<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>CENG462 FUZZY LOGIC (TECH.ELECT.)</td></tr>
<tr><td>Course Semester</td><td>8</td></tr>
<tr><td>Catalogue Data of the Course (Course Content)</td><td>Fuzzy Sets, Fuzzy Relations, Fuzzy Numbers, Fuzzy Functions, Uncertainty and Probability, Fuzzy Logic, Fuzzy Inferences, and Fuzzy Control Systems</td></tr>
<tr><td>Course Textbooks</td><td>Fuzzy Sets, Fuzzy Logic and Their Applications, 2020, MDPI.</td></tr>
<tr><td>Supplementary Textbooks</td><td>Fuzzy Logic: An Introductory Course for Engineering Students, Springer, 2015.</td></tr>
<tr><td>Credit (ECTS)</td><td>6</td></tr>
<tr><td>Prerequisites for the Course (Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Course Type</td><td>Technical Elective</td></tr>
<tr><td>Language of Instruction</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>1. To present the basic knowledge of fuzzy sets and fuzzy logic
2. To show the similarities and differences between fuzzy and classical set theories</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Understands the basic ideas of fuzzy sets, operations and properties of fuzzy sets, as well as fuzzy relationships.
2. Understands the basic properties of membership functions, fuzzification process and defuzzification process.
3. Designs a fuzzy rule-based system.
4. Gain knowledge about combining fuzzy set theory with probability and the decision-making process to deal with random and non-random uncertainty.</td></tr>
<tr><td>Instruction Method
(Face-to-face, Distance education etc.)</td><td>This course will only face-to-face training.</td></tr>
<tr><td>Weekly Schedule of the Course</td><td>Week 1: Fuzzy sets and basic fuzzy set operations
Week 2: Fuzzy sets and basic fuzzy set operations
Week 3: Fuzzy relation and expansion principle
Week 4: Fuzzy relation and expansion principle
Week 5: Linguistic variables
Week 6: Linguistic variables
Week 7: Fuzzy logic and approximate reasoning
Week 8: Fuzzy logic and approximate reasoning
Week 9: Fuzzy rule base
Week 10: Fuzzy rule base
Week 11: Fuzzy decision mechanism
Week 12: Blurs and clarifyers
Week 13: Fuzzy systems for nonlinear structures
Week 14: Fuzzy system design with input-output data set</td></tr>
<tr><td>Teaching Activities
(The time spent for the activities listed here will determine the amount of credit required)</td><td>Weekly theoretical course hours: 3
Reading activities
Internet search and library work
Making a report
Preparing and making presentations
Midterm and revision for midterm
Final exam and revision for final exam</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Number(s)</th><th>Weight (%)</th></tr>
<tr><td>Midterm exam</td><td>1</td><td>30</td></tr>
<tr><td>Assignment</td><td>2</td><td>10</td></tr>
<tr><td>Application</td><td>0</td><td>0</td></tr>
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Project	1	20
Practice	0	0
Quiz	0	0
Final exam	1	40
Total	5	100

Workload of the Course

Activity	Number of Weeks	Duration (Weekly Hour)	End of Semester Total Workload
Weekly theoretical course hours	14	3	42
Weekly practical course hours	0	0	0
Reading activities	14	3	42
Internet search and library work	14	2	28
Designing and implementing materials	0	0	0
Making a report	1	7	7
Preparing and making presentations	1	7	7
Midterm and revision for midterm	1	12	12
Final exam and revision for final exam	1	12	12
Total workload			150
Total workload/ 25			6
Course Credit (ECTS)			6

Contribution Level between Course Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Knowledge of mathematics, science, basic engineering, computing, and computer engineering; ability to use this knowledge in solving complex engineering problems.			x		
2	Ability to define, formulate and analyze complex engineering problems using basic science, mathematics and engineering knowledge and considering the UN Sustainable Development Goals relevant to the problems addressed.				x	
3	Ability to design creative solutions to complex engineering problems; ability to design complex systems, processes, devices, software, algorithms or products to meet current and future requirements, considering realistic constraints and conditions.				x	
4	Ability to select, use and develop appropriate techniques, resources and modern engineering and informatics tools, including estimation and modeling, for the analysis and solution of complex engineering problems while being aware of their limitations.				x	
5	Ability to use research methods to examine complex engineering problems or research topics in computer engineering, including reviewing the literature, designing experiments, conducting experiments, collecting data, analyzing and interpreting results.				x	
6	Knowledge of the effects of engineering practices and the standards used in these practices on society, health and safety, economy, sustainability and environment within the scope of the UN Sustainable Development Goals; awareness of the consequences of engineering solutions in the fields of information security and law.					
7	Acting in accordance with engineering					

	professional principles and knowledge on ethical responsibility; awareness of acting impartially, without discrimination on any issue, and being inclusive of diversity.						
8	Ability to work effectively individually and as a team member or leader in intradisciplinary and multidisciplinary teams (face-to-face, remote, or hybrid).		x				
9	Ability to conduct effective verbal and written communication on technical issues in Turkish or English, prepare reports, make effective presentations and prepare software documentation, considering the various differences of the target audience (such as education, language, profession).			x			
10	Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation.						
11	Lifelong learning skill that includes the ability to learn independently and continuously, to adapt to new and developing scientific practices and technologies, and to think inquisitively about technological changes.						

Lecturer(s) and Contact Information	Lecturer Dr. Bilgehan Arslan bilgehanarslan@gazi.edu.tr