

Approval: 4th Senate Meeting

Course Name : Soft Computing
Course Number : CS-677
Credit : 2-0.5-0.5-3
Students intended for: M.S./Ph.D
Prerequisites : Knowledge of Probability, Statistics and Optimization, C/C++/MATLAB.
Elective or Compulsory: Elective
Semester:

Course Outline: This course introduces the basic concepts of soft computing. The course starts with an introduction to Artificial Neural Network (ANN). Some of the neural network algorithms and Support vector machine algorithm is discussed in detail. In the later part of the course, the concept of fuzzy set is introduced. The contents cover the fuzzy sets and fuzzy reasoning based inference algorithms. Applications of these techniques to real life scenarios are also discussed. Computer simulation would be an integral part of this course and students are required to submit a project report at the end of the course.

Course description: Introduction to soft computing and its applications. Biological neural network, artificial neural networks and applications, mathematical foundations and learning mechanisms, perceptron learning, radial basis function networks, feed forward neural network, competitive learning, self organizing neural network, support vector machine, Application of to Financial Markets, weather prediction. Fuzzy systems and applications: Introduction to fuzzy sets and fuzzy logic systems, fuzzy sets, fuzzy reasoning, fuzzy inference systems, fuzzy clustering, applications of fuzzy systems, neuro-fuzzy modeling and control.

Text Books:

1. Neural Networks, Simon Haykin, Prentice Hall, 1998.
2. Fuzzy Logic with Engineering Applications, Timothy J Ross, Wiley, 2009.
3. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence, J.S.R. Jang, C.T. Sun, E. Mizutani, Prentice Hall, 1996

Reference Books:

1. Fundamentals of Artificial Neural Networks, Mohamad H. Hassoun, MIT Press, 1995.
2. Neural Networks and Fuzzy Systems, Bart Kosko, Prentice Hall of India Learning, 2009.
3. Introduction to Pattern Recognition- Statistical, Structural, Neural and Fuzzy Logic Approaches, M. Friedman and Abraham Kandal, World Scientific, 2005.