

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

#### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

	COUDAGE			
Name of the programme and specialization	III Year B.Tech, EEE	LAN = PART I		
Course Title	FUZZY SYSTEMS AND CENETIC ALCODITING			
Course Code	EEPE13	No. of Credits	03	
Session	July 2023	Section (if, applicable)	BTech EEE A & B	
Name of Faculty	Dr. Aneesa Farhan M A	Department	EEE	
Email	aneesa@nitt.edu aneesafma@gmail.com	Telephone No.	7598164452 8015877137	
Name of Course Coordinator(s) (if, applicable)	NA			
Course Type (please tick appropriately)	Elective			

#### Syllabus (approved in BoS)

Different faces of imprecision – inexactness, ambiguity, undecidability, Fuzziness and certainty, Fuzzy sets and crisp sets.

Intersection of Fuzzy sets, Union of Fuzzy sets - the complement of Fuzzy sets-Fuzzy reasoning. Linguistic variables, Fuzzy propositions, Fuzzy compositional rules of inference- Methods of decompositions and defuzzification.

Methodology of fuzzy design- Direct & Indirect methods with single and multiple experts, Applications– Fuzzy controllers – Control and Estimation.

Genetic Algorithms- basic structure-coding steps of GA, convergence characteristics, applications.

#### Text Books:

- 1. Zimmermann H.J., 'Fuzzy Set Theory and its Applications', Springer Netherlands, 2nd Edition, Illustrated, 2014.
- 2. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', John Wiley & Sons Ltd Publications, 3rd Edition, 2011*Generators'*, *CRC press.*
- 3. M. Mitchell, 'Introduction to Genetic Algorithms", Indian Reprint, MIT press Cambridge, 2nd Edition, 2014

#### **Reference Books:**

- 1. John Yen, Reza Langari, 'Fuzzy Logic, Intelligence, Control & Information', Pearson Education Inc., India, 2007.
- 2. Zdenko Kovacic, Stjepan Bogdan, 'Fuzzy Controller Design Theory and Applications', CRC Press, 1 st Edition, 2006.
- Riza C. Berkaan, Sheldon L. Trubatch, 'Fuzzy Systems Design Principles Building Fuzzy IF THEN Rule Based', IEEE Press, 1997



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## COURSE OBJECTIVES

This course aims to expose students to the fundamental principles of fuzzy logic systems.
Enable the students to apply fuzzy logic concepts to existing and new applications.

INCREMING OF COs with Pos					
Course Outcomes	P	rogram	me Out	tcomes only)	s (PO)
even completion of the course, the students will be able to	P		CO1	CO2	CO3
1. Understand the fundamentals of Fundamentals		01	L	н	н
2 Employ	P	02	н	M	M
and compare the reactions		03			L
supplie the results with existing methods.		205	NA	NA	NA
	P	06	NA	NA	NA
3 Design Furst Last a	F	07	NA	NA	NA
or besign Puzzy logic Systems for engineering applications.	F	908	NA	NA	NA
	F	909	L	L	L
	F	2010	NA	н	L
		2011	NA	н	NA
	F	2012	M	M	M
COURSE OVERVIEW			it it in		

This course aims to expose students to the fundamental principles of fuzzy logic systems.and enable the students to apply fuzzy logic concepts to existing and new applications.

COUR	SOURSE TEACHING AND LEARNING ACTIVITIES				
S.No.	Week/Contact Hours	Торіс	Mode of Delivery		
1	Week 1 July 31st-4 August	Course plan, Different faces of imprecision	Chalk&Talk		
2	Week 2 7 August – 11 August	Different faces of imprecision – inexactness, ambiguity, undecidability,	Chalk&Talk		
3	Week 3 14 August -18 August	Fuzziness and certainty Crisp Sets	Chalk&Talk		
4	Week 4 21 Aug –25 August	Fuzzy sets, Intersection of Fuzzy sets	Chalk&Talk		
5	Week 5 28 Aug -1st September	Union of Fuzzy sets - the complement of Fuzzy sets	Chalk&Talk		



