, and Long Running Background Task as Service. (4 Periods)
10. Create an Application for Simple Mobile Game. (4 Periods)

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Create an application which uses Files, Preferences and Notifications	**K1**
CO2	Create an application for Querying web services and Parsing response	**K2**
CO3	Creating Android Audio Video Application	**K3**
CO4	Create an Application which uses Map Activity and points the locations onto the Map Locations	**K3**
CO5	Create an Application for Simple Mobile Game	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	M	M	S	S
CO2	S	S	S	S
CO3	S	M	M	S
CO4	S	S	M	S
CO5	M	M	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE –III

DIGITAL IMAGE PROCESSING

Semester: III **Exam Hrs:3**
Course Code : 20PCA3E3A **Max.Marks:75**
Total Periods: 60 **Credit:4**

Objective:

To study the various concepts, methods and algorithms of digital image processing with image transformation, image enhancement, image restoration, image compression techniques.

Unit -I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS : (12 Periods)

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

Unit- II IMAGE TRANSFORMS : (12 Periods)

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

Unit- III IMAGE ENHANCEMENT : (12 Periods)

Point operations - contrast stretching, clipping and thresholding density slicing,Histogram equalization, modification andspecification, spatial operations – spatial averaging, low pass, high pass, bandpass filtering, direction smoothing, medium filtering, generalized cepstrum andhomomorphic filtering, edge enhancement using 2-D IIR and FIR filters, color image enhancement.

Unit- IV IMAGE RESTORATION : (12 Periods)

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

Unit -V IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS: (12 Periods)

Image data rates, pixel coding, predictive techniques transformcoding and vector DPCM, Block truncation coding, wavelet transform coding ofimages, color image coding. Random transform, back projection operator,inverse random transform, back projection algorithm, fan beam and algebraicrestoration techniques.

Text Book(s) :

1. Bernd Jahne, Digital Image Processing, Springer, 2013
2. Anil K. Jain, "Fundamentals of Digital Image Processing", PHI, 1995.

Reference Books:

1. Sid Ahmed M.A., "Image Processing", McGraw Hill Inc, 1995.
2. Gonzalaz R. and Wintz P., "Digital Image Processing", Addison Wesley, 2ndEd, 1987

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	To discuss on the basics of digital image processing and digital image formation. To illustrate different mathematical preliminaries to deal with digital image processing.	**K1**
CO2	To be able to Develop Fourier transform for image processing in frequency domain and image Enhancement: Spatial Domain	**K2**
CO3	To be able to evaluate the methodologies for image segmentation, restoration, enhancement, etc	**K3**
CO4	Understand the need for image compression and multi resolution analysis and to learn the spatial and frequency domain techniques of image compression	**K3**
CO5	Learn different feature extraction techniques for image analysis and recognition. To be able to implement image process and analysis algorithms. To be able to Apply image processing algorithms in practical applications.	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	S	S	M	S
CO3	S	M	S	M
CO4	M	S	S	S
CO5	S	M	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE –II

IOT

Semester: III **Exam Hrs:3**
Course Code : 20PCA3E3B **Max.Marks:75**
Total Periods:60 **Credit:4**

Objectives:

1.Students will understand the concepts of Internet of Things and can able to build IOT Applications.
2.The main aim of IoT is to unify everything in world including things, people, place and process under a common infrastructure to provide information and control of state of objects around us.

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 Interoperable 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-Defense-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 Use Cases ",Taylor & Francis,CRC Press,1stEdition,2017.
2. Arshdeep Bahga,Vijay Madisetti, "Internet of Things, A Hands-On Approach ",Universities Press(INDIA)Private Limited ,1stEdition,2015.

Reference Books:

1.Jan Holler , VlasiosTsiatsis,Catherine Mulligan,Stefan Avesand,Stamatis Karnouskos,David Boyle, “From Machine-to –Machine to the Internet of Things :Introduction to a New Age of Intelligence”,1stEdition,Academic Press,2014

Course Outcomes:

After completion of the course, student shall be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain the basic knowledge about IoT and they will be able to use IoT related products in real life.	**K1**
CO2	helps to rely less on physical resources and started to do their work smarter.	**K2**
CO3	Able to understand the application areas 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

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	S
CO2	S	S	S	M
CO3	S	S	S	S
CO4	S	S	M	S
CO5	M	M	S	S

S –Strong; M–Medium; L – Low

ELECTIVE COURSE –III

CLOUD COMPUTING

Semester: III **Exam Hrs:3**
Course Code : 20PCA3E3C **Max.Marks:75**
Total Periods:60 **Credit:4**

Objective:
To impart knowledge on Introduction to Cloud Computing, The Evolution of SaaS, The Anatomy of Cloud Infrastructure, Workflow Management Systems and Clouds.

