Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)

Department of Computer Science and Information Technology
Syllabus for Post Graduation course (M.Sc.C.S.)

(With Effect from Academic Year:2014-15)

Name of the Programme: Master of Computer Science (Second Year Semester III + IV)

Semester : III

Code No	Course Name	Maximum Marks		Total Marks	Credits
		Theory / Practical	Internal		
P-DAM-328	Data Mining	60	40	100	4
P-DIP-329	Digital Image Processing	60	40	100	4
P-ASN-330	ASP.Net	60	40	100	4
P-PRO-331	Project	60	40	100	4
P-LAC-332	DIP	100	-	100	4
P-LAC-333	ASP.Net	100	-	100	4

Semester : IV

Code No	Course Name	Maximum Marks		Total Marks	Credits
		Theory / Practical	Internal		
P-DIS-426	Distributed Network	60	40	100	4
P-LIA-427	Linux Administration	60	40	100	4
P-ELE-428	Elective	60	40	100	4
P-PRO-429	Project	60	40	100	4
P-LAC-430	Linux Administration	100	-	100	4
P-LAC-431	Elective	100	-	100	4

Elective Papers (P-ELE-428) :

1) A.I. and Expert System
2) Advanced Networking Concept
3) Fuzzy System + Neural Network

Course Code: P-DAM-328
Course Title: Data Mining

Total Teaching hours: 60 **Marks: 100**
Credits: 04

Learning Objective:

- Understanding of the value of data mining in solving real-world problems.
- Understanding of foundational concepts underlying data mining.
- Understanding of algorithms commonly used in data mining tools.
- Ability to apply data mining tools to real-world problems..

Course Outcome:

- Display a comprehensive understanding of different data mining tasks and the algorithms most appropriate for addressing them.
- Evaluate models/algorithms with respect to their accuracy.
- Demonstrate capacity to perform a self directed piece of practical work that requires the application of data mining techniques.
- Critique the results of a data mining exercise.
- Develop hypotheses based on the analysis of the results obtained and test them.

SYLLABUS

Unit I

1 Introduction
1.1 Basic Data Mining task
1.2 Data Mining Vs Knowledge discovery in databases
1.3 Data mining metrics
1.4 Social Implication of Data Mining

2 Related Concepts
2.1 Database/OLTP systems
2.2 Information Retrieval
2.3 Decision Support Systems
2.4 Dimensional Modeling
2.5 OLAP
2.6 Web Search Engines

Unit II

3 Data Mining Techniques
3.1 Introduction
3.2 Statistical perspective on Data Mining
3.3 Decision Tree
3.4 Neural networks

4 Classification
4.1 Introduction
4.2 Statistical based algorithms
4.3 Distance based algorithms
4.4 Decision tree based algorithms
4.5 Neural network based algorithm

Unit III

5 Clustering and Association Rules
5.1 Introduction
5.3 Partitional algorithms
5.4 Clustering large databases
5.5 Basic algorithms (Association)
5.6 Parallel and distributed algorithms

Unit IV

7 Web Mining 08
7.1 Introduction
7.2 Web content mining

Reference Books
1. Data Mining – Introductory and Advanced Topics by Margaret H. Dunham & S. Shridhar

Course Code: P-DIP-329
Course Title: Digital Image Processing

Total Teaching hours: 60 **Marks: 100**

Credits: 04

Learning Objective:

1. The fundamentals of digital image processing
2. Image transform used in digital image processing
3. Image enhancement techniques used in digital image processing
4. Image restoration techniques and methods used in digital image processing
5. Image compression and Segmentation used in digital image processing

Course Outcome:

After completion of this course, students should be able to:

- Understand the basics of fundamentals of digital image processing
- Understand how computers represent and manipulate images
- Understand image arithmetic and convert between different data classes
- Understand basics of intensity transformations
- Understand and manipulate image histograms.
- Working with image filtering and noise removal.

SULLABUS

Unit- I Introduction of Image Processing

What is digital image processing?, Applications of digital image processing, fundamental stapes in digital image processing, Components of digital image processing, Elements of visual perception, Light and Electromagnetic Spectrum, image sensing and acquisition devices, a simple image formation model, image sampling and quantization, representing digital images.

