EC6T6FE2   **Artificial Neural Networks**   **Credits: 3**

Lecture : 3 periods/week   **Internal assessment: 30 marks**
Tutorial: 1 period /week   **Semester end examination: 70 marks**

Prerequisites: Control Systems (EC4T1)

Course Objectives:
- Biological motivation to design intelligent systems and control.

- Analysis of learning systems in conjunction with feedback control systems
- Evaluate the performance of the intelligent control systems using computer simulations.
- Exposure to the world control problems.

Learning Outcomes:

Student will be able to
- Analyze the working of biological neural network & the artificial neural networks.
- Apply the principles of artificial neural network in the fields of image processing, pattern recognition & solving optimization problems.
- Design the real time systems using Artificial Neural Networks.

UNIT- I

Introduction to Artificial Neural Networks : Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks.

UNIT- II

Fundamental Models of Artificial Neural Networks : Introduction, McCulloch – Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or LeastmeanSqure (LMS) rule.

UNIT- III

Feed Forward Networks : Introduction, Single Layer Perceptron Architecture, Algorithm, Multilayer Perceptron networks, Back Propagation Network (BPN), Back Propagation rule, Architecture, Training Algorithm, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

UNIT- IV

Adaline And Madaline Networks : Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm, MRII Algorithm.

UNIT- V

Counter Propagation Networks : Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Forward Only counter Propagation Network, Architecture, Training Algorithm.

Learning Resources

Text Books:
1. Artificial Neural Networks - B. Yegnanarayana, PHI, 2006

2. Introduction to Artificial Neural Systems - J.M.Zurada, Jaico Publishers, 3rd Edition,1992

References:

1. Elements of Artificial Neural Networks - KishanMehrotra, Chelkuri K. Mohan, and
2. Sanjay Ranka, Penram International, 2001
3. Artificial Neural Network – Simon Haykin, Pearson Education, 2nd Edition.,2008
4. Fundamental of Neural Networks – LaureneFausett, Pearson, 1st Edition.,1994