COURSE DESCRIPTION FORM	
Course Code and Name	CENG478 NANOTECHNOLOGIES (TECH. ELECT.)
Course Semester	8
Catalogue Data of the Course (*Course Content*)	Smart materials, production, production processes, nano technologies and computer sciences. Nano and micro electromechanical structures. Mathematical models for nano systems. Structural design, simulation and modeling. Hamilton and Lagrange equations.
Course Textbooks	Understanding Nanotechnology by Editors of Scientific American, 2002.
Supplementary Textbooks	Mark Ratner, Daniel Ratner, "Nanotechnology A Gentle Introduction to the Next Big Idea", 9780131014008, 2002. T. Pradeep, "Textbook Of Nanoscience And Nanotechnology", 978-1259007323, 2012.
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	No prerequisites 70% attendance required
Course Type	Technical elective
Language of Instruction	English
Course Objectives	It is aimed that students will have sufficient knowledge to model structural design, simulation and mathematical models used for nanosystems equipped with smart materials.
Course Learning Outcomes	Students taking this course 1. Have knowledge about production processes and smart materials, 2. Perform mathematical modeling for nano systems, 3. Perform structural design and simulation for nano systems.
Instruction Method *(Face-to-face, Distance education etc.)*	Face to face
Weekly Schedule of the Course	Week 1: Smart materials Week 2: Production Week 3: Production processes Week 4: Production processes Week 5: Nano technologies and computer sciences Week 6: Nanotechnologies and computer sciences Week 7: Nano and micro electromechanical structures Week 8: Mathematical models for nano systems Week 9: Mathematical models for nano systems Week 10: Structural design Week 11: Structural design Week 12: Simulation and modeling Week 13: Simulation and modeling Week 14: Hamilton and Lagrange equations
Teaching Activities *(The time spent for the activities listed here will determine the amount of credit required)*	Weekly theoretical course hours: 3 Reading activities Internet search and library work Designing and implementing materials Midterm and revision for midterm Final exam and revision for final exam
Assessment Criteria	

	Number(s)	**Weight (%)**
Midterm exam	1	30
Assignment	3	30
Application		
Project		
Practice		
Quiz		

Final exam		40	
Total		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			
Reading activities	10	3	30
Internet search and library work	12	2	24
Designing and implementing materials	5	6	30
Making a report			
Preparing and making presentations			
Midterm and revision for midterm	1	10	10
Final exam and revision for final exam	1	15	15
Total workload			151
Total workload/ 25			6.04
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.		X			
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.		X				

Lecturer(s) and Contact Information	Assoc. Prof. Dr. Mehmet DEMİRCİ mdemirci@gazi.edu.tr