Unit – II Digital Image Representation and Introduction to M- Function Programming

Digital Image Representation: Coordinate Conventions, Images as Matrices, Reading Images, Displaying Images, Writing Images, Data Classes ,Image Types, Intensity Images, Binary Images, A Note on Terminology, Converting between Data Classes and Image Types, Converting between Data Classes, Converting between Image Classes and Types, Array Indexing : Vector Indexing, Matrix Indexing, Selecting Array Dimensions, Introduction to M-Function Programming: M-Files, Operators, Flow Control, Code Optimization, Interactive I/O.

Unit – III Intensity Transformations and Spatial Filtering

Transformation Functions: Function imadjust, Logarithmic and Contrast-Stretching Transformations, Histogram Processing and Function Plotting: Generating and Plotting Image Histograms, Histogram Equalization, Histogram Matching (Specification),Spatial Filtering , Linear Spatial Filtering, Nonlinear Spatial Filtering, Frequency Domain Processing: The 2-D Discrete Fourier Transform,Computing and Visualizing the 2-D DFT in MATLA, Filtering in the Frequency Domain, Basic Steps in DFT Filtering.

Unit – IV Degradation/Restoration and Color Image Processing

A Model of the Image Degradation/Restoration Process, Noise Models, Geometric Transformations and Image Registration: Geometric Spatial Transformations, Applying Spatial Transformations to Images, Image Registration, Color Image Representation in MATLAB: RGB Images, Indexed Images, IPT Functions for Manipulating RGB and Indexed Images, Converting to Other Color Spaces: NTSC Color Space, The YCbCr Color Space, The HSV Color Space, The CMY and CMYK Color Spaces, The HSI Color Space, The Basics of Color Image Processing.

Reference Books:

1. R.C. Gonsales R. E. Woods, Digital Image Processing, Second Edition, Pearson Education
2. R.C. Gonsales R. E. Woods, Digital Image Processing using MATLAB, Second Edition, Pearson Education

Course Code: P-ASN-330
Course Title: ASP.Net

Total Teaching hours: 60 **Marks: 100**
Credits: 04

Learning Objective:

Asp.net Helps students to create their own web applications. According to Market every site is divided into two categories static or dynamic and subject like asp.net helps to design and develop static as well as dynamic websites. Asp.net technology is one of good choice to develop major project of final year PG students.

Course Outcomes:

- Create a Web form with server controls.
- Separate page code from content by using code-behind pages, page controls, and components.
- Display dynamic data from a data source by using Microsoft ADO.NET and data binding.
- Debug ASP.NET pages by using trace.

Unit-I: Web Development and Asp .Net

Introduction to .Net framework, .NET languages, The .NET class library, About ASP.NET, Basic difference between C# and VB.NET, Data types, Comparison of Asp and Asp .Net, Features of Asp .Net, Benefits of Asp .Net, Web forms and their Components, Overview of Web Services. **Web Application Basics:** Web forms Model, Web forms Internals, Asp.Net Core Server Controls, Working with Page.

Unit-II: Creating Web forms Application

Upgrading HTML Pages to Asp.Net, Asp Pages to Asp.Net, **Adding Data in an Asp.Net Site:** ADO.Net, Paging Through Data Sources, **Creating Web forms Application**: Creating an Asp.Net Web Application Project, Responding to Events, Namespace Fundamentals Maintaining State Information.

Unit-III: Creating a User Interface

Using Web Controls, Using Visual Studio.Net, Validation and Rich Control, Validating Data, Navigating Between forms, Navigation between Pages, **Data Binding:** Bind Data to The UI, Transform and Filter Data Storing and Retrieving Data with ADO.Net, Accessing Data with ADO.Net, Using Data Sets on Web forms, Processing Transactions, Catching and Correcting Errors: Using Exception Handling, Using Error Pages, Logging Exceptions.

