



C. U. SHAH UNIVERSITY

Wadhwan City

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Electrical Engineering
BRANCH: Electrical & Electronics Engineering
SEMESTER: - VIII
CODE: - 4TE08ICS1
NAME – Intelligent Control Systems

Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE08ICS1	Intelligent Control Systems	4	0	2	6	5	30	1.5	70	3	--	20	30	150

Objectives:

- The students will be able to understand the concept of soft Computing and its various techniques namely Fuzzy Logic and Artificial Neural Network and its applications.

Prerequisites:-

- Basic understanding Linear Control Engineering and its applications.
- Basic understanding of Logic Design

Course Outlines

Sr. No.	Course Contents	Hours
1	Fuzzy Systems & Fuzzy Control : Fuzzy set theory, Basic Operations, Semantics of using fuzzy logic. Possibility distribution and Uncertainty measures, knowledge representation using Hypergraphs. Fuzzy Associative Memory [FAM] and FAH Rules, Fuzzification and Defuzzification.	06
2	Development Tools for Fuzzy Systems : Software Tools: Graphic Design, Debugging Modes for Simulation, Optimization and Verification. Fuzzy Logic Description Language. Hardware Tools : Fuzzy Processors, Standard Processors using μP and Microcontrollers, FLSs	10

	and Fuzzy Logic on Distributed Process Control Systems.	
3	Fuzzy Controllers: Knowledge Base v/s Classical Controllers. Parameters of Fuzzy Controllers, Fuzzy Control and Derivation of Relation equation.	10
4	Neural Network Models : Network as function, Neuronal Fields and systems, Common and Pulse coded Signals, Additive models, BAH, Unsupervised models : Hebbian and Competitive learning, Differential Hebbian and CL. Supervised models : BKP, multilayer feedforward, Approximation / optimization models. Temporal models: Linear temporal [IIR adaptive filter], Dynamic models, Prediction based Networks. Stochastic Network, markov mode. ARTI, ARTZ, Architecture, algorithms, analysis and applications.	12
5	Architecture and Implementation : Mapping of Moral network to array architecture, Dedicated Neural processing circuits using : ASIC, FFGA Chips, General purpose Digital Neuro computers	08
6	Neuro Fuzzy Control Systems : Neuro fuzzy technology, Combining neural and Fuzzy. Fuzzy Control with Conventional Control Systems. Comparison of Neuro Fuzzy with adaptive Control Schemes. Application to Industrial Automation and process Plants.	10

Learning Outcomes

- Students will be able to understand the fundamentals of Fuzzy Logic and Artificial Neural Network and its relative advantages with crisp logic controller.

Books Recommended

- Foundation of Fuzzy Systems, by R Kruse, J Gebhart & F Klawonn : John Wiley & Sons.
- Neural Network & Fuzzy Systems, by Bart Kosko : Prentice Hall [India]
- Introduction to Neural Networks by Jacob Zurada : Jaico Publishers.