POORNIMA UNIVERSITY

SCHOOL OF COMPUTER SCIENCE & ENGINEERING

MCA (Artificial Intelligence & Data Science)

TEACHING SYLLABUS

MCA (Artificial Intelligence & Data Science)

(Batch 2021-23)

JULY-2021

POORNIMA UNIVERSITY

Your Dreams Our Goal

VISION

To create knowledge based society with scientific temper, team spirit and dignity of labor to face global competitive challenges.

Mission

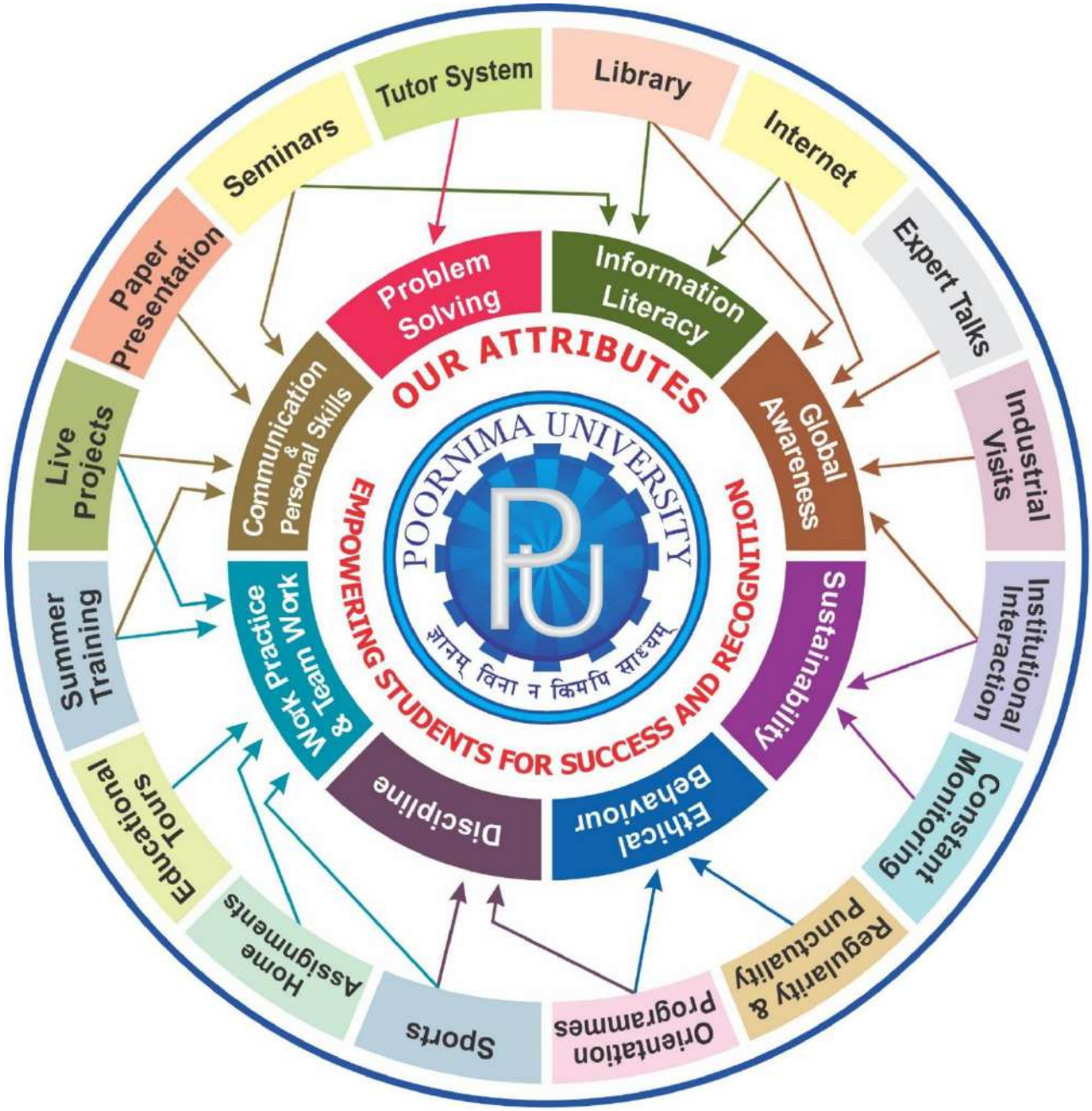
To evolve and develop skill based systems for effective delivery of knowledge so as to equip young professionals with dedication and commitment to excellence in all spheres of life.

Quality Policy

To provide Quality Education through Faculty development, updating of facilities and continual improvement meeting University norms and keeping stake holders satisfied.

Knowledge Wheel

At Poornima, the academic atmosphere is a rare blend of modern technical as well as soft skills and traditional systems of learning processes.


Tutor System
Library
Seminars
Internet
Paper Presentation
Expert Talks
Problem Solving
Information Literacy
OUR ATTRIBUTES
Live Projects
Communication & Personal Skills
Global Awareness
Industrial Visits
POORNIMA UNIVERSITY
PU
ज्ञानम् विना न किमपि साध्यम्
Summer Training
Work Practice & Team Work
Sustainability
Institutional Interaction
EMPOWERING STUDENTS FOR SUCCESS AND RECOGNITION
Educational Tours
Discipline
Ethical Behaviour
Constant Monitoring
Home Assignments
Regularity & Punctuality
Sports
Orientation Programmes

POORNIMA UNIVERSITY, JAIPUR								
School of Computer Science & Engineering								
Name of Program: MCA (Artificial Intelligence & Data Science)							**Batch: 2021-23**	
Teaching Scheme for First Year - First Semester								
Course Code	**Course Name**	**Teaching Scheme (Hrs. per Week)**			**Marks Distribution**			**Credit**
		Lecture (L)	**Tutorials (T)**	**Practical (P)**	**IE**	**ESE**	**Total**	
A.	**University Core Courses**							
	Nil							
B.	**Department Core Courses**							
B.1	**Theory**							
MCDCSA1101	Mathematical Foundation of Computers	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE1102	Computer Networks & Data Communication	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE1103	Web Technologies	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE1104	Core Java Programming	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE1105	Python Programming	**3**	**-**	**-**	**40**	**60**	**100**	**3**
B.2	**Practical**							
MCDCCE1206	Web Technologies Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE1207	Core Java Programming Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE1208	Python Programming Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE1209	Object Oriented Programming Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
C.	**Department Elective**							
MCDECE1111	Computer Graphics & Multimedia	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDECE1112	Data Structures with C							
MCDECE1113	Data Compression Techniques							
D.	**Open Elective: Anyone**							
	Nil							
E.	**Humanities and Social Sciences including Management courses OR Ability Enhancement Compulsory Course (AECC)**							
MCDCHM1210	Spoken English & Communication Skills I	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCHM1211	Personality Development & Emotional Intelligence	**-**	**-**	**2**	**60**	**40**	**100**	**1**
F.	**Skill Enhancement Courses (SEC) OR Project work, Seminar and Internship in Industry or Elsewhere**							
	Nil							
G.	**Social Outreach, Discipline, TEP, VAC& Extra Curricular Activities**							
MCDCCE1612	Discipline & Talent Enrichment Program (TEP)- I	**1**	**-**	**-**	**50**	**-**	**50**	**1**
MCDCCE1613	Campus Recruitment Training (CRT)- I	**2**	**-**	**-**				
MCDCCE1614	Non Syllabus Project (NSP)							
MCDCCE1615	Online Certification Courses							
	Total Hours	**21**	**2**	**12**				
	Total Teaching Hours	**35**						**26**

FIRST SEMESTER

CORE THEORY SUBJECTS

Code: MCDCSA1101	Mathematical Foundation of Computers	3.5 Credits [LTP: 3-1-0]

COURSE OUTCOME

The student would be able:

After completion of the course, students would be able to apply fundamentals of higher mathematical knowledge in science and engineering and also solve curriculum problems.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Matrix Theory	08
2.	Eigen Values	07
3.	Three-dimensional geometry and Vector calculus	08
4.	Calculus	07
5.	Complex Algebra	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Matrix Theory**
	• Introduction of Unit • Introduction to the matrix theory • Types of matrices, • Inverse of matrices, • Rank of matrices, • Solving system of linear equations. • Conclusion of Unit
2.	**Eigen Values**
	• Introduction of Unit • Eigen values and Eigen vectors, • Sparse matrix, • Diagonalization and triangulization of matrices. • Conclusion of Unit
3.	**Three-dimensional geometry and Vector calculus**
	• Introduction of Unit • Basic concepts of three- dimensional geometry (viz. direction cosines and direction ratios), • Equation of aplane and of a straight line. • Basic concepts of vectors, gradient, divergence and curl of a vector. • Conclusion of Unit
4.	**Calculus**
	• Introduction of Unit • Introduction of differential and integral calculus, • Derivatives of various types of functions, • Basic idea of differential equations, • Solutions of ordinary differential equations with constant coefficients • Conclusion of Unit

5.	**Complex Algebra**
	• Introduction of Unit • Introduction to the complex algebra, complex numbers, • Geometrical representation of complex numbers, • Argand diagram, • De- Moirvre'stheorem • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Higher Engineering Mathematics	Ramana B. V.	Latest	Tata McGraw – Hill
2.	Engineering Mathematics	Babu Ram	Latest	Pearson
3.	Analytical Solid Geometry	Narayan Shanti	Latest	S Chand & Company
Reference Book				
1.	Higher Engineering Mathematics, Grewal B. S. and Grewal J. S, Khanna Publishers, New Delhi, Latest Edition			
2.	Engineering Mathematics, KreyszigErrwin, John Wiley& Sons, New York, Latest Edition			

Code: MCDCCE1102	Computer Networks & Data Communication	3.5 Credits [LTP: 3-1-0]

COURSE OUTCOME

On successful completion of the course, the student will be having the basic knowledge of computer networks, data sharing, transmission media and their protocols.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to Networks and Devices**	07
2.	**The Data Link Layer**	08
3.	**Network Layer**	08
4.	**Transport Layer**	07
5.	**Application Layer**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Networks and Devices**
	• Introduction of Unit • Definition and Uses of Computer Network • Network classes • Repeaters, Hub, Bridges , Switches • Routers, Gateways • Routing Algorithms, Distance Vector Routing , Link State Routing • Conclusion of Unit
2.	**The Data Link Layer**
	• Introduction of Unit • Design issues, error detection and correction • Elementary data link protocols, • Data link layer in the internet • THE MEDIUM ACCESS SUBLAYER: Channel allocations problem • Multiple access protocols, Ethernet, Data Link Layer switching, • Wireless LAN, Broadband Wireless, Bluetooth • Conclusion of Unit
3.	**Network Layer**
	• Introduction of Unit • Logical Addressing, IPv4 Addresses, IPv6 Addresses, • Internet Protocol, Internetworking, IPv4, IPv6, • Transition from IPv4 to IPv6, • Address Mapping, Error Reporting and Multicasting, • Forwarding and Routing, • Unicast Routing Protocols, Multicast Routing Protocols • Conclusion of Unit
4.	**Transport Layer**
	• Introduction of Unit • Process-Process Delivery • UDP, TCP and SCTP • Congestion Control, Flow Control and Quality of Service • Techniques to improve QoS, Integrated Services, • QoS in Switched Networks

	• Conclusion of Unit
5.	**Application Layer**
	• Introduction of Unit • Domain Name System, Name Space, Domain Name Space, • Distribution of Name Space, DNS in the Internet, • Types of Records, Registrars, Dynamic Domain Name System (DDNS) • Electronic Mail and File Transfer, Remote Logging, Telnet, Electronic Mail • WWW and HTTP: Architecture, • Web Documents • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Data Communications and Networking,	Behrouza A. Forouzan	Fourth Edition	TMH.
2.	Computer Networks	A.S.Tanenbaum	Fourth Edition	Pearson
Reference Book				
1.	Data Communications and Networking, TATA McGraw Hill, Ferouzan, Behrouz A.			
2.	Data and Computer Communication, Pearson Education , Stallings William			
3.	Computer Networks, PHI, Tanenbaum, Andrew S,			

Code: MCDCCE1103	Web Technologies	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able to design and implement dynamic websites with good aesthetic sense of designing and would have latest web designing tools knowledge.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to HTML**	08
2.	**Introduction to Java Scripts**	07
3.	**JDBC OBJECTS**	09
4.	**Introduction to Servlet**	07
5.	**Introduction to JSP**	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to HTML**
	• Introduction of Unit • Core Elements, Links and Addressing, • Images, Text, Colors and Background, • Lists, Tables and Layouts, • Frames, • Forms, • Cascading Style Sheets • Conclusion of Unit
2.	**Introduction to Java Scripts**
	• Introduction of Unit • Elements of Objects in Java Script, • Dynamic HTML with Java Script • Document type definition, XML Syntax, XML Schemas, • Document Object model, Presenting XML, Using XML Processors • Conclusion of Unit
3.	**JDBC OBJECTS**
	• Introduction of Unit • JDBC Driver Types, • JDBC Packages, Database Connection, Statement Objects, Result Set • JDBC and Embedded SQL • Tables, Inserting Data into Tables, Selecting Data from a Table, • Meta Data, Updating Table, deleting data from Table, • Joining Table, Calculating Data, • Grouping and Ordering Data, Sub quires, View • Conclusion of Unit
4.	**Introduction to Servlet**
	• Introduction of Unit • Servlet Life Cycles, Servlet Basics, • Tomcat Web Server, Configuring Apache Tomcat, • Handling Client Request and Response, • Handling Cookies, • Session Tracking • Conclusion of Unit