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		6	Week 6 04 <sup>h</sup> -08 <sup>th</sup> Septem	Fuzzy reasoning. Assessment 1	Chalk&Talk
		7	Week 7	Linguistic variables, Fuzzy propositions	, Chalk&Talk
		7 11 <sup>th</sup> -15 <sup>th</sup> Septemb		per c	
		8	Week 8 18 <sup>th</sup> -22 <sup>th</sup> Septemb	Fuzzy compositional rules of inference er Assessment III	Chalk&Talk
		9	Week 9 25th -29th September	Methods of decompositions and defuzzification.	Chalk&Talk
	10	5	Week 10 02th -06 th October	Methodology of fuzzy design-	Chalk&Talk
				Assessment 2	
	11		Week 11 09 th to 13 October	Direct & Indirect methods with single and multiple experts,	Chalk&Talk
	13		Week 12 16 th to 20 October	Application Fuzzy controllers	Chalk&Talk
	14		Week 13 23 th to 27 October	Application Fuzzy controllers— Control and Estimation.	Chalk&Talk
	15	3	Week 14 0 th October to 03 November	Genetic Algorithms basic structure- coding steps of GA. Convergence characteristics, Convergence applications.	Chalk&Talk
1	6		Week 14 06 th -10 th November	Assessment III Discussion	Chalk&Talk

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COURSE ASSESSMENT METHODS         S.No.       Mode of Assessment       Type of assessment       Duration       % Weightag         1.       Assessment I       Quiz       1hr       20%         2.       Assessment II       Quiz       1hr       20%         2.       Assessment II       Quiz       1hr       80% of A1 an A2         3.       Compensation Assessment III       Quiz       1 hr       80% of A1 an A2         3.       Simulation/Group       Assignment       20%         4       Assessment IV Final sem(entire syllabus)       End Semester       3 hrs       40%         OURSE EXIT SURVEY         Students feedback through class committee meetings         Teedback guestionnaire from students – twice during the semester         Teedback from students on the course outcomes shall be obtained at the end of the course         URSE POLICY         ttending all the assessment smandatory for every student         the assessment 1 and/or 2, only for a valid reason. And will have a weightage of 80% of Assessment 2         tary case CPA will not be considered as an improvement test.         besolute/Relative grading will be adopted for the course.         ENDANCE POLICY       (A uniform attendance policy as specified below shall be followerd) </th <th>COURSE ASSESSMENT METHODS         S.No.       Mode of Assessment       Type of assessment       Duration       % Weig         1.       Assessment I       Quiz       1hr       20%         2.       Assessment II       Quiz       1hr       20%         CPA       Compensation Assesment (Quiz)       1 hr       80% of A Aze         3.       Simulation/Group Task/surprise test       Assignment       20%         4       Assessment IV Final sem(entire syllabus)       End Semester Examination       3 hrs       40%         OURSE EXIT SURVEY       Students feedback through class committee meetings Feedback questionnaire from students – twice during the semester Feedback from students on the course outcomes shall be obtained at the end of the course         URSE POLICY       ttending all the assessment will be conducted for those students who are being physically a Assessment 1 and/or 2, only for a valid reason. And will have a weightage of 80% of Assess transmittee meetings</th> <th></th> <th>Week 15 13-17 November</th> <th>Compensation Assessr</th> <th>ments</th> <th>Chalk&amp;Talk</th>	COURSE ASSESSMENT METHODS         S.No.       Mode of Assessment       Type of assessment       Duration       % Weig         1.       Assessment I       Quiz       1hr       20%         2.       Assessment II       Quiz       1hr       20%         CPA       Compensation Assesment (Quiz)       1 hr       80% of A Aze         3.       Simulation/Group Task/surprise test       Assignment       20%         4       Assessment IV Final sem(entire syllabus)       End Semester Examination       3 hrs       40%         OURSE EXIT SURVEY       Students feedback through class committee meetings Feedback questionnaire from students – twice during the semester Feedback from students on the course outcomes shall be obtained at the end of the course         URSE POLICY       ttending all the assessment will be conducted for those students who are being physically a Assessment 1 and/or 2, only for a valid reason. And will have a weightage of 80% of Assess transmittee meetings		Week 15 13-17 November	Compensation Assessr	ments	Chalk&Talk
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	bsolute/Relative grading will be adopted for the course. <b>ENDANCE POLICY</b> (A uniform attendance policy as specified below shall be followed)	IRSE P				

> Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

## ACADEMIC DISHONESTY & PLAGIARISM

> Possessing a mobile phone, carrying bits of paper, talking to other students, copying

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