EE651: Artificial Intelligence and It's Applications in Power System

Teaching Scheme			Credits	Marks Distribution				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
4	2	0	6	70	30	30	20	150

Course Content:

Sr. No	Topics	Teaching Hours
1	**Introduction** Introduction, Intelligence, Artificial Intelligence: History, Early Works Techniques, Programming Methods.systems, expert systems brief history of ANN, Fuzzy and GA, Intelligent System: History, Role of IS Comparison with conventional programs.	08
2	**Artificial Neural Network:** Fundamentals Of Neural Networks: Basic Concept, Neural Network Architectures, Characteristics, Learning Methods, early NN Architectures, Back propagation Networks: Architecture, Learning, Illustration,	08
3	**Fuzzy Logic:** Fuzzy Set theory, Crisp Set, Fuzzy set, Crisp relation, fuzzy relations. Fuzzy Systems: Crisp, predicate and fuzzy logic, Rule base system, Defuzzification methods.	08
4	**Genetic Algorithms:** Fundamentals, History, basics, working principal, encoding, fitness function, reproduction, Genetic Modeling, cross over, inversion, deletion, mutation, Bit wise operator, Application. 1. Roulette wheel selection 2. Stochastic remainder Roulette wheel selection , Rank selection, Tournament selection and stochastic universal sampling, different types of cross over methods in GA.	08

5	Applications of ANN, Fuzzy logic and GA in power systems operation and control for solving problems of load forecasting, voltage control, voltage stability, security assessment, feeder load balancing, AGC, Economic load dispatch, Unit commitment. Condition monitoring.	08
	Total Hrs.	**40**

Reference Books:

1. S. Rajasekaran "*Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications*", PHI Publication.
2. S. Rajasekaran, G. A. Vijayalakshmi Pai "*Neural Networks, Fuzzy logic and Genetic algorithms*", PHI publication.
3. Kalyanmoy Deb "*Optimization for Engineering Design*", PHI publication.
4. Kalyanmoy Deb "*Multi-objective Optimization using Evolutionary Algorithms*", Willey Publication.
5. Kevin Warwick, Arthur Ekwue, Raj Agrawal "*Artificial intelligence techniques in power systems*".