ARTIFICIAL NEURAL NETWORKS

OPEN ELECTIVE

Course Objectives:

1. To Introduce the concept of Artificial Neural Networks , Characteristics, Models of Neuron, Learning Rules, Learning Methods, Stability and Convergence

2. To study the basics of Pattern Recognition and Feed forward Neural Networks

3. To study the basics of Feedback neural networks and Boltzmann machine

4. To introduce the Analysis of Feedback layer for different output functions, Pattern Clustering and Mapping networks

5. To study the Stability, Plasticity, Neocognitron and Different applications of Neural Networks

UNIT-I : Basics of Artificial Neural Networks
Introduction: Biological Neural Networks, Characteristics of Neural Networks, Models of Neuron, Topology, Basic Learning Rules
Activation and Synaptic Dynamics: Activation Dynamic Models, Synaptic Dynamic Models, Learning Methods, Stability & Convergence, Recall in Neural Networks

UNIT-II: Functional Units of ANN for Pattern Recognition Tasks: Pattern Recognition problem Basic Fundamental Units, Pattern Recognition Tasks by the Functional Units
Feed forward Neural Networks: Analysis of Pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of Pattern Mapping Networks

UNIT-III:
Feedback Neural Networks: Analysis of linear auto adaptive feed forward networks, Analysis of pattern storage Networks, Stochastic Networks & Stimulated Annealing, Boltzmann machine

UNIT-IV:
Competitive Learning Neural Networks**:** Components of a Competitive Learning Network, Analysis of Feedback layer for Different Output Functions, Analysis of Pattern Clustering Networks and Analysis of Feature Mapping Network

UNIT-V:
Architectures for Complex Pattern Recognition Tasks**:** Associative memory, Pattern mapping Stability – Plasticity dilemma: ART, temporal patterns, Pattern visibility: Neocognitron

UNIT-VI:
Applications of Neural Networks: Pattern classification, Associative memories, Optimization, Applications in Image Processing, Applications in decision making

Text Book

1. B.Yagnanarayana"Artificial Neural Networks", PHI

Reference Book

1. Laurene Fausett ,"Fundamentals of Neural Networks", Pearson Education

2. Simon Haykin , "Neural Networks", Second Edition

Course Outcomes

1. This Course introduces Artificial Neural Networks and Learning Rules and Learning methods

2. Feed forward and Feedback Neural Networks are introduced

3. Applications of Neural Networks in different areas are introduced