OSTIM TECHNICAL UNIVERSITY
FACULTY OF ENGINEERING

COURSE SYLLABUS FORM
2022-2023

Course Name	Course Code	Period	Hour	Application Hour	Lab Hour	Credit	ECTS
Intelligent Cont. Systems	EEE407	Fall	3	0	0	3	4

Prerequisite	None
Language of Instruction	English
Course Status	Elective
Course Level	Undergraduate
Method of Teaching	In class lectures
Learning and Teaching Techniques of the Course	Lectures, Homeworks, Projects

Course Objective

The course aims to improve students knowledge about the intelligent control systems and applications. Intelligent control systems are becoming very important for both academia and industry day by day because of complex and nonlinear behaviors of industrial systems. New control methodologies are required to improve the performance of complex and nonlinear systems. Such controllers which are based on soft computing tools such are fuzzy logic, neural network and evolutionary computation will be investigating throughout the course.

Learning Outcomes

Upon successful completion, students will have the knowledge and skills to:

1.	Learn about the basic concepts of control systems theory
2	Understand the definitions and basics of fuzzy logic
3	Analyze the concepts of genetic algorithm (GA)
4	Demonstrate understanding of the principles and calculations of Neural Networks (NN)
5	Model and design intelligent control systems, and analyze the fuzzy logic-GA-NN based control systems..

Course Outline

This course is an introduction to Intelligent Control Systems and fuzzy logic as the primary focus. Topics include fuzzy logic, genetic algorithm, neural networks etc..

Weekly Topics and Releated Preparation Studies		
Weeks	**Topics**	**Preparation Studies**
1	Intro- control systems theory	Chapter 1, Negnevitsky, 2nd Ed.
2	Intro- intelligent control systems	Chapter 1, Negnevitsky, 2nd Ed.
3	Fuzzy Logic Basics	Chapter 4, Negnevitsky, 2nd Ed.
4	Fuzzy Logic Basics	Chapter 4, Negnevitsky, 2nd Ed.
5	Fuzzy Logic Applications	Chapter 4, Negnevitsky, 2nd Ed.
6	Fuzzy Logic Applications	Chapter 4, Negnevitsky, 2nd Ed.
7	Fuzzy Logic Applications	Chapter 4, Negnevitsky, 2nd Ed.
8	**Midterm Exam**	
9	Genetic Algorithm Basics	Chapter 7, Negnevitsky, 2nd Ed.
10	Genetic Algorithm Basics	Chapter 7, Negnevitsky, 2nd Ed.
11	Genetic Algorithm Applications	Chapter 7, Negnevitsky, 2nd Ed.
12	Neural Network Basics	Chapter 5, Negnevitsky, 2nd Ed.
13	Neural Network Basics	Chapter 5, Negnevitsky, 2nd Ed.
14	Neural Network Applications	Chapter 5, Negnevitsky, 2nd Ed.
15	Fuzzy Logic-Genetic Algorithm-Neural Network based control systems.	Chapter 8, Negnevitsky, 2nd Ed.
16	**Final Exam**	

Textbook(s)/References/Materials:

Negnevitsky M. (2002). *Artificial intelligence : a guide to intelligent systems*. Addison Wesley.

Assessment		
Studies	**Number**	**Contribution margin (%)**
Active Participation		
Lab		
Application		
Field Study		
Course-Specific Internship (if any)		
Quizzes / Studio / Critical		
Homework		
Presentation		

Projects	1	30
Report		
Seminar		
Midterm Exams / Midterm Jury	1	30
General Exam / Final Jury	1	40
	Total	
Success Grade Contribution of Semester Studies		60
Success Grade Contribution of End of Term		40
	Total	100

Course Category	
Basic Vocational Courses	X
Specialization/Field Courses	
Support Courses	
Communication and Management Skills Courses	
Transferable Skills Courses	

Relationship Between Course Learning Outcomes and Program Competencies

No	Learning Outcomes	Contribution Level				
		1	2	3	4	5
1	Ability to apply knowledge of mathematics, science, and engineering				x	
2	Ability to design and conduct experiments and to analyze and interpret experimental results.					
3	Ability to design a system, component, and process according to specified requirements.				x	
4	Ability to work in teams in interdisciplinary areas.				x	
5	Ability to identify, formulate and solve engineering problems.				x	
6	Identifies, defines, formulates and solves complex network problems; chooses and applies analysis and modeling methods suitable for this purpose.					x
7	Develops, selects and uses modern techniques and tools necessary for the analysis and solution of complex problems encountered in Electrical and Electronics Engineering applications; uses required technologies effectively.					x

ECTS / Workload Table

Activities	Number	Duration (Hours)	Total Workload
Course hours (Including the exam week: 16 x total course hours)	14	3	42
Laboratory			
Application			
Course-Specific Internship			
Field Study			
Study Time Out of Class	14	2	28
Presentation / Seminar Preparation			
Projects	2	3	6
Reports			
Homeworks			
Quizzes / Studio Review			
Preparation Time for Midterm Exams / Midterm Jury	1	22	22
Preparation Period for the Final Exam / General Jury	1	22	22
Total Workload	**(120/30=4)**		**120**