Unit-IV: Web Services

Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, Testing Web Applications: Creating Tests, Running Tests. Debugging, Building and Deploying Web Applications, Creating an Installation Program, Maintaining Security: Authenticating and Authorizing Users, Using Windows Authentication, Using forms Authentication.

Books:

1) Russel, “Mastering Asp.Net”, BPB Publication,

2) MatThew Macdonald, “Asp.Net the Complete References”, TMH.

3) ShirishChavan, “Visual Basic.NET”, 1st Edition, 2007, Pearson Publication”. ISBN 81-317-1391-1.

References:

1) Mitchell and Atkinson, “Active Server Pages 3.0 (in 21 Days)” Techmedia”

2) David Buser, John Kauffman, Juan T. Llibre, Brian Francis,Dave Sussman,ChrisUllman,JonDuckett, “Beginning Active Server Pages 3.0”, Wrox Press.

3) ASP.Net Black Book

Course Code: P-LAC-332
Digital Image Processing

Credits: 04

Learning Objective:

6. The fundamentals of digital image processing
7. Image transform used in digital image processing
8. Image enhancement techniques used in digital image processing
9. Image restoration techniques and methods used in digital image processing
10. Image compression and Segmentation used in digital image processing

Course Outcome:

After completion of this course, students should be able to:

- Understand the basics of fundamentals of digital image processing
- Understand how computers represent and manipulate images
- Understand image arithmetic and convert between different data classes
- Understand basics of intensity transformations
- Understand and manipulate image histograms.
- Working with image filtering and noise removal.

Proposed practical list:

1. Study of MatLab Enviornment
2. Working with Data Classes and Image types
3. Working with Array and Matrices
4. Study of Basic Image operations
5. Working with Image Filtering
6. Working with Image Histogram plotting functions
7. Working with histogram equalization and matching
8. Study of Linear Spatial Filtering (Linear and non-linear)
9. Working with Intensity Transformation
10. M-Function: demonstration of control constructs
11. M-Function: demonstration of Looping
12. Study of image Restoration and Degradation functions

P-LAC-333

Asp.net

Total Credits: 4

Learning Objective:

Asp.net Helps students to create their own web applications. According to Market every site is divided into two categories static or dynamic and subject like asp.net helps to design and develop static as well as dynamic websites. Asp.net technology is one of good choice to develop major project of final year PG students.

Course Outcomes:

- Create a Web form with server controls.
- Separate page code from content by using code-behind pages, page controls, and components.
- Display dynamic data from a data source by using Microsoft ADO.NET and data binding.
- Debug ASP.NET pages by using trace.

Proposed Practical List:

1] Introduction to Visual Studio IDE

2] Creating Empty Web Site

3] Creating Asp.net Web Application

4] Asp.net application to demonstrate asp.net page life cycle

5] Asp.net application to demonstrate IsPostBack property

6] Asp.net application to demonstrate Response.Redirect

7] Asp.net application to demonstrate Server.Transfer

8] Asp.net application to works with Button and TextBox control

9] Asp.net application with try, catch and finally blocks

10] Create Webpage with CSS style

11] Creating Theme in asp.net

12] Asp.net Application with master and child pages

13] Asp.net application with Validation Controls

14] Build asp.net application to maintain state using session

15] Create Database oriented Asp.net web application

Course Code: P-DIS- 426
Course Title: **Distributed System**

Total Teaching Hours: 60 Marks: 100
Credits: 04

Learning Objective:

- The course aims to provide an understanding of the principles on which the Internet and other distributed systems are based; their architecture, algorithms and how they meet the demands of contemporary distributed applications.
- The course covers the building blocks for a study of distributed systems, and addressing the characteristics and the challenges that must be addressed in their design: scalability, heterogeneity, security and failure handling being the most significant.
- This course also covers issues and solutions related to the design and the implementation of distributed applications.

Course Outcome:

Upon successful completion of this course student should be able to:

- understand knowledge of the basic elements and concepts related to distributed system technologies;
- understand knowledge of the core architectural aspects of distributed systems;
- Design and implement distributed applications.
- Student will be able to get knowledge of DSM.
- Student will get knowledge about architecture, RPC.
- Student will revise the concepts of operating system.
- Student will be able to know about disk and diskless network.