5.	**Introduction to JSP**
	• Introduction of Unit • Benefits of JSP, Basic Syntax, • Invoking Java code with JSP Scripting • Elements, JSP Page Directive, • Including Files in JSP Pages, Introduction to Java Beans, • Using JAVA Bean Components in JSP Documents, • MVC Architecture • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Web Programming, building internet applications	Chris Bates, Dreamtech	Latest	Wiley
2.	The complete Reference HTML and DHTML	A. Powey	Latest	Thomas
3.	The complete Reference J2ME,	James Keogh	Latest	-
4.	Core Servlets and Java Server Pages	Marty Hall Larry Brown	Latest	-
Reference Book				
1.	Internet, World Wide Web, How to program, Dietel , Nieto, PHI/PEA			
2.	Web Tehnologies, Godbole, Kahate, 2nd Ed., TMH			

Code: MCDCCE1104	Core Java Programming	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able:

- Understand the concepts of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Develop programs using the in-built Java API and the Java standard class library.
- Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g.,by using access control identifies, automatic documentation through comments, error exception handling).
- Use of development environment like Eclipse for collaborative programming

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Overview**	08
2.	**Classes and Objects**	07
3.	**Inheritance**	08
4.	**Package, Interfaces and Exception Handling**	07
5.	**Multithreaded Programming**	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Overview**
	• Introduction of Unit • Introduction to Java, importance of Java, • Interactive Development Environments • Eclipse/Net Beans, basics ofOOP. • Data Types, Variable, and Arrays • Primitive data types, typecasting, • Arrays, operators and control structures, identifiers, constants and literals • Conclusion of Unit
2.	**Classes and Objects**
	• Introduction of Unit • Class fundamentals, declaring objects, • Assigning object reference variables, introducing methods, • Constructors, this keyword, garbage collection, the finalize()method, • Overloading methods, using objects as parameters and return type, • Introducing access control, understanding static, • Conclusion of Unit
3.	**Inheritance**
	• Introduction of Unit • Inheritance basics, using super, • Multilevel hierarchy, constructor inhierarchy, • Method overriding, dynamic method dispatch, • Using abstract classes,

	• Conclusion of Unit
4.	**Package, Interfaces and Exception Handling**
	• Introduction of Unit • Packages, access protection, importing packages, interfaces, • Exception-handling fundamentals, exception types, • Using try and catch, multiple catch clauses, • Nested try statements, throw, throws, finally, • JAVA'sbuilt-in exceptions, user defined exception. • Conclusion of Unit
5.	**Multithreaded Programming**
	• Introduction of Unit • The Java thread model, the main thread, • Creating multiple threads, threads priorities, managing threads, • Thread class built-infunctions. • I/O and String Handling: I/O basics, reading console input, writing console output, • The print writer class, reading and writing files, string constructors, • Operations on string, string tokenizing, stringbuffer. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Java: The Complete Reference	H. Schildt	Latest	-
2.	Mastering Java J2SE	John Jukowski	Latest	-
3.	The complete Reference J2ME,	James Keogh	Latest	-
Reference Book				
1.	A. B. Downey, Think Java: How to Think Like a Computer Scientist,2011.			
2.	P. Deitel and H. Deitel, Java How To Program (Early Objects),10thEdition,2015.			

Code: MCDCCE1105	Python Programming	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able to write python scripts, work with lists and sequence of data, functions to facilitate code reuse and flow control structure.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Introduction To Python and Data Types	08
2.	Python Program Flow Control	07
3.	Python Functions, Modules and Packages	08
4.	Python String, List and Dictionary Manipulations	07
5.	Python File Operation	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction To Python and Data Types**
	• Introduction of Unit • Installation and Working with Python • Understanding Python variables, Operators • Understanding python blocks • Declaring and using Numeric data types: int, float, complex • Using string data type and string operations • Defining list and list slicing • Use of Tuple data type • Conclusion of Unit
2.	**Python Program Flow Control**
	• Introduction of Unit • Conditional blocks using if, else and elif • Simple for loops in python • For loop using ranges, string, list and dictionaries • Use of while loops in python • Loop manipulation using pass, continue, break and else • Programming using Python conditional and loops block • Conclusion of Unit
3.	**Python Functions, Modules And Packages**
	• Introduction of Unit • Organizing python codes using functions • Organizing python projects into modules • Importing own module as well as external modules • Understanding Packages • Powerful Lamda function in python • Programming using functions, modules and external packages • Conclusion of Unit
4.	**Python String, List and Dictionary Manipulations**
	• Introduction of Unit • Building blocks of python programs • Understanding string in build methods

	• List manipulation using in build methods • Dictionary manipulation • Programming using string, list and dictionary in build functions. • Conclusion of Unit
5.	**Python File Operation**
	• Introduction of Unit • Reading various types of files in python • Writing log files in python • Understanding read functions, read(), readline() and readlines() • Understanding write functions, write() and writelines() • Manipulating file pointer using seek • Programming using file operations. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Fundamentals of Python: First Programs	Kenneth Lambert	Latest	Course Technology, Cengage Learning
2.	Python: The Complete Reference	Martin Brown	Latest	McGraw Hill
3.	Programming and Problem Solving with Python	Ashok NamdevKamthane	Latest	McGraw Hill
Reference Book				
1.	Python Programming Fundamentals: A Beginner's Handbook, By NischaykumarHegde, Educreation Publishing			
2.	Python Programming: An Introduction to Computer Science, By John M. Zelle, Jim Leisy Publication			

PRACTICAL

Code: MCDCCE1206	Web Technologies Lab	1 Credit	[LTP: 0-0-2]

Course Outcome:-

Students will be able to design static and websites.

LIST OF EXPERIMENTS:

1.	Design of the Web pages using various features of HTML and DHTML
2.	Client server programming using Servlets, ASP and JSP on the server side and java script on the client side
3.	Web enabling of databases
4.	Multimedia effects on web pages design using Flash.
5.	Case Study: Design & Development of Websites with Database Connectivity and Multimedia Effects
6.	Creating Online shopping
7.	Creating Online examination
8.	Design Chat system
9.	Design Mailing system
10.	Design a university home page
11.	Design navigation on university home page
12.	Design a website as minor project

Code: MCDCCE1207	Core Java Programming Lab	1 Credit	[LTP: 0-0-2]

Course Outcome:-

Students will be able:

- Implement Object oriented features using Java
- Apply the concept of polymorphism and inheritance.
- Implement exception handling
- Develop network and window application using awt and swings.

LIST OF EXPERIMENTS:

1	Write a Java program that prints all real solutions to the quadratic equation ax2 +bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2 -4ac is negative, display a message stating that there are no real solutions
2	Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer. (use Scanner class to read input)
3	Write a Java program for sorting list of names. Read input from command line
4	Write a Java program to create a Student class with following fields Hall ticket number Student Name Department Create 'n' number of Student objects where 'n' value is passed as input to constructor.
5	Write a Java program to read copy content of one file to other by handling all file related exceptions.
6	Write a Java program that creates three threads. First thread displays "Good Morning" everyone second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
7	Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
8	Write a Java program for handling mouse events
9	Write a Java program that allows the user to draw lines, rectangles and ovals.
10	Write a Java program for handling key events using Adapter classes
11	Develop simple calculator using Swings
12	Develop an applet that displays a simple message in center of the screen

Code: MCDCCE1208	Python Programming Lab	1 Credit	[LTP: 0-0-2]

Course Outcome:-

Students will be able:

- Interpret the use of procedural statements like assignments, conditional statements, loops and function calls.
- Infer the supported data structures like lists, dictionaries and tuples in Python.
- Illustrate the application of matrices and regular expressions in building the Python programs.
- Discover the use of external modules in creating excel files and navigating the file systems.
- Describe the need for Object-oriented programming concepts in Python.

LIST OF EXPERIMENTS:

1	Implement a sequential search
2	Create a calculator program
3	Explore string functions
4	Read and write into a file
5	Demonstrate usage of basic regular expression
6	Demonstrate use of advanced regular expressions for data validation.
7	Demonstrate use of List
8	Demonstrate use of Dictionaries
9	Create Comma Separate Files (CSV), Load CSV files into internal Data Structure
10	Write script to work like a SQL SELECT statement for internal Data Structure made in earlier exercise
11	Write script to work like a SQL Inner Join for an internal Data Structuremade in earlier exercise
12	Demonstrate Exceptions in Python

Code: MCDCCE1209	Object Oriented Programming Lab	1 Credit	[LTP: 0-0-2]

Course Outcome:-

Students will be able:

- Understand the difference between the top-down and bottom-up approach
- Describe the object-oriented programming approach in connection with C++
- Apply the concepts of object-oriented programming
- Illustrate the process of data file manipulations using C++
- Apply virtual and pure virtual function & complex programming situations

1. Write a program in C++ to exchange the content of two variables using call by reference
2. Write a program in C++ to demonstrate the Constructor Overloading, assume desired parameters.
3. Write a program in C++ to create the class shape, and overload the function to return the perimeters of the different shapes.
4. Write a program in C++ demonstrating the public, protected and private parameters.
5. Write a program in C++ demonstrating the Static Data member.
6. Write a program in C++ to demonstrate constructor with default argument.
7. Write a program in C++ to demonstrate destructor in inheritance.
8. Write a program in C++ to demonstrate unary operator over complex number class.
9. Write a program in C++ to demonstrate multiple inheritance.
10. Write a program in C++ to demonstrate multilevel inheritance.
11. Write a program in C++ to demonstrate public inheritance.
12. Write a program in C++ to demonstrate protected inheritance.
13. Write a program in C++ to demonstrate constructor call in the derived class.
14. Write a program in C++ to demonstrate virtual function.
15. Write a program in C++ to demonstrate friend function.
16. Write a program to implement an Account Class with member functions to Compute Interest, Show Balance, Withdraw and Deposit amount from the Account.

DEPARTMENT ELECTIVES

Code: MCDECE1111	Computer Graphics & Multimedia	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able:

- Describe the process of problem solving through C.
- Write a justifiable C program for a given algorithm.
- Trace the certain C program manually

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Introduction to computer graphics & graphics systems	08
2.	Scan Conversion Points, Lines& Circles	07
3.	2D & 3D Transformations	08
4.	Viewing & Hidden Surfaces Detections	07
5.	Introduction to Multimedia	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to computer graphics & graphics systems**
	• Introduction of Unit • Overview of computer graphics • Representing pictures • Preparing, presenting & interacting with pictures for presentations • Visualization & image processing • RGB color model, direct coding • Raster scan display • Conclusion of Unit
2.	**Scan Conversion Points, Lines& Circles**
	• Introduction of Unit • Concepts of Pixels, Resolution, Persistence, Aspect Ratio • Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, • Circle generation algorithm, Ellipse generating algorithm • Scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm • Conclusion of Unit
3.	**2D & 3D Transformations**
	• Introduction of Unit • 2D-Translation, 2D-Rotation, 2D-Scaling • 2D-Matrix representations & homogeneous coordinates, • Transformations between coordinate systems • Reflection shear • 3D-Translation, 3D-Rrotation, 3D-Scaling • Conclusion of Unit
4.	**Viewing & Hidden Surfaces Detections**

	• Introduction of Unit • Window to viewport • Co-ordinate transformation, clipping operations • Point clipping, line clipping, • Clipping circles, polygons & ellipse • Z-buffer algorithm, Back face detection, BSP tree method, • Hidden line elimination • Conclusion of Unit
5.	**Introduction to Multimedia**
	• Introduction of Unit • Concepts, uses of multimedia, hypertext and hypermedia. • Image, video and audio standards • Digital audio, MIDI, processing sound, sampling, compression • MPEG compression standards, compression through spatial and temporal redundancy • Inter-frame and intra-frame compression • Animation: types, techniques, key frame animation • Virtual Reality concepts. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Computer Graphics	Donald Hearn and Pauline Baker M	Latest	Prentice Hall, New Delhi
2.	Procedural Elements of Computer Graphics	Rogers	Latest	Tata McGraw Hill
Reference Book				
1.	Foley, Vandam, Feiner and Hughes, ―Computer Graphics: Principles and Practice‖, 2nd Edition, Pearson Education,			
2.	Jeffrey McConnell, Computer Graphics: Theory into Practice, Jones and Bartlett Publishers			
3.	Andleigh, P. K and Kiran Thakrar, Multimedia Systems and Design, PHI,			

Code: MCDECE1112	Data Structures with C	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able:

- Implement and interpret various data structures and its representation.
- Understand and appreciate the trees and the associated merits of executing different operations on it.
- Understand the different sorting and searching techniques.
- Implement various graph techniques and witness its merits and applications.
- Understand effective storage management.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	DATA STRUCTURES	08
2.	TREES	07
3.	SORTING AND SEARCHING	08
4.	GRAPHS AND THEIR APPLICATIONS	07
5.	STORAGE MANAGEMENT	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**DATA STRUCTURES**
	• Introduction of Unit • Introduction - Arrays - Structures • Stack: Definition and examples, Representing Stacks • Queues and lists: Queue and its Representation, lists • Applications of Stack, Queue and Linked Lists. • Conclusion of Unit
2.	**TREES**
	• Introduction of Unit • Binary Trees - Operations on Binary trees • Binary Tree Representations - node representation, • Internal and external nodes, implicit array representation • Binary tree Traversals - Huffman Algorithm • Representing Lists as Binary Trees. • Conclusion of Unit
3.	**SORTING AND SEARCHING**
	• Introduction of Unit • General Background - Exchange sorts • Selection and Tree Sorting • Insertion Sorts • Merge and Radix Sorts • Basic Search Techniques • Tree Searching - General Search Trees - Hashing. • Conclusion of Unit
4.	**GRAPHS AND THEIR APPLICATIONS**
	• Introduction of Unit • Graphs - An application of graphs - Representation • Transitive closure - Warshall's algorithm

	• Shortest path algorithm - a flow Problem • Dijkstra's algorithm - An application of scheduling • Linked representation of Graphs – • Graph Traversals • Conclusion of Unit
5.	**STORAGE MANAGEMENT**
	• Introduction of Unit • General Lists: Operations, linked list representation, using lists, • Freeing list nodes • Automatic list Management • Reference count method, • Garbage Collection, Algorithms, Collection and compaction • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Data Structures using C	Tanenbaum A.S., Langsam Y. Augestein M.J	Latest	Pearson Education
2.	Data Structures and Program Design in C	Robert Kruse & Clovis L.Tondo	Latest	Prentice Hall
Reference Book				
1.	Weiss, "Data Structures and Algorithm Analysis in C", Addison Wesley, Second Edition, 2005.			
2.	Y.Langsam, M.J.Augestein, A.M.Tanenbaum, "Data Structures Using C and C++", 2nd Edition,Prentice Hall of India, 2000.			

