

## UEI401: ARTIFICIAL INTELLIGENT TECHNIQUES AND APPLICATIONS

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>2</b>	<b>4.5</b>

**Course Objectives:** To introduce the concept of artificial intelligence, methods, techniques and applications

**Overview of Artificial Intelligence:** The concept and importance of AI, Human intelligence vs. Machine intelligence.

**Expert Systems:** Expert systems: advantages, disadvantages, Expert system architecture, Functions of various parts, Mechanism and role of inference engine, Types of Expert system, Tuning of expert systems, Role of Expert systems in instrumentation and process control.

**Artificial Neural Networks:** Structure and function of a single neuron, Artificial neuron models, Types of activation functions, Neural network architectures, Neural learning, Evaluation of networks, Supervised learning, Back propagation algorithm, Unsupervised learning, winner-take all networks, Application of neural networks for Classification, Clustering, Pattern associations, Function approximation, Forecasting etc.

**Fuzzy Logic:** Fuzzy sets and systems, Operations on Fuzzy sets, Fuzzy relations, Membership functions, Fuzzy rule generation, De-Fuzzification, Fuzzy controllers,

**Genetic Algorithms:** Introduction and concept, Coding, Reproduction, Cross-over and mutation scaling, Fitness, Applications, Swarm intelligence, and their applications.

**Laboratory work:** Use of FIS, ANFIS, Simulink, Fuzzy logic, Neural Networks and GA applications in MATLAB.

### Course Learning Outcomes (CLO):

After the successful completion of the course the students will be able to:

1. elucidate the knowledge and general concepts of artificial intelligence.
2. explain the concept of Artificial Neural Networks, Learning and Pattern Classification
3. illustrate the concept of fuzzy logic and its applications
4. illustrate the concept of genetic algorithms and its applications

### Text Books:

1. *Petterson, D.W., Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India (2007).*
2. *Zurada, J.M., Introduction to Artificial Neural Network System, Jaico Publication (2006).*
3. *Hagan, M.T., Neural network design, Prentice Hall of India .*
4. *Ross, T.J., Fuzzy logic with engineering applications, TMH*

### Reference Books:

1. *Yegnanarayana, B., Artificial Neural Networks, Prentice-Hall of India Private Limited (2008).*
2. *Winston, P.H., Artificial Intelligence, Addison Wesley (1994).*

### Evaluation Scheme:

S.NO.	Evaluation Elements	Weightage
1	MST	20
2	EST	40
3	Sessional (May include Assignments//Quizzes/Lab Evaluations)	40