

**PANIPAT INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**Department of Electronics & Communication Engineering**

**LESSON PLAN**

**Subject Name:** - Neural Networks and Fuzzy Logic  
**Year:** - 4<sup>th</sup>

**Subject Code:** - ECO-14A  
**Semester:** - 8<sup>th</sup>

Lecture No	Unit No	Topic	COs Covered
L 1	UNIT-I	Artificial neural network: Introduction, characteristics- learning methods – taxonomy	CO1
L 2		Evolution of neural networks- basic models - important technologies - applications.	
L 3		Fuzzy logic: Introduction - crisp sets- fuzzy sets - crisp relations and fuzzy relations:	
L 4		Cartesian product of relation - classical relation, fuzzy relations,	
L 5		Tolerance and equivalence relations,	
L 6		Non-iterative fuzzy sets.	
L 7		Genetic algorithm- Introduction - biological background	
L 8		Traditional optimization and search techniques -.	
L 9		Genetic basic concepts	
		Revisions	
L 10	UNIT-II	McCulloch-Pitts neuron - linear separability - hebb network.	CO2
L 11		Supervised learning network: perceptron networks –	
L 12		Adaptive linear neuron, multiple adaptive linear neurons,	
L 15		BPN, RBF, TDNN- associative memory network: auto- associative memory network,	
L16		Hetero-associative memory network, BAM, hop field networks,	

L17		Iterative auto associative memory network & iterative associative memory network –	
L 18		Unsupervised learning networks: Kohonen self-organizing feature maps,	
L 19		LVQ – CP networks, ART network.	
L 20		Revisions	
L 21	UNIT-III	Membership functions: features,	CO3
L 22		fuzzification, methods of membership value assignments	
L 23		Defuzzification: lambda cuts - methods	
L 24		Fuzzy arithmetic and fuzzy measures: fuzzy arithmetic - extension principle -	
L 25		fuzzy measures - measures of fuzziness - fuzzy integrals -	
L 26		Fuzzy rule base and approximate reasoning: truth values and tables,	
L 27		Fuzzy propositions, formation of rules-decomposition of rules	
L 28		Aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-	
L 29		Overview of fuzzy expert system-fuzzy decision making.	
L 30	UNIT-IV	Neuro-fuzzy hybrid systems	CO4
L 31		Genetic neuro hybrid systems	
L 32		Genetic fuzzy hybrid and fuzzy genetic hybrid systems –	
L 33		Genetic fuzzy hybrid and fuzzy genetic hybrid systems –	
L 34		Simplified fuzzy ARTMAP - Applications: A fusion approach of multispectral images with SAR,	
L 35		Simplified fuzzy ARTMAP - Applications: A fusion approach of multispectral images with SAR,	
L 36		Connected cars IoT Transportation	
L37		Optimization of traveling salesman problem using genetic algorithm approach,	
L38		Soft computing-based hybrid fuzzy controllers.	
L39		Revision	

**Reference Books:**

1. Elaine Rich and Kevin Knight “Artificial Intelligence”, 2nd Edition, Tata Mcgraw-Hill, 2005.
2. Stuart Russel and Peter Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Edition, Prentice Hall, 2009.

**Text book(s) and/or required material**

1. T1. Kliryvan- Fuzzy System & Fuzzy logic Prentice Hall of India, First Edition.
2. Lawrence Fussett- fundamental of Neural network Prentice Hall , First Edition.  
Reference Books: 1. Bart Kosko, —Neural network and Fuzzy Systeml - Prentice Hall-1994.
3. J.Klin and T.A.Folger, —Fuzzy setsl University and information- Prentice Hall -1996.
4. J.M.Zurada, —Introduction to artificial neural systemsl-Jaico Publication house,Delhi 1994.
5. VallusuRao and HayagvnaRao , —C++ Neural network and fuzzy logicl-BPB and Publication, New Delhi,1996.
6. Intelligent Systems and Control-<http://nptel.ac.in/courses/108104049/16>