Code: MCDECE1113	Data Compression Techniques	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able:

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Information and Coding	08
2.	Implementation of Arithmetic Coding	08
3.	Dictionary Techniques	08
4.	Lz78 Technique, Sampling and Quantization, Sampling, Quantization	07
5.	Compression of Still Images	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Information and Coding**
	• Introduction of Unit • Information and entropy, Noiseless and memory less coding, Shannon – Fano Coding, • Shannon coding, Shannon – Fano Coding, Huffman coding: • Huffman coding algorithm-minimum variance Huffman codes, optimality of Huffman code, • length of Huffman code, extended Huffman code, non-binary Huffman code, • Huffman coding with low memory requirements, • Adaptive Huffman coding: update procedure, encoding procedure, decoding procedure, golomb codes, • Rice codes, Tunstall codes, applications of Huffman coding, Arithmetic coding • Conclusion of Unit
2.	**Implementation of Arithmetic Coding**
	• Introduction of Unit • Introduction, coding a sequence-generating a tag, • Deciphering the tag, generating a binary code-uniqueness and efficiency of the arithmetic code, • Algorithm implementation, integer implementation, comparison of Huffman and arithmetic coding, • Adaptive arithmetic coding. • Conclusion of Unit
3.	**Dictionary Techniques**
	• Introduction of Unit • Static dictionary, • Adaptive dictionary-LZ77 approach, LZ78 approach, • Applications, The LZ77 technique • Conclusion of Unit
4.	**LZ 78 Technique, Sampling and Quantization, Sampling, Quantization**
	• Introduction of Unit • Uniform quantizer, adaptive quantization, non-uniform quantization, empty coded quantization, and advantages of vector quantization over scalar quantization, • The Linde-Buzo-Gray algorithm, tree structured vector quantize, structure vector quantizes, variatior theme, trellis-coded quantization, • Predictive Coding, Delta modulation (Adaptive and Delayed coding),

	• Differential pulse code modulation, Transform Coding, Defining a Transform, • Interpretation of transforms, The Karhunun-Loeve transform, The Hadamard transform, • The Discrete Fourier Transform, The Discrete Cosine Transform, • The Discrete Wavelet Transform, Sub band Coding, Filters, • Down sampling and Up sampling, Bit allocation. . • Conclusion of Unit
5.	**Compression of Still Images**
	• Introduction of Unit • JPEG, The Baseline System, • Progressive DCT- based mode of operation, Hierarchical mode of operation, • Sequential lossless mode of operation JPEG 2000, • Video Image Compression: MPEG, MPEG-1, MPEG2, MPEG 4 and MPEG7 • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Publication
1.	Elements of Data Compression	Adam Drozdek, Thomson Brooks/Cole	ISBN:981-240-626-3
2.	Introduction to Data Compression,	KHALID SAYOOD	- Elsevier
3.	Data Compression Techniques	Ida Mengyi Pu, Butterworth Heinemann	-

Code: MCDCHM1210	Spoken English & Communication Skills I	1 Credits	[LTP: 0-0-2]

Course Outcomes:

On successful completion of the course the learners will be able to

CO	Cognitive Abilities	Course Outcomes
CO-01	**Understanding/Applying**	Prepare and deliver a clear and fluent demonstrative, informative, and persuasive presentation and enlarge their vocabulary by keeping a vocabulary journal.
CO-02	**Applying/Creating**	Classify the factors that influence use of grammar and vocabulary in speech and writing.
CO-03	**Understanding/Applying**	Recognize and Consciously Use English to Create and Maintain Productive work in professional and educational settings.
CO-04	**Understanding/Applying**	Enhance their language proficiency in writing by identifying the errors and rectifying them.
CO-05	**Understanding/Applying**	Generate a pile of ideas by examining issues in greater depth, looking at different dimensions of these issues.

A. OUTLINE OF THE COURSE

Unit No.	Title of the Unit	Time required for the Unit (Hours)
1	**Speaking Skills Enhancement Training**	**6**
2	**Vocabulary Building Training**	**7**
3	**Proficiency in English**	**4**
4	**Written Communication Skill**	**6**
5	**Group Discussion**	**6**

B. DETAILED SYLLABUS

Unit	Unit Details	
1.	**Speaking Skills Enhancement Training**	**Method**
	• Introduction of the Course & the topic	• Theory/Practical
	• Describing people – Appearance & Character	• Practical
	• Correcting common mistakes while speaking English.	• Practical
	• Appreciating & Criticizing: Events & Performances	• Theory/Practical
	• Preparing speech on different situations.	• Practical
	• Practice Session	• Practical
	• Conclusion & Summary of the Unit	• Theory/Practical
2.	**Vocabulary Building Training**	
	• Introduction of the topic	• Theory/Practical
	• Vocabulary for situational dialogues	• Theory/Practical
	• Phrasal Verbs & Idioms	• Theory/Practical
	• Vocabulary for speeches and descriptions	• Theory/Practical
	• Developing Professional Vocabulary	• Theory/Practical
	• Practice Sessions	• Practical
	• Conclusion & Summary of the Unit	• Theory/Practical
3.	**Proficiency in English**	

	• Introduction of the topic • Feedback and questioning Technique • Objectiveness in Argument • Development etiquettes and manners • Study of different pictorial expression of non-verbal communication and its analysis • Practice Session • Conclusion & Summary of the Unit	• Theory / Practical • Theory/Practical • Practical • Practical • Theory/Practical • Practical • Theory/Practical
4.	**Written Communication Skill**	
	• Introduction of the topic • Correction of errors • Making of Sentences • Paragraph Writing • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Theory/Practical
5.	**Group Discussion**	
	• Introduction of the topic • Face your Fear & Speak with Confidence • Introduction to Group Discussion • Important Do's & Don'ts of GD. • Practice Session • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Practical • Theory/Practical

Code: MCDCHM1211	Personality Development & Emotional Intelligence	1 Credit	[LTP: 0-0-2]

Course Outcomes:

On successful completion of the course the learners will be able to

CO	Cognitive Abilities	Course Outcomes
CO-01	**Understanding/ Applying**	Understand the art of Power Dressing and making a great first impression by polishing their Corporate/ Business manners.
CO-02	**Understanding/ Applying**	Enhance their self-esteem, confidence and assertive behaviour to handle difficult situations with grace, style, and professionalism.
CO-03	**Understanding/ Applying**	Apply the understanding of harmony in existence in their profession and lead an ethical life.
CO-04	**Creating / Applying**	Recognize and use emotional intelligence to create and maintain productive workplace relationships and team environment.
CO-05	**Creating/Applying**	Apply collaborative, inclusive and creative communication skills.

C. OUTLINE OF THE COURSE

Unit No.	Title of the Unit	Time required for the Unit (Hours)
1	**Personal Grooming & Attitude Building**	**6**
2	**Mentoring & Interpersonal Skills**	**6**
3	**Conflict & Stress Management**	**7**
4	**Social Skills Development**	**7**
5	**Self Esteem Enhancement**	**2**

D. DETAILED SYLLABUS

Unit	Unit Details	
1.	**Personal Grooming & Attitude Building**	**Method**
	• Introduction of the Course & the topic • Impactful Personality • Attitude Building Activities • Self-Grooming & Dressing Sense • Time Management • Team Building Activities • Conclusion & Summary of the Unit	• Theory/Practical • Theory • Practical • Practical • Practical • Practical • Theory/ Practical
2.	**Mentoring & Interpersonal Skills**	
	• Introduction of the topic • Mentoring: Coaching one or more people • Leadership: Leading and assisting others by example • Problem Solving: Resolving personal, group, and business conflict • Communicating with Confidence • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Practical • Theory/ Practical
3.	**Conflict & Stress Management**	
	• Introduction of the topic • The role of communication in conflict/stress and	• Theory/Practical • Theory/Practical

	conflict/stress management processes. • Analyse the components of conflict/stress that lead to constructive or destructive communication patterns. • Recommend effective conflict/stress management communication for a given situation • Practice Sessions. • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Practical • Theory/Practical
4.	**Social Skills Development**	
	• Introduction of the topic • Listening Skills activities • Social Problem Solving • Being a part of the group and expression of feelings • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Theory/Practical
5.	**Self Esteem Enhancement**	
	• Introduction of the topic • Face your Fear & Speak with Confidence • Case Study/Class Survey • Personal Growth & Development Session • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Theory/Practical

SECOND SEMESTER

POORNIMA UNIVERSITY, JAIPUR								
School of Computer Science & Engineering								
Name of Program: MCA (Artificial Intelligence & Data Science)							**Batch: 2021-23**	
Teaching Scheme for First Year – Second Semester								
Course Code	**Course Name**	**Teaching Scheme (Hrs. per Week)**			**Marks Distribution**			**Credit**
		Lecture (L)	**Tutorials (T)**	**Practical (P)**	**IE**	**ESE**	**Total**	
A.	**University Core Courses**							
	Nil							
B.	**Department Core Courses**							
B.1	**Theory**							
MCDCCE2101	Data Mining & Data Warehouse	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE2102	Advanced Java Programming	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE2103	Design and Analysis of Algorithm	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE2104	R Programming for Data Science	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE2105	Data Science and Analytics	**3**	**-**	**-**	**40**	**60**	**100**	**3**
B.2	**Practical**							
MCDCCE2206	Data Mining Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE2207	Advanced Java Programming Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE2208	R Programming Lab for Data Science	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE2209	Data Science and Analytics Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
C.	**Department Elective**							
MCDECE2111	Application Programming for Mobile Devices	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDECE2112	Internet of Things							
MCDECE2113	Computer Cryptography & Network Security							
D.	**Open Elective: Anyone**							
	Nil							
E.	**Humanities and Social Sciences including Management courses OR Ability Enhancement Compulsory Course (AECC)**							
MCDCHM2210	Spoken English & Communication Skills II	**-**	**-**	**2**	**60**	**40**	**100**	**1**
F.	**Skill Enhancement Courses (SEC) OR Project work, Seminar and Internship in Industry or Elsewhere**							
	Nil							
G.	**Social Outreach, Discipline, TEP, VAC& Extra Curricular Activities**							
MCDCCE2611	Discipline & Talent Enrichment Program (TEP)- II	**2**	**-**	**-**	**50**	**-**	**50**	**1**
MCDCCE2612	Campus Recruitment Training (CRT)- II	**3**	**-**	**-**				
MCDCCE2613	Non Syllabus Project (NSP)							
MCDCCE2614	Online Certification Courses							
	Total Hours	**23**	**2**	**10**				
	Total Teaching Hours	**35**						**25**

CORE THEORY SUBJECTS

Code: MCDCCE2101	Data Mining & Data Warehouse	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able to

- Design a data warehouse system and perform business analysis with OLAP tools.
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis and apply appropriate classification and clustering techniques for data analysis
- Design a data mart or data warehouse for any organization
- Extract knowledge using data mining techniques and Adapt to new data mining tools.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Data Warehousing, Business Analysis And On-Line Analytical Processing (Olap)	08
2.	Data Mining – Introduction	07
3.	Data Mining – Frequent Pattern Analysis	08
4.	Classification And Clustering	07
5.	Weka Tool	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP)**
	• Introduction of Unit • Basic Concepts – Data Warehousing Components • Building a Data Warehouse • Database Architectures for Parallel Processing - Parallel DBMS Vendors – Multidimensional Data Model • Data Warehouse Schemas for Decision Support, Concept Hierarchies – • Characteristics of OLAP Systems • Typical OLAP Operations, OLAP and OLTP. • Conclusion of Unit
2.	**DATA MINING – INTRODUCTION**
	• Introduction to Data Mining Systems • Knowledge Discovery Process – Data Mining Techniques – Issues – applications • Data Objects and attribute types, Statistical description of data • Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization • Data Visualization, Data similarity and dissimilarity measures. • Conclusion of Unit
3.	**DATA MINING – FREQUENT PATTERN ANALYSIS**
	• Introduction of Unit • Mining Frequent Patterns, Associations and Correlations

	• Mining Methods- Pattern Evaluation Method • Pattern Mining in Multilevel, Multi Dimensional Space • Constraint Based Frequent Pattern Mining, • Classification using Frequent Patterns • Conclusion of Unit
4.	**CLASSIFICATION AND CLUSTERING**
	• Introduction of Unit • Decision Tree Induction • Bayesian Classification – Rule Based Classification – Classification by Back Propagation – • Support Vector Machines — Lazy Learners – Model Evaluation and Selection- • Techniques to improve Classification Accuracy. • Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – • Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods. • Conclusion of Unit
5.	**WEKA TOOL**
	• Introduction of Unit • Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database – • Introduction to WEKA, • The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Data Mining Concepts and Techniques,	Jiawei Han and Micheline Kamber	Third Edition	Elsevier, 2012
Reference Book				
1.	Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.			
2.	K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.			
3.	Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.			

