COURSE DESCRIPTION FORM	
Course Code and Name	CENG352 MATHEMATICAL MODELING (TECH. ELECT.)
Course Semester	6
Catalogue Data of the Course (*Course Content*)	Modeling and mathematical modeling, types and applications, linear programming models, nonlinear models, dynamic programming models, transportation, transshipment, and assignment models, network models, forecasting models, nonlinear programming
Course Textbooks	A Course in Mathematical Modeling, Douglas D. Mooney, Randall Swift, American Mathematical Society, 1999.
Supplementary Textbooks	- An Introduction to Mathematical Modeling, Edward A. Bender, Dover Publications, 2000. - Concepts of Mathematical Modeling, Walter J. Meyer, Dover Publications, 2004.
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	-
Course Type	Technical Elective
Language of Instruction	English
Course Objectives	To provide knowledge about mathematical modeling of decision problems, solution techniques and applications in various fields.
Course Learning Outcomes	Students taking this course 1. Create mathematical models of decision problems. 2. Recognize the tools used in solving mathematical models. 3. Apply methods to solve mathematical models. 4. Know real-world applications of mathematical modeling.
Instruction Method *(Face-to-face, Distance education etc.)*	The mode of delivery of this course is face to face.
Weekly Schedule of the Course	Week 1: Modeling and mathematical modeling, types and applications. Week 2: Modeling: basic principles and definitions. Week 3: Linear programming models I Week 4: Linear programming models II Week 5: Solution approaches to linear programming models. Week 6: Nonlinear models: Integer programming I Week 7: Nonlinear models: Integer programming II Week 8: Dynamic programming models: deterministic. Week 9: Dynamic programming models: probabilistic Week 10: Transportation, transshipment, and assignment models Week 11: Transportation, transshipment, and assignment models Week 12: Network models Week 13: Forecasting models Week 14: Nonlinear programming
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 Midterm and revision for midterm Final exam and revision for final exam

Assessment Criteria

	Number(s)	Weight (%)
Midterm exam	1	35
Assignment	5	25
Application		
Project		
Practice		
Quiz		

Final exam	1	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	0	0	0
Reading activities	10	4	40
Internet search and library work	10	4	40
Designing and implementing materials	0	0	0
Making a report	0	0	0
Preparing and making presentations	0	0	0
Midterm and revision for midterm	1	13	13
Final exam and revision for final exam	1	15	15
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.		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).						
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).						
10	Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation.		X				
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