

ARTIFICIAL INTELLIGENCE APPLICATION TO POWER SYSTEMS

Course Code	19EE4801A	Year	IV	Semester	II
Course Category	Program Elective-VI	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understand the concept of different artificial intelligence concepts like Fuzzy systems, Artificial Neural Networks, Genetic Algorithm and PSO
CO2	Analyse the concepts of Fuzzy Logic and Artificial Neural Networks.(L4)
CO3	Analyse the concepts of Different Programming techniques like GA and PSO(L4)
CO4	Apply the different Artificial intelligence techniques to power system applications.(L3)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3												2	2
CO3		3											2	2
CO4	3			2	2								2	2

SYLLABUS		
Unit No.	Contents	Mapped CO
I	FUZZY LOGIC: Introduction, Comparison between Fuzzy and crisp logic, Fuzzy sets, Membership function, Basic fuzzy set operations, properties of Fuzzy set, fuzzy relations, Fuzzy inference system, Mamdani, Sugeno, Fuzzy rule based system, defuzzification methods.	CO1,CO2
II	ARTIFICIAL NEURAL NETWORKS: Fundamental concepts, Basic models, Learning rules, Single layer and multi-layer feed-forward and feedback networks, Supervised and unsupervised learning, Recurrent networks, Modular network, Self-organizing maps, Function networks, Neural network controller.	CO1,CO2
III	GENETIC ALGORITHM: Fitness function, different types GA operators 1. Roulette wheel selection 2. Stochastic remainder Roulette wheel selection, Rank selection, Tournament selection and stochastic universal sampling, different types of cross over methods.	CO1,CO3
IV	PARTICLE SWARM OPTIMIZATION (PSO): Basic concepts, Swarm intelligence, population, velocity updation, particle- best (pbest), global-best (gbest), velocity initialization, solution, Applications of PSO.	CO1,CO3

V	APPLICATION OF AI TECHNIQUES: Load forecasting, load flow studies, economic load dispatch, load frequency control, reactive power control, speed control of DC and AC motors.	CO1,CO4
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Learning Resources
Text Books: <ol style="list-style-type: none"> 1. S.Rajasekaran and G.A.V.Pai Neural Networks, Fuzzy Logic & Genetic Algorithms, PHI, New Delhi, 2003. 2. Clerc, M. "Particle Swarm Optimization". First Edition, Wiley-ISTE, 2006.
Reference Books: <ol style="list-style-type: none"> 1. Jacek M. Zurada, "Introduction to Artificial Neural Systems", 1st Edition, Jaico Publishing House, 2007. 2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", John Wiley & Sons, 2009. 3. F. Karray and C. De Silva, "Soft Computing and Intelligent Systems Design, Theory, Tools and Applications", Prentice Hall, 2004.