Code: MCDCCE2102	Advanced Java Programming	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

The student would be able to

- Gain the knowledge of Server Side programming by implementing Servlet and JSP. Understand and write the deployment descriptor and enterprise application deployment.
- To understand the Java Servlets and Database connectivity.
- To know more about the Enterprise Java Bean (EJB) Programming
- Design and Develop various application by Integrating any of Servlets, JSPs, Swing and Applet using Database by analyzing requirements and evaluating existing system.
- Gain the knowledge of J2EE architecture, MVC Architecture, Summarize Multi -tier Application, Various Network Protocol.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	APPLET, AWT AND EVENT HANDLING	08
2.	INTRODUCING SWING & JAVA BEANS	07
3.	JDBC	08
4.	SERVLETS	07
5.	JSP	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**APPLET, AWT AND EVENT HANDLING**
	• Applet Basics – Applet architecture • HTML APPLET tag – Passing parameter to AppletgetDocumentBase() and getCodeBase() • AWT classes and Graphics – AWT Controls Event Handling • Event Classes – Event Listener Interfaces – Layout Managers – Menus
2.	**INTRODUCING SWING & JAVA BEANS**
	• Exploring Swing – JLabel and ImageIcon, JTextField • The Swing Buttons – JTabbedPane -JScrollPane, JList&JcomboBox –Trees &JTables • What Is a Java Bean? • Advantages of Java Beans – Introspection, Bound and Constrained Properties – Persistence & Customizers
3.	**JDBC**
	• Presentation to JDBC CONNECTION settings – The Concept of JDBC – • JDBC Driver Types – JDBC Packages – A Brief Overview of the JDBC Process – • Database Connection – Associating the JDBC/ODBC Bridge with the Database – • Statement Objects – Result Set.
4.	**SERVLETS**
	• Background, The Life Cycle of a Servlet & The JSDK-A Simple Servlet • The Servlet API -RolePlay-Servlet Concept – The javax.servlet Package –

	• Reading Servlet Parameters, The javax.servlet.http Package – • Handling HTTP Request and Responses – Using Cookies – Session Tracking.
5.	**Java Server Pages**
	• Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP • Life Cycle, JSP Scripting Elements, JSP Directives, JSP Action, JSP • Implicit Objects, JSP Expression Language, JSP Standard Tag Libraries, • JSP Custom Tag, JSP Session Management, JSP Exception Handling, JSP • CRUD Application.

C. RECOMMENDED STUDY MATERIAL

S. No	**Text Books:**	**Author**	**Edition**	**Publication**
1.	"Java 2-The complete reference"	Naughton and H.Schildt, (2007)	Fifth Edition	McGraw Hill.
Reference Book				
1.	Jim Keogh, (2002), "The Complete Reference J2EE", Tata McGraw Hill Edition, New Delhi.			
2.	Marty Hall, Larry Brown, (2004), "Core Servlets and Java Server Pages", 2nd Edition, Pearson Education.			

Code: MCDCCE2103	Design and Analysis of Algorithm	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

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

CO#1: Analyze the asymptotic performance of algorithms
CO#2: Choose appropriate algorithm design paradigm like Divide and Conquer and Greedy for solving engineering problems
CO#3: Apply Dynamic Programming and Backtracking to solve engineering problems
CO#4: Solve common engineering design problems using Randomize algorithms
CO#5: Evaluate arithmetic expressions using parallel model.

A. OUTLINE OF THE COURSE

Unit No.	Title of The Unit	Time required for the Unit (Hours)
1.	**Introduction to Analysis of Algorithms**	07
2.	**Divide and Conquer and Greedy Methods**	08
3.	**Dynamic Programming and Backtracking**	08
4.	**Randomized Algorithms**	07
5.	**Parallel Models**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Analysis of Algorithms**
	• Introduction of Unit • Algorithm definition and specification, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences, • Performance analysis • Elementary Data structures:- stacks and queues, trees, dictionaries, priority queues –sets and disjoint set union, graphs, basic traversal and search techniques. • Conclusion of Unit
2.	**Divide and Conquer and Greedy Methods**
	• Introduction of Unit • Divide and conquer:- General method, binary search, merge sort, Quick sort, • The Greedy method:-General method, knapsack problem, minimum cost spanning tree, single source shortest path. • Conclusion of Unit
3.	**Dynamic Programming and Backtracking**
	• Introduction of Unit • Dynamic Programming, general method, multistage graphs, all pair shortest path, optimal binary search trees, 0/1 Knapsack, traveling salesman problem, flow shop scheduling. • Backtracking:- general method, 8-Queens problem, sum of subsets, graph coloring, Hamiltonian cycles, knapsack problem, Branch and bound:- The Method, 0/1 Knapsack problem, traveling salesperson. • Conclusion of Unit
4.	**Randomized Algorithms**
	• Introduction of Unit • Randomized Algorithms: Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, randomized algorithm for 2- SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems. • Conclusion of Unit
5.	**Parallel Models**

	• Introduction of Unit • Parallel models:-Basic concepts, performance Measures, • Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division • Parallel Evaluation of General Arithmetic Expressions, First-Order Linear recurrence. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Design and analysis of Algorithms	Aho A.V , J.D Ulman	Third Edition	Addison Wesley
2.	Design and Analysis of Algorithms	Dave and Dave	Second Edition	Pearson
Reference Book				
1.	Introduction to Algorithms, Cormen, Leiserson, Rivest, Prentice Hall of India			
2.	Fundamental of Computer algorithms, Horowitz and Sahani			

Code: MCDCCE2104	R PROGRAMMING LANGUAGE	3 Credits [LTP: 3-0-0]

COURSE OUTCOME:

This course provides a knowledge of application of procedure to read and write different format of data set into R environment, understand the uniqueness in R programming with the help of apply function in R programming language, apply different options in I/O operations in R programming Language, know the interpretation of summary statistics and testing of hypothesis and know the built-in functions for graphs and non-parametric testing of hypothesis in R.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to R Environment**	12
2.	**Data Structures and Control Statements**	12
3.	**I/O operations and String Manipulations**	12
4.	**R for Summary Statistics and Parametric Tests**	12
5.	**R for Graphs, Nonparametric Tests and ANOVA**	12

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to R Environment**
	• History and development of R Statistical computing programming language. • Installing R and R studio. • Getting started with R. • Creating new working directory. • Changing existing working directory. • Installing the available packages. • Calling the installed packages, • Variable definition in R. • Simple functions, vector definition and logical expressions • Matrix calculation and manipulation using matrix data types.
2.	**Data Structures and Control Statements**
	• Introduction to different data types, vectors, atomic vectors, types and tests, coercion, lists, list indexing, • Function applying on the lists, adding and deleting the elements of lists, attributes, name and factors, matrices and arrays, • Matrix indexing, filtering on matrix, generating a covariance matrix. • lapply( ) and sapply( ) on data frames, • Control statements.
3.	**I/O operations and String Manipulations**
	• Introduction to I/O functions in R • Using of scan( ), readline ( ) function,

	• Comparison and usage of scan and readline function, • Reading different format files into R: text file, CSV file • Statistical package files, xls and xlsx files. • Converting from one format to another using in built function, • Writing different file format in to the local machine directory, • Basics of string manipulations – grep ( ), nchar ( ), paste( ), sprintf( ), substr( ), regexpr( ), strsplit( ), • Testing of file name with given suffix.
4.	**R for Summary Statistics and Parametric Tests**
	• Descriptive statistics – summary statistics for vectors, making contingency tables, creating contingency tables from vectors. • Testing tables and flat table objects, cross tables, testing cross tabulation, recreating original data from contingency tables, switching class, mean (arithmetic, geometric and harmonic), • Median, mode for raw and grouped data, measure of dispersion – range, standard deviation, variance, coefficient of variation, testing of hypothesis – small sample test, large sample test – for comparing mean, proportion, variance (dependent and independent samples).
5.	**Testing of Hypothesis: Non - Parametric Test**
	• Introduction to graphs, • Box-Whisker Plot, Scatter plots, pairs plots, line chart, Pie Chart, • Bar Charts • Non-parametric test: The Wilcoxon U-Test (Mann-Whitney): One and Two-Sample U-Test, Tests for association: Chi Square Tests, • Yates Correction for 2X2 Tables, single category goodness of fit tests, • Analysis of Variance for one-way variation and two variation

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Book	Author	Publication
1.	Beginning R: The statistical Programming Language	Dr. Mark Gardener	John Wiley & Sons, Inc.
2.	The art of R programming	Norman Matloff	no starch Press, San Francisco
3.	Introduction to Probability and Statistics for Engineers and Scientists	Owen Jones, Robert Maillardet and Andrew Robinson	CRC Press
4.	The R Book	Hadley Wickham	CRC Press
5.	Advanced R	Ken Black	Sixth Edition, John Wiley & Sons, Inc.

Code: MCDCCE2105	Data Science and Analytics	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

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

CO#1: Implement statistics and probability in data science
CO#2: Analyze the data using algorithms
CO#3: Design mathematical model for decision making using business intelligence
CO#4: Apply Natural Language Processing on text
CO#5:.Analyze the syntax and semantics of text using Natural Language Processing

A. OUTLINE OF THE COURSE

Unit No.	Title of The Unit	Time required for the Unit (Hours)
1.	**Statistics**	08
2.	**Data Analytics**	07
3.	**Business Intelligence**	08
4.	**Natural Language Processing-I**	07
5.	**Natural Language Processing-II**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Statistics**
	• Introduction of Unit • Introduction to Statistics and Probability • Basic terminologies, contingency table, frequency and cross table, graphs, histogram and frequency polygon, Random variables, statistical properties of random variables, Expectation, jointly distributed random variables, moment generating function, characteristic function, limit theorems, probability, trial, events, types of events, apriori probability, statistical or empirical probability, Bayes theorem, • Regression and Correlation • Introduction to linear model, properties of regression coefficients, Spurious regression concepts, significance of regression coefficients using t test and F test, concepts of auto correlation, multiple linear regression analysis, correlation analysis, properties of correlation coefficients, significance of single correlation coefficient, significance of multiple correlation coefficients, concepts of multiple correlation and partial correlation • Conclusion of Unit
2.	**Data Analytics**
	• Introduction of Unit • Data Analytics Lifecycle: Overview - Discovery - Data Preparation - Model Planning - Model Building - Communicate Results – Operationalize • Regression analysis • Classification techniques • Clustering • Association rules analysis • Conclusion of Unit
3.	**Business Intelligence**
	• Introduction of Unit • Business intelligence: Definition - Effective and timely decisions - data, information and knowledge – role of mathematical models - BI architectures. • Decision Support Systems: Definition - Representation of the decision-making process - Evolution of information systems - - development of DSS.

	• Mathematical models for decision making: Structure - development of a model - classes of models • Conclusion of Unit
4.	**Natural Language Processing-I**
	• Introduction of Unit • Text pre-processing, terminologies related with text processing, challenges of text preprocessing, tokenization, sentence segmentation. • Introduction to lexical analysis, finite state morphonology, finite state morphology, morphology vs lexical analysis, paradigm based lexical analysis. • Conclusion of Unit
5.	**Natural Language Processing-II**
	• Introduction of Unit • Syntactic parsing, The Cocke–Kasami–Younger Algorithm, parsing as deduction, Implementing Deductive Parsing, LR Parsing, Constraint-based Grammars, Issues in Parsing • Natural Language Semantics, Theories and Approaches to Semantic Representation, Relational Issues in Lexical Semantics, Fine-Grained Lexical-Semantic Analysis. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Data Smart: Using Data Science to Transform Information into Insight	John W. Foreman		Wiley Publication
2.	Introduction to probability Models	Sheldon M. Ross	Ninth Edition	Elsevier Publication
3.	Hand Book of Natural Language Processing	NITIN INDURKHYA FRED J. DAMERAU	Second Edition	CRC Press
4.	Text Mining Classification, Clustering, and Applications	Ashok N. Srivastava, Mehran Sahami		CRC Press
Reference Book				
1.	Data Science from Scratch: First Principles with Python, Joel Grus, PHI			
2.	Principles of Data Science, Sinan Ozdemir, PACKT			
3.	Mining Text Data, Charu C. Aggarwal, ChengXiangZhai, Springer Publication			

PRACTICAL

Code: MCDCCE2206	Data Mining Lab	1 Credit	[LTP: 0-0-2]

Course outcomes:

After undergoing the course students will be able to:

- Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
- Develop skills and apply data mining tools for solving practical problems
- Advance relevant programming skills.
- Gain experience and develop research skills by reading the data mining literature.

List of Experiments

1. Study of WEKA tool and applying data mining techniques on following data sets in ARFF file Format i.e customer's data, weather forecasting data, agricultural data etc.
2. Implementation / Usage of WEKA for classification of above mentioned data set.
3. Implementation / Usage of WEKA for prediction of above mentioned data set.
4. Study of Meta edits tool and drawing diagram for the problem statement: Any Hotel management system and employer management in pharmaceutical company.
5. Usage of METAEDIT tool for making E-R diagrams for the above problem statement.
6. Usage of METAEDIT tool for state transaction for the above problem statement.
7. Study of AR miner Tool.
8. Usage of AR miner for data warehouse.
9. Study of DB miner Tool.
10. Implementation of various classification algorithms like decision tree, neural networks.
11. Comparison of various databases such as Oracle, Sybase.
12. Comparison of various data mining tools.

Code: MCDCCE2207	Advanced Java Programming Lab	1 Credit	[LTP: 0-0-2]

LIST OF EXPERIMENTS:

1. Application Development using APPLET and SWING.
2. Application Development using Enterprise Java Bean.
3. Program to perform database operation.
4. Basic servlet program
5. Basic JSP program
6. Database Operation in jsp
7. Program for Tag
8. Session management in jsp
9. Program for Custom JSP Tag
10. Program for Basic Hibernate
11. Web Services.
12. Design a Mailing System

Code: MCDCCE2208	R PROGRAMMING LAB	1 Credit	[LTP: 0-0-2]

A. List of Programs

Part A

1. Install and configure R, set working directory.
2. Install Packages and calling installed packages
3. R studio environment and functionalities of R studio
4. Implement basic R operations (data input, missing values, importing data into R using different formats : xlsx, CSV, Text files)
5. Use R as a calculator
6. Explore various functionalities of dataframes.
7. Create data set using data frames, list and tables.
8. Create the contingency table for the given raw data.
9. Create the interactive user input code line in r using readline ( ) function.
10. Create the contingency table for the given vector format data.
11. Convert the contingency table to original format of the given data.
12. Analyse and give interpretation of summary statistics for the given data.
13. Calculate mean, median and mode for the grouped data and compare the results for the given data.
14. Analyse the given data for non-parametric tests and give the interpretations.
15. Use R for test the given data

    In order to compare the effectiveness of two sources of nitrogen, namely ammonium chloride (NH4Cl) and urea, on grain yield of Coarse cereal, an experiment was conducted. The results on the grain yield of Coarse Cereal (kg/plot) under the two treatments are given below.

