17CS012 ARTIFICIAL NEURAL NETWORKS

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Course description and objectives:
On completion of this course the students will be able to expose themselves towards intelligence systems and knowledge based systems. It also provides knowledge of learning networks.

Course Outcomes:
Students can able to

- ✓ Understand the difference between biological neuron and artificial neuron
- ✓ Understand the application areas of neural networks
- ✓ Understand building blocks of Neural Networks.
- ✓ Develop neural network models
- ✓ Design and develop applications using neural networks.

Skills:

- ✓ Learn to design and build neural network models
- ✓ Learn to develop learning algorithms for machine learning

UNIT -I
Introduction to Artificial Neural Networks : Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between them and the Computer, Comparison Between Artificial and Biological Neural Network Basic Building Blocks of Artificial Neural Networks, Artificial Neural Network (ANN) terminologies.

UNIT - II
Fundamental Models of Artificial Neural Networks : Introduction, McCulloch - Pitts Neuron Model, Learning Rules, Hebbian Learning Rule Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Least Mean Square(LMS)Rule,Competitive Learning Rule, Out Star Learning, Boltzmann Based Learning, Hebb Net.
Perceptron Networks : Introduction, Single Layer Perceptron, Brief Introduction to Multilayer Perceptron Networks.

UNIT - III
Adaline and Madaline Networks: Introduction, Adaline, Madaline.
Associative Memory Networks: Introduction, Algorithms for Pattern Association, Hetero Associative Memory Neural Networks, Auto Associative Memory Network, Bi- directional Associative Memory.

UNIT – IV
Feedback Networks: Introduction, Discrete Hopfiled Net, Continuous Hopfiled Net, Relation between BAM and Hopfiled Nets.
Feed Forward Networks: Introduction, Back Propagation Network (BPN), Radial Basis Function Network (RBFN).

UNIT – V
Self Organizing Feature Map : Introduction, Methods Used for Determining the Winner, Kohonen Self Organizing Feature Maps, Learning Vector Quantization (LVQ),Max Net, Maxican Hat, Hamming Net

Adaptive Resonance Theory : Introduction, ART Fundamentals, ART 1, ART2

TEXT BOOKS:

1. Sivanandam, S Sumathi, S N Deepa; "Introduction to Neural Networks", 2nd ed.,TATA McGraw HILL : 2005.

REFERENCES BOOKS:

1. Simon Haykin, "Neural networks A comprehensive foundations", 2nd ed., Pearson Education, 2004.
2. B Yegnanarayana, "Artificial neural networks", 1st ed., Prentice Hall of India P Ltd, 2005.
3. Li Min Fu, "Neural networks in Computer intelligence", 1st ed., TMH, 2003