SYLLABUS

Unit I: Introduction to Distributed System

1. Fundamentals: Distributed computing, system model, distributed operating system, designing operating system, Introduction to DCE.

2. Message Passing: Desirable features message passing system, Issues in message passing, synchronization, buffering, multidatagram messages, Encoding and decoding of message data, Process addressing, Failure handling, Group communication.

Unit II: Distributed Shared Memory and Synchronization

3. Distributed Shared Memory: General architecture of DSM systems, Design and implementation of DSM, Granularity, structure of shared memory space, consistency models, Replacement Strategy, Thrashing, other approaches to DSM, Heterogeneous DSM, and Advantages of DSM.

4. Synchronization: clock synchronization, event ordering, mutual exclusion, Deadlock, Election Algorithm.

Unit III: Resource and Process Management and DFS

5. Resource and Process Management: Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach, Introduction to process management, process migration, Threads.

6. Distributed File System: Introduction, good features of DFS, File models, File Accessing models, File sharing Semantics, File-Caching Schemes, File Replication, Fault Tolerance, Atomic Transactions and design Principles.

Unit IV: Naming

7. Naming: Introduction, Desirable features of Naming System, Fundamental concepts, System oriented Names, Object locating mechanisms, human oriented Names, Name Caches and Naming and Security.

Reference Books:

1. Pradeep K Sinha. Distributed Operating Systems: Concepts and design. IEEE computer society press.
2. A. Tanuenbaum. Distributed Operating System. Pearson Edition.
3. PUDER, ROMER. Distributed Systems Architecture: Middleware approach. ELSEVIER Publication.
4. Distributed Computing, Principles and Applications, M.L. Liu, Pearson Education.

.

Course Code: P-LIA-427
Course Title: **Linux Administration**

Total Teaching Hours: 60 Marks: 100
Credits: 04

Learning Objective:

- To familiarize students with the Linux environment
- To learn the fundamentals of shell scripting/programming
- To familiarize students with basic linux administration

Course Outcome:

- Work confidently in Unix/Linux environment
- Write shell scripts to automate various tasks
- Master the basics of linux administration

UNIT I : Introduction to Linux

History: UNIX, Linus and Linux , Current application of Linux systems, Properties of Linux: Linux Pros, Linux Cons Linux Flavors: Linux and GNU, GNU/Linux. Logging in, activating the user interface and logging out: Introduction, Graphical mode, Text mode. Absolute basics: The commands, General remarks, Using Bash features.

UNIT II: Files and file system

General overview of the Linux file system: General, types of files, about partitioning: Why partition, Partition layout and types, More file system layout: Visual, The file system in reality. Orientation in the file system: The path, Absolute and relative paths. The most important files and directories: The kernel, The shell, Shell types, home directory.

UNIT III: Managing files and security

The most important configuration files, The most common devices, working with vi/vim editor. Manipulating files: Viewing file properties, Creating and deleting files and directories, finding files, grep command. File security: Access rights, chmod command, Umask command, chown, chgrp.

UNIT IV: System Administration

Starting and stopping services: linuxconf command. Using RPM as a package manager, granting privileges to users: su, sudo command., adding user: adduser command, passwd command,

Reference books:

1. Introduction to Linux: A Hands on Guide by Machtelt Garrels.
2. Red Hat Linux 7.2 Unleashed By Bill Ball Et al, Techmedia Publication.

Course Code:- P-ELE-428
Course Title:- Elective

Total Teaching Hours: 60 Total Marks: 100
Credit: 04

Elective I- Fuzzy System and Neural Network

Learning Objective:

- Be able to understand basic knowledge of fuzzy sets and fuzzy logic
- Be able to apply basic knowledge of fuzzy information representation and processing
- Be able to apply basic fuzzy inference and approximate reasoning
- Be able to understand the basic notion of fuzzy rule base
- Be able to apply basic fuzzy system modelling methods
- Be able to apply the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.