    NH4Cl : 13.4, 10.9, 11.2, 11.8, 14.0, 15.3, 14.2, 12.6, 17.0, 16.2, 16.5, 15.7.

    Urea : 12.0, 11.7, 10.7, 11.2, 14.8, 14.4, 13.9, 13.7, 16.9, 16.0, 15.6, 16.0.

    Assess which source of nitrogen is better for Coarse Cereal.

Part B

16. Before an increasing in exercise duty on tea, 800 persons out of a sample of 1000 persons were found to be tea drinkers. After an increasing in duty, 800 people were tea drinkers in a sample of 1200 people. Using SE of a proportion, state whether there is a significant decrease in consumption of tea after the increase in the exercise duty.
17. Use R for test the given data

    A health status survey in a few villages revealed that the normal serum protein value of children in that locality is 7.0 g/100ml. A group of 16 children who received high protein food for a period of six months had serum protein values shown below. Can we consider that the mean serum protein level of those who were fed on high protein diet is different from that of the general population?

S.No. (Child No.)	1	2	3	4	5	6	7	8
Protein level (g%)	7.10	7.70	8.20	7.56	7.05	7.08	7.21	7.25

S.No. (Child No.)	9	10	11	12	13	14	15	16

Protein level (g%)	7.36	6.59	6.85	7.90	7.27	6.56	7.93	8.56	

18. Students were selected to training. Their performance was noted by giving a test and the marks recorded out of 50. They were given effective 6 months training and again they were given a test and marks were recorded out of 50.

Students	1	2	3	4	5	6	7	8	9	10
Before training	25	20	35	15	42	28	26	44	35	48
After training	26	20	34	13	43	40	29	41	36	46

By applying the t-test can it be concluded that the students have benefited by the training?

19. 100 individuals of a particular race were tested with an intelligence test and classified into two classes. Another group of 120 individuals belong to another race were administered the same intelligence test and classified into the same two classes. The following are the observed frequencies of the two races:

Race	Intelligence		
Intelligent	Non-intelligent	Total	
Race I	42	58	100
Race II	55	65	120
Total	97	123	220

Test whether the intelligence is anything to do with the race.

20. Obtain the correlation coefficient between the heights of father(X) and of the son (Y) from the following data

X	65	66	67	68	69	70	71	72
Y	67	68	65	68	72	72	69	71

And also test its significance. Using R functions.

21. Consider the inbuilt data set cars.
22. Find Correlation between possible variables and pairwise correlation
23. Find regression line between appropriate variables
24. Display the summary statistics and comment on the results

Code: MCDCCE2209	Data Science and Analytics Lab	1.5 Credits [LTP: 0-0-3]

List of Experiments
Data preparation, Model selection
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.
Apply k-Means algorithm to cluster a set of data stored in a .CSV file.
Perform setting up and Installing Hadoop.
Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
Implement Matrix Multiplication with Hadoop Map Reduce
Import the legacy data from different sources such as (Excel, SqlServer, Oracle etc.) and load in the target system.
Perform the Extraction Transformation and Loading (ETL) process to construct the database.
Data Visualization from ETL Process
Text preprocessing using Noise removal and Lexicon normalization
Feature Engineering on Text data using Syntactical parsing

DEPARTMENT ELECTIVES

Code: MCDECE2111	Application Programming for Mobile Devices	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

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

CO#1: Identify the aspects related to mobile applications
CO#2: Design and implement the user interfaces of mobile applications.
CO#3: Design the mobile applications that is aware of the resource constraints of the mobile devices.
CO#4: Develop advanced mobile applications that accesses the databases and the web.
CO#5: Develop useful mobile applications in the current scenario using Google Android and Eclipse simulator.

A. OUTLINE OF THE COURSE

Unit No.	Title of The Unit	Time required for the Unit (Hours)
1.	**Introduction**	07
2.	**User Interface**	08
3.	**Application Design**	08
4.	**Application Development**	07
5.	**Tools**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction**
	• Introduction of Unit • Mobile Applications • Characteristics and Benefits • Application Model • Infrastructure and Managing Resources • Mobile Software Engineering • Frameworks and Tools • Mobile devices Profiles • Conclusion of Unit
2.	**User Interface**
	• Introduction of Unit • Generic UI Development • VUIs and Mobile Applications • Text to Speech techniques • Designing the right UI • Multimodal and Multichannel UI • Gesture based UIs • Screen Elements and Layouts • Voice XML • Java API • Conclusion of Unit
3.	**Application Design**
	• Introduction of Unit

	• Memory Management • Design patterns for limited memory • Work flow for Application Development • Techniques for composing Applications • Dynamic Linking • Plug ins and rules of thumb for using DLLs • Concurrency and Resource • Management • Look and feel • Conclusion of Unit
4.	**Application Development**
	• Introduction of Unit • Intents and Services • Storing and Retrieving data • Communication via the Web • Notification and Alarms • Graphics and Multimedia • Telephony • Location based services • Packaging and Deployment • Security and Hacking • Conclusion of Unit
5.	**Tools**
	• Introduction of Unit • Google Android Platform • Eclipse Simulator • Android Application Architecture • Event based programming • Apple iPhone Platform • UI tool kit interfaces • Event handling and Graphics services • Layer Animation • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Mobile Applications: Architecture, Design, and Development	Valentino Lee, Heather Schneider, Robbie Schell		OREILLY
2.	Professional Mobile Application Development	Jeff McWherter, Scott Gowell	First	WILEY
Reference Book				
1.	Ubiquitous Computing: Smart Devices, Environments and Interactions, Poslad, Wiley			
2.	Programming Android Zigurd Mednieks, Laird Dornin, G,Blake Meike and Masumi Nakamura, O'Reilly			

Code: MCDECE2112	**Internet of Things**	**3 Credits [LTP: 3-0-0]**

COURSE OUTCOME

The student would be able

- Understand general concepts of Internet of Things (IoT) and recognize various devices, sensors and applications (Understand, Knowledge)
- Apply design concept to IoT solutions (Apply)
- Analyze various M2M and IoT architectures (Analyze)
- Evaluate design issues in IoT applications (Evaluate)
- Create IoT solutions using sensors, actuators and Devices (Create)

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**INTRODUCTION TO IOT**	8
2.	**IOT NETWORKING CORE**	8
3.	**IOT ARCHITECTURE**	7
4.	**IOT APPLICATION DEVELOPMENT**	8
5.	**INDUSTRIAL IOT**	7

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**INTRODUCTION TO IOT**
	• Introduction of Unit • Sensing, Actuation, Networking basics, • Communication Protocols • Sensor Networks • IoT Definition, Characteristics of IoT • Functional Blocks, Physical design of IoT, Logical design of IoT • Communication models & APIs • Conclusion of Unit
2.	**IOT NETWORKING CORE**
	• Introduction to unit • Introduction to Arduino Programming • Integration of Sensors and Actuators with Arduino • Introduction to Raspberry Pi, Implementation of IoT with Raspberry Pi • Other IoT supported hardware platforms such as: ARM Cortex Processors, Intel Galileo boards • Wireless networking equipment and configurations • Accessing hardware and device file interactions • Conclusion of Unit
3.	**IOT ARCHITECTURE**
	• Introduction of Unit • IoT reference Model and Architecture • Remote monitoring and sensing • Remote controlling and performance analysis • Communication pattern, 6LoWPAN,

	• Sensors and sensor Node and interfacing using any Embedded target boards • Conclusion of Unit
4.	**IOT APPLICATION DEVELOPMENT**
	• Introduction of Unit • Application protocols: MQTT, REST/HTTP, CoAP, MySQL • Back-end Application Designing • Apache for handling HTTP Requests • MongoDB Object type Database • HTML, CSS & jQuery for UI Designing • JSON lib for data processing, Security & Privacy during development • Conclusion of Unit
5.	**INDUSTRIAL IOT**
	• Introduction of Unit • Data Handling and Analytics • Sensor-Cloud, Cloud Computing Services for IoT • Case Study: Agriculture, Healthcare, Activity Monitoring • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Internet of Things: Architectures, Protocols and Standards	Simone Cirani, Gianluigi, Marco, and Luca Veltri	Latest	WILEY
2.	Internet of Things	RMD Sundaram Shriram K Vasudevan, Abhishek S	Latest	WILEY
Reference Book				
1.	Designing the Internet of Things, Adrian McEwen, Hakim Cassimally, John Wiley and Sons			
2.	Internet of Things (A Hands-on Approach), Vijay Madisetti and Arshdeep Bahga,1st Edition, VPT, 2014			

Code: MCDECE2113	**Computer Cryptography & Network Security**	**3 Credits [LTP: 3-0-0]**

COURSE OUTCOME

The student would be able

- To know about various encryption techniques.
- To understand the concept of Public key cryptography.
- To study about message authentication and hash functions
- To impart knowledge on Network security
- To understand various protocols for network security to protect against the threats in the networks.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction**	**08**
2.	**Symmetric Key Cryptographic**	**07**
3.	**Asymmetric Key Cryptographic**	**08**
4.	**Internet Security**	**07**
5.	**Practical Implementation**	**08**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction**
	Multi-level model of security, Cryptography, Secret Key Cryptography, Modes of Operation, Hashes and Message Digest, Public Key Algorithm, Security Handshake Pitfall, Strong Password Protocol; Case study of real time communication security; Introduction to the Concepts of Security, Security Approaches, Principles of security, Types of attacks; Cryptographic Techniques: Plain text and Cipher text , Substitution Techniques, Transposition Techniques Encryption and Decryption, Symmetric and Asymmetric Key Cryptography.
2.	**Symmetric Key Cryptographic**
	Computer-based symmetric Key Cryptographic; Algorithms: Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES)
3.	**Asymmetric Key Cryptographic**
	Computer-based Asymmetric Key Cryptographic Algorithms; Cryptography, Overview of Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm; Public Key Infrastructure (PKI) Digital Certificates, Private Key Management , The PKI Model, Public Key Cryptography Standards (PKCS)
4.	**Internet Security**
	Internet Security Protocols Secure Socket Layer (SSL) , Secure Hyper Text Transfer Protocol (SHTTP) , Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, 3-D Secure Protocol , Email Security
5.	**Practical Implementation**
	Practical Implementations of Cryptography/Security: Cryptographic Solutions Using Java, Cryptographic Solutions Using Microsoft, Cryptographic Toolkits, Security and Operating Systems; Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN)

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Cryptography and Network Security	Atul Kahate	Latest	Tata McGraw-Hill
2.	Network Securities	Charlie Kaufman,Radia Perlman,Mike Speciner	Latest	Pearson
3.	Securities For computer Networks	J. A. Coopeer	Latest	TMH
Reference Book				
1.	Computer and Communication Networks by Nader F. Mir, Pearson			
2.	Data Communications and networking by Forouzan, TMH			

Code: MCDCHM2210	Spoken & Communication Skills II	1.5 Credits [LTP: 0-0-3]

COURSE OUTCOME

The student would be able to

- Develop their skills in interpersonal communication and in expressing their views in a clear and succinct manner.
- Demonstrate professional behavior(s) including preparedness, professional attire, and respectful presentation & develop confidence in relationship to their interviewing skills.
- Understand how to leverage grammar and formatting in email preparation & understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks & to enhance the speaking tone, pace & common phrases that's appropriate for phone conversations.
- Use an understanding of self-image to increase effectiveness in personal and professional relationships.
- Recognize the importance of experiential learning as a method of career researching and some of the key programs and resources available to them.

A. OUTLINE OF THE COURSE

Unit No.	Title of the Unit	Time required for the Unit (Hours)
1	**Group Discussion**	8
2	**Job Interview & Resume Building**	8
3	**Professional Email & Telephonic Conversation**	8
4	**Confidence Building**	6
5	**Career Option & Role Selection**	2

B. DETAILED SYLLABUS

Unit	Unit Details	
1.	**Group Discussion**	**Method**
	• Introduction of the Course & the topic • Practice Sessions • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Theory/Practical
2.	**Introduction to Job Interview & Resume Building**	
	• Introduction of the topic • Basics of Job Interviews: Job interview basics • Patterns & Composition of Questions • Body Language and Cues • Correcting the Common Interview Pitfalls • How to Sustain in Difficult Situations during Interview • **Technical/ HR Interview** • Questions on Management Response Quotient (MRQ) or Situational Response Tests (SRT) • Stress Interview • Behavioural Event interviews	• Theory/Practical • Theory/Practical • Theory/Practical • Practical • Theory/Practical • Practical • Practical • Practical

	• Practice Session • Resume Updation • Conclusion & Summary of the Unit	• Practical • Practical • Theory/Practical
3.	**Professional Email & Telephonic Conversation**	
	• Introduction of the topic • Email Etiquette • Practice Session • Important Telephonic phrases • Practice Session • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Theory/Practical • Practical • Theory/Practical
4.	**Confidence Building & Negotiation Skills**	
	• Introduction of the topic • Pyramid of Success in Negotiation. • Different Phases of Negotiation. • Barriers & Overcoming the barriers. • Practice Session • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Practical • Theory/Practical
5.	**Career Option & Role Selection**	
	• Introduction of the topic • Brain Storming Sessions • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Theory/Practical

