

Course Description Form			
Course Code and Name	CENG352 MATHEMATICAL MODELING (TECH.ELECT.)		
Course Semester	6		
Catalog 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		
Textbook	A Course in Mathematical Modeling, Douglas D. Mooney, Randall Swift, American Mathematical Society, 1999.		
Supplementary Textbooks	<p>- An Introduction to Mathematical Modeling, Edward A. Bender, Dover Publications, 2000.</p> <p>- Concepts of Mathematical Modeling, Walter J. Meyer, Dover Publications, 2004.</p>		
Credit	6		
Prerequisites of the Course (Attendance Requirements)	-		
Type of the Course	Technical Elective		
Instruction Language	English		
Course Objectives	To provide knowledge about mathematical modeling of decision problems, their techniques and solutions applications.		
Course Learning Outcomes	Mathematical modeling of decision problems, their techniques and solutions applications.		
Instruction Methods	The mode of delivery of this course is face to face		
Weekly Schedule	<p>Week 1: Modeling and mathematical modeling, types and applications.</p> <p>Week 2: Modeling: basic principles and definitions.</p> <p>Week 3: Linear programming models I</p> <p>Week 4: Linear programming models II</p> <p>Week 5: Solution approaches to linear programming models.</p> <p>Week 6: Nonlinear models: Integer programming I</p> <p>Week 7: Nonlinear models: Integer programming II</p> <p>Week 8: Dynamic programming models: deterministic.</p> <p>Week 9: Dynamic programming models: probabilistic</p> <p>Week 10: Transportation, transshipment, and assignment models</p> <p>Week 11: Transportation, transshipment, and assignment models</p> <p>Week 12: Network models</p> <p>Week 13: Forecasting models</p> <p>Week 14: Nonlinear programming</p>		
Teaching and Learning Methods <i>(These are examples. Please fill which activities you use in the course)</i>	<p>Weekly theoretical course hours: 3</p> <p>Reading Activities</p> <p>Internet browsing, library work</p> <p>Material Design and Implementation</p> <p>Preparation of Midterm and Midterm Exam</p> <p>Final Exam and Preparation for Final Exam</p>		
Assessment Criteria		Numbers	Total Weighting (%)
	Midterm Exams	1	35
	Assignment	5	25
	Application		
	Projects		
	Practice		
Quiz			

	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	0	0			
	Reading Tasks	10	4	40			
	Studies	10	4	40			
	Material Design and Implementation	0	0	0			
	Report Preparing	0	0	0			
	Preparing a Presentation	0	0	0			
	Presentations	0	0	0			
	Midterm Exam and Preparation for Midterm Exam	1	13	13			
	Final Exam and Preparation for Final Exam	1	15	15			
	Other (should be emphasized)	0	0	0			
	Total Workload			150			
	Total Workload / 25			6			
	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 intradisciplinary 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	
	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	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		Prof. Dr. M. Ali AKCAYOL akcayol@gazi.edu.tr					