Course Description Form	
Course Code and Name	CENG478 NANOTECHNOLOGIES (TECH.ELECT.)
Course Semester	8
Catalog Content	Smart materials, production, production processes, nanotechnologies and computer science. Nano and micro electro mechanic structures. Mathematical models for nano systems. Structural design, simulation and modeling. Hamilton and Lagrange Equations.
Textbook	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	6
Prerequisites of the Course (*Attendance Requirements*)	There is no prerequisite or co-requisite for this course.
Type of the Course	Technical Elective
Instruction Language	English
Course Objectives	Teaching structural design, simulation and mathematical modeling for nano systems.
Course Learning Outcomes	1. Ability to have knowledge about production processes and smart materials. 2. Ability of mathematical modeling for nano systems. 3. Ability of simulation using structural design for nano systems.
Instruction Methods	The mode of delivery of this course is face to face
Weekly Schedule	1. Week: Smart materials 2. Week: Production 3. Week: Production processes 4. Week: Production processes 5. Week: Nano-technology and computer science 6. Week: Nano-technology and computer science 7. Week: Nano-and micro-electro-mechanical structures 8. Week: Mathematical models for nano-systems 9. Week: Mathematical models for nano-systems 10. Week: Structural design 11. Week: Structural design 12. Week: Simulation and modeling 13. Week: Simulation and modeling 14. Week: Hamilton and Lagrange equations
Teaching and Learning Methods (*These are examples. Please fill which activities you use in the course*)	Weekly theoretical course hours: 3 Reading Activities Internet browsing, library work Designing and implementing materials Preparation of Midterm and Midterm Exam Final Exam and Preparation for Final Exam

Assessment Criteria		Numbers	Total Weighting (%)	
	Midterm Exams	1	30	
	Assignment	2	30	
	Application	0		
	Projects	0		
	Practice	0		
	Quiz	0		

Percent of In-term Studies (%)		60		
Percentage of Final Exam to Total Score (%)		40		
Attendance				

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	10	3	30
Studies	12	2	24
Material Design and Implementation	5	6	30
Report Preparing			0
Preparing a Presentation			0
Presentations			0
Midterm Exam and Preparation for Midterm Exam	1	10	10
Final Exam and Preparation for Final Exam	1	15	15
Other (should be emphasized)			0
Total Workload			151
Total Workload / 25			6.04
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems				X	
2	Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes				X	
3	Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose					X
4	Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies					X
5	Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions				X	
6	Ability to work effectively in interdisciplinary and interdisciplinary teams or individually					X
7	Ability to efficiently prepare, evaluate and interpret reports					X
8	Ability to make presentations and conduct effective verbal and written communication in Turkish and English					X
9	Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself			X		

No	Description	1	2	3	4	5
10	Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles			X		
11	Ability to apply knowledge on project management, risk management and change management				X	
12	Awareness of entrepreneurship and innovation, ability to design and build sustainable systems				X	
13	Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and security					X
14	Awareness of the legal consequences of engineering solutions	X				
15	Ability to apply knowledge on software development process and documentation rules	X				
16	Knowledge on standards used in engineering applications			X		
17	Awareness of occupational health and security, information security and privacy	X				

The Course's Lecturer(s) and Contact Information	Computer Engineering Department Chair bmbb@gazi.edu.tr