THIRD SEMESTER

POORNIMA UNIVERSITY, JAIPUR								
School of Computer Science & Engineering								
Name of Program: MCA (Artificial Intelligence & Data Science)							**Batch: 2021-23**	
Teaching Scheme for Second Year - Third Semester								
Course Code	**Course Name**	**Teaching Scheme (Hrs. per Week)**			**Marks Distribution**			**Credit**
		Lecture (L)	**Tutorials (T)**	**Practical (P)**	**IE**	**ESE**	**Total**	
A.	**University Core Courses**							
	Nil							
B.	**Department Core Courses**							
B.1	**Theory**							
MCDCCE3101	Artificial Intelligence and Expert System	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE3102	Advance Database Management	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE3103	Neural Networks	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE3104	Cloud Web Services	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDCCE3105	Soft Computing Techniques	**3**	**-**	**-**	**40**	**60**	**100**	**3**
B.2	**Practical**							
MCDCCE3206	AI & ML Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE3207	Advance Database Management Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE3208	Neural Networks Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
MCDCCE3209	Linux Administration Lab	**-**	**-**	**2**	**60**	**40**	**100**	**1**
C.	**Department Elective**							
MCDECE3111	Virtualization & Cloud Computing	**3**	**-**	**-**	**40**	**60**	**100**	**3**
MCDECE3112	Blockchain Technology							
MCDECE3113	Theory of Computation							
D.	**Open Elective: Anyone**							
	Nil							
E.	**Humanities and Social Sciences including Management courses OR Ability Enhancement Compulsory Course (AECC)**							
MCDCHM3210	Sales & Negotiation Skills	**-**	**-**	**2**	**60**	**40**	**100**	**1**
F.	**Skill Enhancement Courses (SEC) OR Project work, Seminar and Internship in Industry or Elsewhere**							
MCDCCE3511	Internship Training	**-**	**-**	**2**	**60**	**40**	**100**	**1**
G.	**Social Outreach, Discipline, TEP, VAC& Extra Curricular Activities**							
MCDCCE3612	Discipline & Talent Enrichment Program (TEP)- III	**1**	**-**	**-**	**50**	**-**	**50**	**1**
MCDCCE3613	Campus Recruitment Training (CRT)- III	**2**	**-**	**-**				
MCDCCE3614	Non Syllabus Project (NSP)							
MCDCCE3615	Online Certification Courses							
	Total Hours	**21**	**2**	**12**				
	Total Teaching Hours	**35**						**26**

THIRD SEMESTER

Core Theory Subjects

Code: MCDCCE3101	Artificial Intelligence and Expert System	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

1. Develop the skills to gain a basic understanding of neural network theory and artificial Intelligence theory.
2. Explore the functional components of neural network classifiers and the functional components of artificial intelligence classifiers.
3. Develop and implement a basic trainable neural network or an artificial Intelligence system for a typical biomedical application.
4. Describe, apply, and implement uninformed and informed search techniques to solve problems.
5. Independently investigate an AI technique and describe, apply, and implement that technique.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to AI and Intelligent agent**	08
2.	**Game Playing**	08
3.	**Knowledge and Reasoning**	08
4.	**Learning**	07
5.	**NLP**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to AI and Intelligent agent:**
	Different Approach of AI, Problem Solving : Solving Problems by Searching, Uninformed search, BFS, DFS, Iterative deepening, Bi directional search, Hill climbing, Informed search techniques: heuristic, Greedy search, A* search, AO* search, constraint satisfaction problems
2.	**Game Playing:**
	Game Playing: Minimax, alpha-beta pruning, jug problem, chess problem, tiles problem.
3.	**Knowledge and Reasoning:**
	Knowledge and Reasoning: Building a Knowledge Base: Propositional logic, first order logic, situation calculus. Theorem Proving in First Order Logic. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.
4.	**Learning:**
	Learning: Overview of different forms of learning, Supervised base learning: Learning Decision Trees, SVM, Unsupervised based learning, Market Basket Analysis, Neural Networks.
5.	**NLP:**
	Introduction to Natural Language Processing: Different issue involved in NLP, Expert System, Robotics.

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication

1.	Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.			
2.	Introduction to AI & Expert System: Dan W. Patterson, PHI.			
3.	Artificial Intelligence by Luger (Pearson Education)			
4.	Russel & Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall			

Code: MCDCCE3102	Advance Database Management System	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

1. **OUTLINE OF THE COURSE**

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Query Processing and Optimization	**08**
2.	Object Database Systems	**08**
3.	Parallel and Distributed Databases	**08**
4.	Database Security and Authorization	**07**
5.	POSTGRES	**07**

D. DETAILED SYLLABUS

Unit	Unit Details
1.	**Query Processing and Optimization**
	• Overview of Relational Query Optimization • System Catalog in a Relational DBMS, Alternative Plans • Translating SQL, Queries into Algebra, Estimating the Cost of a Plan • Relational Algebra Equivalences, Enumeration of Alternative Plans.
2.	**Object Database Systems**
	• Motivating Examples, Structured Data Types • Operations On Structured Data, Encapsulation and ADT's • Inheritance, Objects, OIDs and Reference Types • Database Design for an ORDBMS, ORDBMS Implementation Challenges, ORDBMS • Comparing RDBMS, OODBMS, and ORDBMS.
3.	**Parallel and Distributed Databases**
	• Architectures for Parallel, Databases, Parallel Query Evaluation • Parallelizing Individual Operations, Parallel Query Optimization • Distributed DBMS Architectures, Storing Data in a Distributed DBMS • Distributed Catalog Management, Distributed Query Processing, Updating Distributed Data • Introduction to Distributed Transactions, Distributed Concurrency Control, Distributed Recovery.
4.	**Database Security and Authorization**
	• Introduction to Database Security, Access Control • Discretionary Access Control- Grant and Revoke on Views and Integrity Constraints • Mandatory Access Control- Multilevel Relations and Polyinstantiation • Covert Channels, DoD Security Levels • Additional Issues Related to Security- Role of the Database Administrator, Security in Statistical Databases, Encryption.
5.	**POSTGRES**
	• POSTGRES user interfaces, sql variations and extensions • Transaction Management, Storage and Indexing, Query processing and optimizations, System Architectures. • XML: Motivation, Structure of XML data, XML Document Schema, Querying and Transformation, Application Program Interface to XML, Storage of XML Data, XML applications.

E. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Fundamentals of Database Systems	Elmasri R and Navathe SB	Latest	Addison Wesley
2.	Database Systems	Connolly T, Begg C and Strachan A	Latest	Addison Wesley
3.	Distributed Database: Principles and System	Ceri Pelagatti	Latest	Tata McGraw Hill

Code : MCDCCE3103	Neural Network	3 Credits [LTP: 3-0-0]

COURSE OUTCOME:

This course provides a knowledge to Know the basic concepts of neural networks and its components, know neural network learning and adaption techniques, know the detailed concepts of single layer perceptron neural networks, know the detailed concepts of multilayer perceptron neural networks and Explain the different field of application on neural network models.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to Neural Network System**	5
2.	**Neural Network Learning and Adaptation**	10
3.	**Single Layer Perceptron Classifiers**	10
4.	**Multilayer Feedforward Neural Networks**	10
5.	**Single-Layer Feedback Neural Networks**	10

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Neural Network System**
	• Introduction to biological neurons and their artificial models • History of artificial neural systems development • Simple Memory and Restoration of Patterns • Basic concepts related to neural networks • Single layer and multiple layer perceptron • McCulloch-Pitts Neuron Model
2.	**Neural Network Learning and Adaptation**
	• Introduction to neural network learning and adaptation • Learning as approximation or Equilibria Encoding • Concepts of supervised and unsupervised learning • Neural network learning rules
3.	**Single Layer Perceptron Classifiers**
	• Introduction to single layer perceptron • Classification model, features and decision tree, • Discriminant functions • Linear machine and minimum distance classification • Non parametric training concepts • Training and classification using the discrete perceptron • Single layer continuous neural networks for linearly separable classification, multi category single layer perceptron neural networks
4.	**Multilayer Feedforward Neural Networks**

	• Introduction to multilayer perceptron neural networks • Linearly non separable pattern classification • Delta learning rule for multilayer perceptron networks • Feedforward recall and error Back-Propagation training, training errors • Multilayer Feedforward Networks as Universal Approximators, • Learning Factors
5.	**Single-Layer Feedback Neural Networks**
	• Introduction to single layer feedback neural networks • Basic concepts of dynamic systems • Mathematical Foundations of Discrete-Time and gradient type Hopfield Networks • Transient Response of Continuous-Time Networks • Relaxation Modelling in Single-Layer Feedback Networks, • Summing Network with Digital Outputs

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Book	Author	Publication
1.	Introduction to Artificial Neural Systems	Jacek M Zurada	West Publishing Company.
2.	An Introduction to Neural Networks	Kevin Gurney	UCL Press
3.	Principles of Artificial Neural Networks	Daniel Graupe	2nd Edition, World Scientific Publishing Co. Pte. Ltd

Code: MCDCCE3104	Cloud Web Services	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

1. To explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
2. To apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost by Load balancing approach.
3. To discuss system virtualization and outline its role in enabling the cloud computing system model.
4. To illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
5. To analyze various cloud programming models and apply them to solve problems on the cloud.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Introduction to Cloud Technologies	**08**
2.	Introduction to AWS	**08**
3.	AWS identity services, security and compliance	**08**
4.	AWS computing and marketplace	**07**
5.	Other AWS services and management services	**07**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Cloud Technologies**
	• Introduction to the Cloud Computing, History of cloud computing, Cloud service options, Cloud Deployment models, Business concerns in the cloud. • Virtualization and Cloud Platforms Exploring virtualization, Load balancing, Hypervisors, Machine imaging, Cloud marketplace overview, Comparison of Cloud providers.
2.	**Introduction to AWS**
	• AWS history, AWS Infrastructure, AWS services, AWS ecosystem. • Programming, management console and storage on AWS Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Glacier - Content delivery platforms
3.	**AWS identity services, security and compliance**
	• Users, groups, and roles - Understanding credentials, Security policies, IAM abilities and limitations, AWS physical security - AWS compliance initiatives, Understanding public/private keys, Other AWS security capabilities
4.	**AWS computing and marketplace**
	• Elastic cloud compute - Introduction to servers, Imaging computers, Auto scaling, Elastic load balancing, Cataloging the marketplace, AMIs, Selling on the marketplace. • AWS networking and databases Virtual private clouds, Cloud models, Private DNS servers (Route 53), Relational database service – DynamoDB, ElastiCache, Redshift.
5.	**Other AWS services and management services**
	• Analytics services, Application services, Cloud security, CloudWatch, CloudFormation, CloudTrail, OpsWorks. • AWS billing and Dealing with disaster Managing costs, Utilization and tracking, Bottom line impact, Geographic and other concerns, Failure plans, Examining logs.

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Cloud Computing Bible	Barrie Sosinsky	Latest	John Wiley & Sons
2.	Amazon Web Services For Dummies	Bernard Golden	Latest	_
3.	Cloud Computing: Principles and Paradigms	Rajkumar Buyya	Latest	John Wiley & Sons,

Code: MCDCCE3105	Soft Computing Techniques	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

1. Learn soft computing techniques and their applications.
2. Analyze various neural network architectures.
3. Define the fuzzy systems.
4. Understand the genetic algorithm concepts and their applications.
5. Identify and select a suitable Soft Computing technology to solve the problem; construct a solution and implement a Soft Computing solution

A. OUTLINE OF THE COURSE

Unit No.	Title of The Unit	Time required for the Unit (Hours)
1.	Introduction to Soft Computing	**6**
2.	Fuzzy Logic	**7**
3.	Artificial Neural Networks	**7**
4.	Nature Inspired Algorithms	**6**
5.	Multi-Objective Optimization	**6**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	Introduction to Soft Computing
	• Introduction of Unit • Concept of Computing Systems • Soft Computing Versus Hard Computing • Characteristics of Soft Computing, • Applications of Soft Computing Techniques • Conclusion of Unit
2.	Fuzzy Logic
	• Introduction of Unit • Fuzzy Sets and Membership Functions, • Operations on Fuzzy Sets, • Fuzzy Relations, Rules, Propositions, • Implications and Inferences, • Defuzzification Techniques - Fuzzy Logic Controller Design, • Applications of Fuzzy Logic • Conclusion of Unit
3.	Artificial Neural Networks
	• Introduction of Unit • Biological Neurons and its Working, • Simulation of Biological Neurons to Problem Solving, • Different ANNs Architectures, • Training Techniques for ANNs, • Applications of ANNs to Solve Real Life Problems • Conclusion of Unit
4.	Nature Inspired Algorithms
	• Introduction of Unit • Genetic Algorithms, Concept of "Genetics" and "Evolution" • Application to Probabilistic Search Techniques, • Basic GA Framework and Different GA Architectures, GA Operators- Encoding, Crossover, Selection,

	Mutation, etc., • Solving Single-Objective Optimization Problems Using GAs, Particle Swarm Optimization-Implementation, Operators, • Ant Bee Colony Optimization Implementation, Operators, Case Studies. • Conclusion of Unit
5.	Multi-Objective Optimization
	• Introduction of Unit • Problem Solving Concept of Multi-Objective Optimization Problems (MOOPs) and Issues of Solving Them. • Multi-Objective Evolutionary Algorithm (MOEA), • Non-Pareto Approaches to Solve MOOPs, • Pareto-Based Approaches to Solve MOOPs, • Applications with MOEAs. • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	**Textbooks:**	**Author**	**Edition**	**Publication**
1.	Principles of soft computing	Sivanandam.S. N, Deepa.S.N	Second Edition	Wiley India Pvt Limited, 2011
2.	"Neuro fuzzy and soft computing	Juh Shing Roger Jang, Cheun Tsai Sun, Eiji Mizutani	Fourth Edition	Prentice Hall, 1997
Reference Book				
1.	Aliev,R.A, Aliev,R.R, "Soft Computing and its Application", World Scientific Publishing Co. Pvt. Ltd., 2001			
2.	Mehrotra.K, Mohan.C.K, Ranka.S, "Elements of Artificial Neural Networks", The MIT Press, 1997			
3.	Juh Shing Roger Jang,Cheun Tsai Sun,Eiji Mizutani, "Neuro fuzzy and soft computing", Prentice Hall, 1997.			
4.	Ronald R.Yager, Lofti Zadeh, "An Introduction to fuzzy logic applications in intelligent Systems", Kluwer Academic, 1992.			
5.	Cordón.O, Herrera.F, Hoffman.F, Magdalena.L "Genetic Fuzzy systems", World Scientific Publishing Co. Pvt. Ltd., 2001.			