Course Outcome:

- Introduction to fuzzy sets : The uncertain and inexact nature of the real world: ideas and examples; fuzzy membership functions; fuzzy numbers and fuzzy arithmetic
- Introduction to fuzzy logic: Basic concept and properties of fuzzy logic versus classical two-valued logic
- Introduction to intelligent decision-making: Multi-objective optimization, performance evaluation, decision-making
- Introduction to fuzzy modeling :Static fuzzy modeling; dynamic fuzzy modeling
- Apply the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.

SYLLABUS

Unit I: Crisp Set and Fuzzy Sets & Fuzzy Sets Vs Crisp Sets

1.1 Introduction
1.2 Crisp Sets: An Overview
1.3 Fuzzy Sets: Basic Types
1.4 Fuzzy Sets: Basic Concepts
1.5Additional properties of alpha
1.6 Representation of Fuzzy Sets

Unit II: Operations on Fuzzy Sets

2.1 Types Of operations
2.2 Fuzzy Complements
2.3 Fuzzy Intersections: t- Norms
2.4 Fuzzy Unions: t – Conorms

Unit III: Fuzzy Relations

3.1 Crisp Vs Fuzzy Relations
3.2 Binary Fuzzy Relations
3.3 Binary Relation on a Single Set
3.4 Fuzzy Equivalence Relations
3.5 Fuzzy Compatibility Relations.

Unit IV: Neural Network

4.1 Fuzziness in neural networks
4.2 Neural trained fuzzy system
4.3 BAM- bidirectional associative memory, inputs and outputs, weights and training.
4.4 FAM-fuzzy associative memory, association, FAM neural networks.

Reference Books:

1. Rao, Vallinu B.,and Rao, Hayagriva . Neural networks and fuzzy Logic, second edition, BPB Publication
2. Berkan C. Riza, Trubatch L, Sheldon, Fuzzy Systems design Principlea. IEEE Press , standard publishers distributers
3. Freeman A. James, Skapura M. David- neural networks algorithms, applications and programming Techniques, Pearson Education

Elective II- Artificial Intelligence

Learning Objective:

The objective of the course is to present an overview of artificial intelligence (AI) principles and approaches. ... Students will implement a small AI system in a team environment. The knowledge of artificial intelligence plays a considerable role in some applications students develop for courses in the program.

Course Outcome:

- To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
- To have an appreciation for the engineering issues underlying the design of AI systems.
- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
- To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.

Unit I – General Issues and overview of AI

The AI problems: what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies; forward and backward chaining Exhaustive searches: Depth first Breadth first search.

Unit II – Heuristic Search Techniques

Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Min Max Search procedure; Alpha-Beta cutoff; Additional Refinements.

Unit III – Knowledge Representation

First Order Predicate Calculus; Skolemnisation; Resolution Principle and Unification; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Scripts; Conceptual Dependency AI Programming Languages Introduction to LISP, Syntax and Numeric Function; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

Unit IV – Natural Language Processing and Parsing Techniques

Context – Free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Planning Overview – An Example Domain: The Blocks Word; Component of Planning Systems; Goal Stack Planning (linear planning); Non-linear Planning using constraint posting; Probabilistic Reasoning and Uncertainty; Probability theory; Bayes Theorem and Bayesian networks; Certainty Factor.

Reference Books

1. Nils J. Nilsson: Principles of Artificial Intelligence – Narosa Publication house.

2. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norving, Pearson Education 2nd Edition.
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.
4. Artificial Intelligence by Gopal Krishna, Janakiraman.

Elective III: Advanced Networking Concepts

Learning Objective:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course outcome:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Unit I :

1. Review of Basic Concepts

1.1 Network Architecture – Protocol Hierarchies, Layered model, services, interface
1.2 Reference Models
1.3 Underlying Technologies

2. LAN Hardware

2.1 Network Interface card
2.2 Transmission Media
2.3 Topologies
2.4 Active hub and passive hub
2.5 Repeaters
2.6 Wireless LAN

Unit II:

3. The Internet Layer Protocols

3.1 IP-Datagram , fragmentation and reassembly
3.2 ICMP –types of messages, error reporting, ICMP package
3.3 BOOTP and DHCP