Unit- I **(12 Periods)**
Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud - Features of a cloud-Infrastructure Management-Infrastructure as a Service Providers-Platform as a Service Providers-Challenges and Risks. Broad Approaches to Migrating into the Cloud - Seven Step Model of Migration into a Cloud.

Unit- II **(12 Periods)**
The Evolution of SaaS-The Challenges of SaaS Paradigm-Approaching the SaaS Integration Enigma- New Integration Scenarios- The Integration Methodologies- SaaS Integration Products, Platforms and Services-B2Bi Services - Background of Enterprise cloud computing paradigm-Issues for Enterprise Applications on the Cloud-Transition Challenges- Enterprise Cloud Technology and Market Evolution -Business drivers toward a marketplace for Enterprise cloud computing- The Cloud Supply Chain.

Unit- III **(12 Periods)**
The Anatomy of Cloud Infrastructure- Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- RVWS Design -Cluster as a Service: The Logical Design -Cloud Storage : from LANs TO WANs- Technologies for Data Security in Cloud Computing .

Unit- IV **(12 Periods)**
Workflow Management Systems and Clouds - Architecture of Workflow Management Systems Utilizing Clouds for Workflow Execution-A Classification of Scientific Applications and Services in the Cloud-SAGA based Scientific Applications that Utilize Clouds. MapReduce Programming Model- Major MapReduce Implementations for the Cloud- MapReduce Impacts and Research Directions. AModel for Federated Cloud Computing -Traditional Approaches to SLO Management-Types of SLA -Life Cycle of SLA - SLA Management in Cloud-Automated Policy based Management.

Unit-V **(12 Periods)**
Grid and Cloud- HPC in the Cloud: Performance related Issues -Data Security in the Cloud- The Current State of Data Security in the Cloud-Homo Sapiens and Digital Information-Risk- Identity-The Cloud, Digital Identity and Data Security -Content Level Security :Pros and Cons-Legal Issues in Cloud Computing -Data Privacy and Security Issues- Cloud Contracting models- Case Studies : Aneka and CometCloud.

Text Book(S):

1. Cloud Computing Principles and Paradigms, by RajkumarBuyya, James Broberg, and AndrzejGoscinski. 2011 .

Reference Books:
1.Cloud Application Architectures,GeorgeReese,ISBN: 184047142,Shroff/O'Reilly,2009.

Course Outcomes

After completion of the course, student shall be able to

CO Number	CO Statement	Knowledge Level
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 features can be delivered more Easily on virtual infrastructures.	**K3**
CO5	Familiarize and apply Cloud deployment tools in real time applications	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	S
CO2	S	S	M	M
CO3	S	S	S	S
CO4	S	S	M	M
CO5	M	M	S	S

S –Strong; M–Medium; L – Low

SKILL DEVELOPMENT COURSE

Semester: III **Exam Hrs:3**
Course Code : 20PCA3SD1 **Max.Marks:60**

Total Periods: 30 **Credit :2**

Objective:

1. To develop inter personal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.

Unit- I - INTERPERSONAL SKILLS (6 Periods)
Gratitude Understanding the relationship between Leadership Networking & Team work. Assessing Interpersonal Skills Situation description of Interpersonal Skill. Team Work: Necessity of Team Work Personally, Socially and Educationally

Unit-II – LEADERSHIP (6 Periods)
Skills for a good Leader, Assessment of Leadership Skills

Unit- III - STRESS MANAGEMENT (6 Periods)
Causes of Stress and its impact, how to manage & distress, Circle of control, Stress Busters. Emotional Intelligence What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales. Managing Emotions.

Unit- IV - CONFLICT RESOLUTION (6 Periods)
Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution.

Unit-V - DECISION MAKING (6 Periods)
, Process and practical way of Decision Making, Weighing Positives & Negatives. Technical Topic Presentation

Text Book(S):

SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.

Reference Books: Importance and necessity of Decision Making

1. Covey Sean, Seven Habit of Highly Effective Teens, New York, Fireside Publishers,

2. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster,

3. Thomas A Harris, I am ok, You are ok , New York-Harper and Row-

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Develop and articulate a personal philosophy of leadership	**K1**
CO2	Identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions.	**K2**
CO3	Understand concepts of democratic leadership and processes	**K3**
CO4	Approaches to conflict resolution	**K3**
CO5	Importance and necessity of Decision Making	**K3**

Mapping with Programme Outcomes

COS	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M
CO2	M	S	S	S
CO3	S	S	M	S
CO4	S	M	S	M
CO5	M	S	M	S

S –Strong; M–Medium; L – Low