PRACTICAL

Code: MCDCCE3206	AI & ML Lab	2 Credits	[LTP: 0-0-2]

Course Outcome:-

- Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate proficiency in applying scientific method to models of machine learning.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate proficiency in applying scientific method to models of machine learning.

List of Experiments:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
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. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
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.
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.
7. Write a program to construct 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.
8. Apply EM 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.
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.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Code: MCDCCE3207	Advanced Database Management Lab	2 Credits	[LTP: 0-0-2]

Course Outcome:-

Students will be able

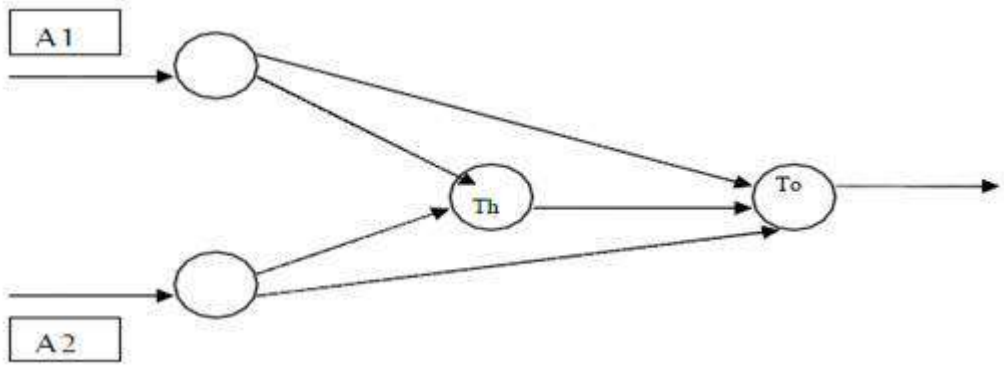
- To explore the features of a Database Management Systems
- To interface a database with front end tools
- To understand the internals of a database system

LIST OF EXPERIMENTS:

13.	Write a PL/SQL block to calculate the incentive of an employee whose ID is 110.
14.	Write a PL/SQL block to adjust the salary of the employee whose ID 122.
15.	Write a PL/SQL block to describe the usage of LIKE operator including wildcard characters and escape character.
16.	Write a PL/SQL procedure to calculate the incentive on a target achieved and display the message either the record updated or not.
17.	Write a PL/SQL program to check whether a number is even or odd.
18.	Write a PL/SQL procedure to calculate the incentive on a specific target otherwise a general incentive to be paid using IF-THEN-ELSE.
19.	Write a PL/SQL program to check whether a date falls on weekend i.e. SATURDAY or SUNDAY.
20.	Write a PL/SQL program to display the description against a grade using CASE statement.
21.	Write a PL/SQL program to check whether a given number is positive, negative or zero.
22.	Write a PL/SQL program to check whether a given character is letter or digit.
23.	Write a PL/SQL program to convert a temperature in scale Fahrenheit to Celsius and vice versa.
24.	Write a program in PL/SQL to print the value of a variable inside and outside a loop using LOOP EXIT statement.
25.	Write a program in PL/SQL to insert records from one table to another.
26.	Write a program in PL/SQL to show the uses of CURVAL and NEXTVAL with a sequence name.
27.	Write a program in PL/SQL to find the number of rows effected by the use of SQL%ROWCOUNT attributes of an implicit cursor
28.	Write a program in PL/SQL to show the uses of SQL%FOUND to determine if a DELETE statement affected any rows
29.	Write a function incr_salary, which takes two parameters, employee ssn and the percentage by which the salary needs to be raised and returns the new salary.
30.	Write a procedure Get_On_Hand that has one in and one out parameter. This procedure should take in equipment number and send the quantity on hand for this equipment through the out parameter.
31.	Write a trigger, which checks the quantity on hand in the equipment table for every update and displays an error message if the quantity on hand falls below 2.
32.	Write a PL/SQL code to create a) Package specification b) Package body.

Code: MCDCCE3208	. Neural Network Lab	2Credits	[LTP: 0-0-2]

A. List of Programs

Part A	
	Neural Network 1. Design and train perceptron for identifying ODD and EVEN number? 2. Write a program to implement McCulloch-pitts model of Neuron: 3. Design and train perceptron for identifying ODD and EVEN number? a) Design and train a perceptron for AND gate b) Design and train a perceptron for OR gate? c) Design and train a perceptron for EX-OR gate? d) Design and train a perceptron for NOR gate? 4. Create a bidirectional Associative memory (BAM) for ID and telephone number? 5. Design and train the Hopfield net to map the input vector with the stored vector and correct them? 6. Write a program for back propagation algorithm? 7. Write a program to implement Delta rule? 8. Write a program of perceptron training algorithm? 9. Write a program to test and train a dataset (dataset can be anything: eg: wine dataset)? 10. Write a program for Error back propagation Algorithm? 11. Write a program to implement Hebb's rule(unsupervised learning algorithm) 12. Write a program for back propagation algorithm, then user will provide the i/ps according to requirement & display the o/ps: e) Given a set of i/p – o/p patterns (Al, Bl) l = 1,2,……L .Where the l i/p vector Al = (Al1 , Al2 , …….., AlI)T & o/p vector Bl = (Bl1 , Bl2, …….., Blk)T f) Assume only one hidden layer & initial setting of weights to be arbitrary .Assume i/p layer with only liner units g) Then o/p signal is equal to i/p activation value for each of these units. Let ηη 13. Write a program to solve XOR Problem. Solution to XOR in (MLP) Multi-Layer Perceptron  Where Th = 2.5, To = 1.0. Determine the weight values for XOR Problem so that o/p should be:

A1	A2	Y
0	0	0
0	1	1
1	0	1
1	1	0

14. Apply PCA on the MNIST dataset. (Use the sci-kit learn library or try writing PCA yourself.

15. Binary classification using Python and interpret and predict the output for given data.

16. Age detection using neural network procedure with Python.

17. Multiple linear regression and diagnostic measures using neural Network procedure to predict data. Compare how neural network is better over ordinary least square estimates.

Code: MCDCCE3209	Linus Administrator Lab	2 Credits [LTP: 0-0-2]

Course Outcome:-

Students will be able to run various UNIX commands on a standard UNIX/**LINUX** Operating system .They will be able to run C / C++ programs on UNIX.

LIST OF EXPERIMENTS:

1	Installation of Red HAT Linux operating system. a. Partitioning drives b. Configuring boot loader (GRUB/LILO) c. Network configuration d. Setting time zones e. Creating password and user accounts f. Shutting down
2	Software selection and installation
3	Basic Commands
4	Do the following changes in Grub file a. Write the path where the grub file is located. b. Change the timeout and title of the system.
5	Setting up Samba Server
6	Configuring dhcp server and client
7	Configure a DNS Server with a domain name of your choice.
8	Configure a Linux server and transfer files to a windows client . (Setting up NFS File Server)
9	Connecting to the internet a. Setting up linux as a proxy server b. Configuring mozilla or firefox to use as a proxy.
10	Configure FTP on Linux Server. Transfer files to demonstrate the working of the same.
11	Using gcc compiler (Programming using C).
12	Using gcc ++ compiler (Programming using C++).
13	Configuring Apache Web Server.
14	Linux system administration a. Becoming super user b. Temporarily changing user identity with su command c. Using graphical administrative tools d. Administrative commands e. Administrative configuration files

DEPARTMENT ELECTIVE

Code: MCDECE3111	Virtualization & Cloud Computing	3 Credits [LTP: 3-0-0]

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

- Describe the main concepts, key technologies, strengths, and limitations of cloud
- Explain the architecture and infrastructure of cloud computing and various service models.
- Understand the concept and application of virtualization
- Understand service management in cloud computing
- Understand security and privacy issues in cloud computing

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Introduction to Cloud Technologies	**08**
2.	Cloud Computing Architecture and Service Models	**08**
3.	Virtualization	**06**
4.	Service Management in Cloud Computing	**06**
5.	Cloud Security	**06**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Cloud Technologies**
	Overview of computing paradigm: Recent trends in Computing - Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Evolution of cloud computing - Business driver for adopting cloud computing. Introduction to Cloud Computing: Cloud Computing - Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers. Properties, Characteristics & Disadvantages - Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing. Role of Open Standards.
2.	**Cloud Computing Architecture**
	Cloud Computing Architecture: Cloud computing stack - Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services. Service Models (XaaS) - Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS). Deployment Models, Public cloud, Private cloud, Hybrid cloud, Community cloud
3.	**Virtualization**
	Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM). Resource Virtualization - Server, Storage, Network. Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service). Renting, EC2 Compute Unit, Platform and Storage, pricing, customers. Service Oriented Architecture (SOA). Cloud Platform and Management – computation Web services, Web 2.0, Web OS
4.	**Service Management in Cloud Computing**
	Service Management in Cloud Computing: Service Level Agreements(SLAs), Billing & Accounting,

	Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing
5.	**Cloud Security**
	Cloud Security: Infrastructure Security - Network level security, Host level security, Application level security. Data security and Storage - Data privacy and security Issues, Jurisdictional issues raised by Data location: Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Cloud Computing Bible	Barrie Sosinsky	Latest	John Wiley & Sons
2.	Cloud Computing: A Practical Approach	Velte Anthony T., Velte Toby J. and Elsenpeter Robert	Latest	McGraw Hill, Indian edition
3.	Cloud Computing: Principles and Paradigms	Rajkumar Buyya	Latest	John Wiley & Sons,

Code: MCDECE3112	Blockchain Technology	3 Credits	[LTP: 3-0-0]

COURSE OBJECTIVES:

1. Explain design principles of Bitcoin and Ethereum.
2. Explain Nakamoto consensus.
3. Explain the Simplified Payment Verification protocol.
4. Design, build, and deploy smart contracts and distributed applications,
5. Integrate ideas from blockchain technology into their own projects.

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

1. Familiarise the functional/operational aspects of cryptocurrency ECOSYSTEM.
2. Understand emerging abstract models for Blockchain Technology.
3. Design, build, and deploy a distributed application.
4. Evaluate security, privacy, and efficiency of a given blockchain system.
5. Identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**The consensus problem & cryptographic basics**	**08**
2.	**Blockchain**	**08**
3.	**Distributed Consensus**	**08**
4.	**Ethereum**	**07**
5.	**Cryptocurrency Regulation**	**07**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**The consensus problem & cryptographic basics**
	• Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. • Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.
2.	**Blockchain**
	• Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain
3.	**Distributed Consensus**
	• Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate
4.	**Ethereum**
	• History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contracts -, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin
5.	**Cryptocurrency Regulation**

	• Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Zero Knowledge proofs and protocols in Blockchain, Blockchain Applications in IoT and DNS etc.

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).			
2.				
3.				

S. No	Reference Books:	Author	Edition	Publication
1.	Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies			
2.	Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System			
3.	DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.			
4.	Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts			
5.	Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015 (article available for free download)			
6.	.A.Garay et al, The bitcoin backbone protocol - analysis and applications EUROCRYPT 2015 LNCS VOl 9057, (VOLII), pp 281-310. (Also available at eprint.iacr.org/2016/1048)			
7.	R.Pass et al, Analysis of Blockchain protocol in Asynchronous networks , EUROCRYPT 2017, (eprint.iacr.org/2016/454)			
8.	R.Pass et al, Fruitchain, a fair blockchain, PODC 2017 (eprint.iacr.org/2016/916)			

Code: MCDECE3113	Theory of Computation	3 Credits	[LTP: 3-0-0]

COURSE OUTCOME

Upon successful completion of this subject students should be able to:

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Finite Automata & Regular Expression**	**08**
2.	**Regular Sets of Regular Grammars**	**08**
3.	**Context Free Languages& Pushdown Automata**	**08**
4.	**Turing Machines**	**07**
5.	**Linear bounded Automata Context Sensitive Language**	**07**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Finite Automata & Regular Expression**
	• Basic Concepts of finite state system, • Deterministic and non-deterministic finite automation and designing regular expressions, relationship between regular expression & Finite automata, • Mminimization of finite automation, • Mealy & Moore Machines.
2.	**Regular Sets of Regular Grammars**
	• Basic Definition of Formal Language and Grammars. Regular Sets and Regular • Grammars, closure proportion of regular sets, • Pumping lemma for regular sets, decision Algorithms for regular sets, • Myhell_Nerod Theory & Organization of Finite Automata.
3.	**Context Free Languages& Pushdown Automata**
	• Context Free Grammars – Derivations and Languages – Relationship between derivation and derivation trees – ambiguity – simplification of CEG – Greiback Normal form – Chomsky normal forms – • Problems related to CNF and GNF Pushdown Automata: Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Pushdown automata and CFL - pumping lemma for CFL - • Applications of pumping Lemma.
4.	**Turing Machines**
	• Turing machines – Computable Languages and functions – Turing Machine constructions – Storage in finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape. • Undecidability: Properties of recursive and Recursively enumerable languages – Universal Turing Machines as an undecidable problem – Universal • Languages – Rice's Theorems.
5.	**Linear bounded Automata Context Sensitive Language**
	• Chomsky Hierarchy of Languages and automata, Basic Definition & descriptions of Theory & Organization of Linear bounded Automata • Properties of context-sensitive languages

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Introduction to Automata Theory, Languages and Computation by Hopcroft and Ullman.			
2.	Elements of the Theory of Computation by Papadimitriou and Lewis Harry.			
3.	For problems : Introduction to the Theory of Computation by Michael Sipser.			