4. Routing Protocols

4.1 Interior and Exterior routing – RIP, OSPF, BGP
4.2 Multicase Routing- Unicast, Multicast and Broadcast, Multicasting, Multicast trees

Unit III:

5. The Transport Layer

5.1 The transport service –Services provided, services primitives, Sockets
5.2 Process-to-process communication
5.3 Elements of transport protocols – addressing, connection establishment, connection release, flow control and buffering , multiplexing, crash recovery
5.4 UDP- Introduction, Remote Procedure Call
5.5 TCP –service model, protocol, frame format , connection establishment, release, connection management, silly window syndrome- Negle's algorithm, error control,
congestion control, state transition diagram

6. Sockets and Client –server Model
6.1 Client-Server Model- Concurrency , Processes
6.2 Socket Interface –sockets, byte Ordering, Socket system calls, connectionless and connection Oriented applications
6.3 Implementation of Sockets (C/ Java etc)

Unit IV:
7. The Application Layer
DNS Telnet and Rlogin, FTP, TFTP, SNMP, SMTP, World Wide Web(Client and server side, cookies, wireless web), Java and the internet

8. Introduction to Network security
8.1 Cryptography, symmetric key algorithm, Public key algorithms, Digital signatures, Certificates, IPSec, Firewalls, Virtual Private Networks, Network Address Translation, Authentication protocols, Social Issues

Reference Books:
1) Beehrouz Forouzan , TCP/IP protocol suit , second edition, Tata McGraw Hill
2) Andrew S. Tanenbaum, Computer Networks , Fourth Edition, Prentice Hall
3) Douglas E. Comer, Internetworking with TCP/IP , vol 1,
4) William Stallings, Data and Computer Communications , Seventh edition , Pearson Edition

Course Code: P-LAC-430
Linux Administration

Credits: 04

Learning Objective:
Teach Basics of Linux Operating System

- Teach ownership and permissions of the files and directories.
- Explain why these issues exist.
- Learn to set permissions files/directories
- Learn to manipulate files/directories – list files, create, delete, and move just about anything on the file system
- Mention vi - a standard Unix text editor
- Learn How to create users , groups and setting the passwords
- Understand Different network configuartions
- Know about Storage and backups

Course Outcome:
On completion of this course the student should be able to:
Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

Proposed Practical List:

1. Study of installation of linuxo.s.
2. Study of file related commands
3. Study of utility commands
4. Study of directory related commands
5. Study of compression related commands
6. Study of filter commands
7. Study of communication commands
8. Study of network related commands
9. Study of printer related commands
10. Study of vi editor.
11. Write a simple shell program

Course Code: P-LAC-431
Elective

Credits: 04

Learning Objective:

- Be able to understand basic knowledge of fuzzy sets and fuzzy logic
- Be able to apply basic knowledge of fuzzy information representation and processing
- Be able to apply basic fuzzy inference and approximate reasoning
- Be able to understand the basic notion of fuzzy rule base
- Be able to apply basic fuzzy system modelling methods
- Be able to apply the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.

Course Outcome:

- Introduction to fuzzy sets : The uncertain and inexact nature of the real world: ideas and examples; fuzzy membership functions; fuzzy numbers and fuzzy arithmetic
- Introduction to fuzzy logic: Basic concept and properties of fuzzy logic versus classical two-valued logic
- Introduction to intelligent decision-making: Multi-objective optimization, performance evaluation, decision-making
- Introduction to fuzzy modeling :Static fuzzy modeling; dynamic fuzzy modeling Apply the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.

Proposed Practical List:

1. Practical Based on set using MATLAB
2. Practical Based on crisp set using MATLAB
3. Practical Based on fuzzy set using MATLAB
4. Practical Based on fuzzy compliment using MATLAB
5. Practical Based on Compatibility Relations using MATLAB
6. Practical Based on Fuzzy relation using MATLAB
7. Practical Based on equivalence Relation using MATLAB
8. Practical Based on Binary relation on single set in MATLAB
9. Practical Based on intersection on two fuzzy set using MATLAB
10. Practical Based on Union on two fuzzy set using MATLAB.