NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTLINE TEMPLATE			
Course Title	**FUZZY SYSTEMS**		
Course Code	EE671	**No. of Credits**	3
Department	**Electrical and Electronics Engineering**	**Faculty**	**Ms.S.MALARVILI**
Pre-requisite Course	CONTROL SYSTEMS		
E-mail	-	**Telephone No.**	-
Course Type	Elective course		

COURSE OVERVIEW

The theory of fuzzy sets is, basically, a theory of graded concepts- a theory in which everything is a matter of degree or, to put it figuratively, everything has elasticity. This course deals with both the theory and its applications, explains in clear terms the basic concepts that underline the theory and how they relate to their classical counterparts. This course covers most of the mathematical proofs in order to get deeper understanding of fuzzy systems. This course provides the ways in which the theory can be applied to the solution of realistic problems, particularly in the area of decision analysis, and motivates the theory by applications in which fuzzy systems play an essential role.

COURSE OBJECTIVES

This course is designed to expose students to fuzzy methods of analyzing problems which involve incomplete or vague criteria rather than crisp values. The course investigates requirements analysis, logical design, and technical design of components for fuzzy systems development.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. To Assimilate the uncertainty concept	PO_3, PO_6, $PO_9 - PO_{14}$
2. To Apply and analyze fuzzy sets for existing systems.	PO_3, PO_6, $PO_9 - PO_{14}$
3. To Develop fuzzy logic theory for linear and non-linear systems.	PO_3, PO_6, $PO_9 - PO_{14}$

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week	Topic	Mode of Delivery
1.	I week of August ($2^{nd} - 4^{th}$) 3 hr	Introduction to the course and flexible mode of course delivery	
2.	II week of August ($8^{th} - 10^{th}$) 3 hrs	Different faces of imprecision – inexactness, Ambiguity, Undecidability	
3.	II week of August ($16^{th} - 17^{th}$) 2 hrs	Fuzziness and certainty, Probability and fuzzy logic, Intelligent systems.	Lecture(Chalk& board / Power point presentation)
4.	III week of August ($22^{nd} - 24^{th}$) 3 hrs	Fuzzy sets and crisp sets - Intersections of Fuzzy sets, Union of Fuzzy sets, the complement of Fuzzy sets.	
5.	IV week of August ($29^{th} - 31^{st}$) 3 hrs	Problem solving on Fuzzy sets	
6.	I week of September ($5^{th} - 7^{th}$) 3 hrs	Problem solving on Fuzzy sets	

7.	12th September	**Assessment 1**	**Problem solving**
8.	II week of September (12th – 14th) **3 hrs**	Fuzzy reasoning - Linguistic variables, Fuzzy propositions, Problems	
9.	III week of September (19th & 20th) **2 hrs**	Fuzzy reasoning -Fuzzy compositional rules of inference, Problems	
10.	IV week of September (26th – 28th) **3 hrs**	Fuzzy reasoning - Methods of decompositions, Defuzzification, Problems	
11.	I week of October (3rd – 5th) **3 hrs**	Methodology of fuzzy design - Direct & Indirect methods with single and multiple experts	**Lecture(Chalk& board / Power point presentation)**
12.	II week of October (10th – 12th) **3 hrs**	Methodology of fuzzy design- Adaptive fuzzy control, Rule base design using dynamic response.	
13.	III week of October (17th & 18th) **2 hrs**	Methodology of fuzzy design- Problem solving.	
14.	19th October	**Assessment 2**	**Objective Type**
15.	IV & V week of October (24th & 26th & 31st) **3 hrs**	Fuzzy logic applications to engineering ,Fuzzy decision making	**Lecture(Chalk& board / Power point presentation)**
16.	I week of November (1st & 2nd) **2 hrs**	Neuro-Fuzzy systems, Problems.	

17.	II week of November (7th - 9th) 3 hrs	Fuzzy Genetic Algorithms, Problems.	
18.	III week of November (14th - 16th) 3 hrs	Mini project	Power point presentation
19.	21st November	**Assessment 3**	**Objective Type**

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Assesment (Written test)	12th September 19th October 21st November	*1 hour each	20%
2.	Assignment			10%
3.	Mini Project	III week of November (14th - 16th)	Details will be given later	20%
4.	End Semester Exam (Written test)	13th December	2 hours	50%

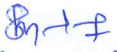***Best two out of three is considered**

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Zimmermann H. J., 'Fuzzy set theory and its applications', Allied publishers limited, Madras, 4th Edition, 2001

2. Klir G. J. and Folger T., 'Fuzzy sets, uncertainty and information', Prentice Hall of India, New Delhi,1991.

3. EarlCox, 'The Fuzzy Systems Handbook', AP professional Cambridge, 1999.

COURSE POLICY

1. Every student should maintain 75% attendance, if not they have to redo the course.

2. All the students are expected to be genuine during the course work. Taking information by copying another student's paper or using study material of any form during any assessments is considered dishonest. Any evidence of such academic dishonesty will result in loss of marks in that assessment. Additionally names of such students will be reported to Class Committee Chairperson and HOD for necessary actions.

3. A criterion for passing the course is as per the institution norms.

FOR SENATE'S CONSIDERATION

(CS.MALARVILI)
Course Faculty

CC-Chairperson

29/08/2017
HoD/Dept. of EEE