Code: MCDCHM3210	Sales & Negotiation Skills	2 Credits	[LTP: 0-0-2]

Course Outcomes:

On successful completion of the course the learners will be able to

- Understand Sales and Personal Selling Process.
- Understand the importance of preparation in a negotiation deal & how to set about it.
- Develop Negotiation Strategies – Use a proven model to move through the stages of sales and negotiation to work towards a win-win situation.
- Understand the different styles of negotiating; BATNA – Establish the other party's bargaining positions.
- Effectively close and confirm the negotiation and sale.
- Highlight a few just don't do it in negotiation and proven sales techniques.

A. OUTLINE OF THE COURSE

Unit No.	Title of the Unit	Time required for the Unit (Hours)
1	**An Introduction to Sales and Negotiation**	8
2	**The Preparation Stage**	6
3	**The Discussion Stage**	8
4	**The Proposing Stage**	4
5	**The Bargaining and Closing Stage**	6

B. DETAILED SYLLABUS

Unit	Unit Details	
1.	**An Introduction to Sales and Negotiation**	**Method**
	• Introduction of the topic • What is Sales? Types of Sales. Importance of Sales • Personal Selling & Process. • Assessment of your current sales and negotiation strengths and improvement areas • What is negotiation? • Knowing when to negotiate • Why do Negotiations break down? • How successful are you in Sales & Negotiation? • Legal aspects in Sales & Negotiation • Conclusion & Summary of the Unit	• Theory/ Practical • Theory/Practical • Theory/Practical • Practical • Practical • Theory/Practical • Practical • Practical • Practical • Practical • Theory/Practical • Theory/Practical
2.	**The Preparation Stage**	

	• Introduction of the topic • The importance of preparation • Why we need to prepare • What to prepare • Preparing a range of objectives • Constants and variables • Researching the other party • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Practical • Practical • Theory/Practical
3.	**The Discussion Stage**	
	• Introduction of the topic • Rapport building • Opening the negotiation • Questioning techniques • Listening skills • Controlling emotions • Art of persuasion and emotional Intelligence • Influencing and assertiveness skills • Spotting the signs - non-verbal communication and voice clues • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Practical • Practical • Practical • Theory/Practical
4.	**The Proposing Stage**	
	• Introduction of the topic • Stating your opening position • Responding to offers • Adjournments • Administering Contracts and Role of Negotiations • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Practical • Practical • Practical • Theory/Practical
5.	**The Bargaining and Closing Stage**	
	• Introduction of the topic • Making concessions - the techniques • Closing techniques • Confirming agreement • Conclusion & Summary of the Unit	• Theory/Practical • Practical • Practical • Practical • Theory/Practical

POORNIMA UNIVERSITY, JAIPUR								
School of Computer Science & Engineering								
Name of Program: MCA (Artificial Intelligence & Data Science)							**Batch: 2021-23**	
Teaching Scheme for Second Year - Fourth Semester								
Course Code	**Course Name**	**Teaching Scheme (Hrs. per Week)**			**Marks Distribution**			**Credit**
		Lecture (L)	**Tutorials (T)**	**Practical (P)**	**IE**	**ESE**	**Total**	
A.	**University Core Courses**							
	Nil							
B.	**Department Core Courses**							
B.1	**Theory**							
MCDCCE4101	Information Security & Cyber Law	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
MCDCCE4102	Machine Learning & Deep Learning	**3**	**1**	**-**	**40**	**60**	**100**	**3.5**
B.2	**Practical**							
MCDCCE4203	Machine Learning Lab using Python	**-**	**-**	**2**	**60**	**40**	**100**	**1**
C.	**Department Elective**							
	Nil							
D.	**Open Elective: Anyone**							
	Nil							
E.	**Humanities and Social Sciences including Management courses OR Ability Enhancement Compulsory Course (AECC)**							
MCDCHM4204	Use of Social Media	**-**	**-**	**2**	**60**	**40**	**100**	**1**
F.	**Skill Enhancement Courses (SEC) OR Project work, Seminar and Internship in Industry or Elsewhere**							
MCDCCE4305	Major Project	**-**	**-**	**21**	**60**	**40**	**100**	**12**
G.	**Social Outreach, Discipline, TEP, VAC& Extra Curricular Activities**							
MCDCCE4606	Discipline & Talent Enrichment Program (TEP)- IV	**1**	**-**	**-**	**50**	**-**	**50**	**1**
MCDCCE4607	Campus Recruitment Training (CRT)- IV	**1**	**-**	**-**				
MCDCCE4608	Non Syllabus Project (NSP)							
MCDCCE4609	Online Certification Courses							
	Total Hours	**8**	**2**	**25**				
	Total Teaching Hours	**35**						**22**

FORTH SEMESTER

Code: MCDCCE4101	Information Security & Cyber Law	**4 Credits [LTP: 3-1-0]**

COURSE OUTCOME

The student would be able:

After completion of the course, students would be able to apply fundamentals of higher mathematical knowledge in information security and cyber law and also solve curriculum problems.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Introduction to Cryptographic Protocols**	08
2.	**Information Security Threats**	07
3.	**Introduction to cyber law**	08
4.	**Information technology Act**	07
5.	**Cyber law and related Legislation**	08

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Cryptographic Protocols**
	• Computer Security Concepts (CIA), Threats, Attacks, and Assets • Introduction to Protocols, Communications using Symmetric Cryptography • Substitution Ciphers and Transposition Cipher • Block cipher, Stream cipher, Modes of operation • Symmetric and Asymmetric cryptography.
2.	**Information Security Threats and Algorithms**
	Vulnerabilities: • Virus, Malware, DDoS attack • Trojan, Worm, Spyware • Phishing attacks, Packet Sniffing, • man-in-middle attack, DNS poisoning **Algorithms** • Data Encryption Standard: Description of DES , RSA Algorithms • One- Way Hash Functions, MD5
3.	**Introduction to cyber law**
	• Evolution of computer Technology, emergence of cyber space. • Cyber Jurisprudence, Jurisprudence and law, • Doctrinal approach, Consensual approach, Real Approach • Cyber Ethics, Cyber Jurisdiction

	• Cyber Laws of other countries: EU GDPR, PIPEDA (Canada), etc.
4.	**Information technology Act**
	• Overview of IT Act, 2000 • Amendments in 2008/2013 and Limitations of ITAct • Legal Recognition of Electronic Records, Legal Recognition of Digital Signature • Certifying Authorities, Cyber Crime and Offences • Network Service Providers Li- ability
5.	**Cyber law and related Legislation**
	• Patent Law, Trademark Law • Copyright, Software Copyright or Patented • Do- main Names and Copyright disputes • Electronic Data Base and its Protection • IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code • Relevant Sections of Reserve Bank of India Act • Law Relating To Employees And Internet, Online Dispute Resolution (ODR).

C. RECOMMENDED STUDY MATERIAL

S. No	**Text Books:**	**Author**	**Edition**	**Publication**
1.	Cryptography and Network Security	William Stallings	Latest	Tata McGraw – Hill
2.	Handbook of Cyber Laws	Vakul Sharma,Macmillan	Latest	Lexis Nexis
3.	Cyber Law Simplified	Vivek Sood	Latest	Tata McGraw – Hill
4.	Cryptography and Network Security	Atul Kahate	Latest	Tata McGraw – Hill
Reference Book				
1.	Handbook of Applied Cryptography, by Alfred J. Menezes, PaulC. van Oorschot and Scott A. Vanstone, CRC Press,			
2.	Articles in various journals and conference proceedings.			

Code: MCDCCE4102	Machine Learning & Deep Learning	4 Credits	[LTP: 3-1-0]

COURSE OUTCOME

The student would be able:

- Student will be capable to understand basics of Machine learning including Supervised Learning, Unsupervised Learning, Ensemble Learning, Reinforcement Learning concepts.
- Student will be capable to get the concept of Attribute oriented analysis and implement them to solve various problem.
- Students will be introduced with feature selection, dimension reduction and associated computing techniques for various applications.
- Students will be capable to understand basics of Data science concepts.

COURSE OBJECTIVE

- To understand the basics of machine learning, understand the need for machine learning, techniques, the problems faced and the current state of art.
- Provide technical details about various recent algorithms with specific focus on Deep Learning.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	**Machine Learning Basics**	08
2.	**Attributes and features**	08
3.	**Evaluation Metrics**	08
4.	**Introduction to Deep Learning**	07
5.	**Convolutional Neural Network**	07

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Machine Learning Basics**
	• Introduction to Machine Learning • Supervised Learning, Decision Tree Induction, Naïve Bayes Classification, Rule based Classification, K-Nearest Neighbor • Unsupervised Machine learning, Clustering, Association rule mining. • Reinforcement learning • Machine learning model evaluation – accuracy, the train/test/validation split, confusion matrix. • Conclusion of Unit
2.	**Attributes and features**
	• Introduction of Unit • Attribute-oriented analysis: Attribute generalization, Attribute relevance, Class comparison, Statistical measures • Feature selection (Filters; Wrappers) • Dimensionality reduction: PCA and LDA Y combinator and recursion. • Conclusion of Unit
3.	**Evaluation Metrics**
	• Introduction of Unit • Model Evaluation Parameters • Parameter Estimation: Maximum Likelihood and Bayesian Parameter Estimation, • Discriminative Methods: Distance-based methods, Linear Discriminant Functions,

	• Decision Tree • Random Decision Forest and Boosting • Conclusion of Unit
4.	**Introduction to Deep Learning**
	• Introduction to deep learning • Difference between neural network and deep neural networks, • Deep Neural Networks: Multilayer Perceptron(MLP), Recurrent neural networks(RNN), Long short-term memory(LSTM), • Applications-Automatic speech recognition, image recognition, Natural language processing, Bioinformatics, Mobile advertising, Financial fraud detection, Military. Techniques to improve deep networks: DNN Optimization, Regularization • Conclusion of Unit
5.	**Convolutional Neural Network**
	• Introduction of Unit • Convolutional Neural Network • Basic structure of Convolutional Network • Case studies: Alex net, VGG- Net, GoogLeNet, Applications of CNN– Object Detection, Content based image Retrieval • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL

S. No	Text Books:	Author	Edition	Publication
1.	Understanding Machine Learning: From Theory to Algorithms,	Shalev-Shwartz,S., Ben-David,S.,	Latest	Cambridge University Press
2.	Pattern Recognition and Machine Learning,	C. M. BISHOP	Latest	Springer-Verlag New York
3.	Deep Learning,	Goodfellow,I., Bengio.,Y., and Courville,A.,	Latest	MIT Press

Code: MCDCCE4203	Machine Learning Lab using Python	1 Credits	[LTP: 0-0-2]

Course Outcome:-

Students will be able:

- Understand the implementation procedures for the machine learning algorithms.
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms.
- Identify and apply Machine Learning algorithms to solve real world problems.
- Understand the implementation of deep learning algorithms

LIST OF EXPERIMENTS:

1	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 and generate confusion matrix
2	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.
3	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	Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5	Import the diabetes dataset in .csv format and calculate the accuracy of a given model by using various feature selection algorithms
6	Build an ensemble learning model on random forest and boosting and compare the performance of both classifiers
7	Write a program to evaluate the performance measure of any classifier. Apply Train-Test Split for Evaluating Machine Learning Algorithms
8	Implement the any Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
9	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.
10	Apply EM 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.
11	Implement Convolutional Neural Networks in Python with Keras
12	Implement Convolutional Neural Networks in Python with Tensor flow

Code: MCDCHM4204	Basics of Use of Social Media	1 Credits [LTP: 0-0-2]

Course Outcomes:

On successful completion of the course the learners will be able to

- Develop an understanding towards Social platforms like Facebook, LinkedIn, Twitter, YouTube and Instagram which are being used by almost everyone.
- Understand how social channels Like Facebook & Instagram are all about collaborating, networking, sharing and generating knowledge and content – something which is of great value in the context of education.
- Analyze the terminology used for Twitter marketing and develop brands with its help.
- Equip themselves with the knowledge of use of social media like LinkedIn, Pinterest & Google+ and learn the techniques of marketing with their help.
- Strengthen the skills acquired which come in handy to them to market themselves and their company over social media once they enter into the Corporate World.

A. OUTLINE OF THE COURSE

Unit No.	Title of the Unit	Time required for the Unit (Hours)
1	**Introduction to the Concepts of Social Media**	**8**
2	**Facebook & Instagram Marketing**	**6**
3	**Twitter Marketing**	**4**
4	**LinkedIn, Pinterest & Google+ Marketing**	**6**
5	**YouTube Marketing**	**8**

B. DETAILED SYLLABUS

Unit	Unit Details	
1.	**Introduction to the Concepts of Social Media**	**Method**
	• Introduction of the Course & the topic • What is Social Media • An Introduction to all Social Media Platforms • Difference between Traditional Media & Social Media • Why to care about Social Media • Social Media Management • What is SEO & SMO • On Page and Off Page Optimisation • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Theory/Practical
2.	**Facebook & Instagram Marketing**	
	• Introduction of the Course & the topic • Facebook & Instagram Marketing Terminology • The Facebook Newsfeed Algorithm and how it works • Organic reach on Facebook • How to approach content marketing on social media • Facebook Analytics • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Theory/Practical
3.	**Twitter Marketing**	

	• Introduction of the Course & the topic • Twitter Marketing Terminology • How to use twitter as a conversational Platform • Why Brands should be obsessed with Twitter • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Practical • Practical • Theory/Practical
4.	**LinkedIn, Pinterest & Google+ Marketing**	
	• Introduction of the Course & the topic • LinkedIn Marketing Terminology • Understanding LinkedIn as a Professional network • How it helps in B2B business • How this platform can be used to drive more professional opportunities • Google Adsense • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Theory/Practical
5.	**YouTube Marketing**	
	• Introduction of the Course & the topic • How to create a YouTube Channel • Managing the account and its layout • Creating Videos and its Technicalities associated with YouTube • You Tube Monetization • Affiliate Marketing • Online Reputation Management • Influencer Marketing • Conclusion & Summary of the Unit	• Theory/Practical • Theory/Practical • Theory/Practical • Theory/Practical • Practical • Practical • Practical • Practical • Theory/Practical

Thanks
Happy Learning