T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTY

FACULTY OF SCIENCES

MATHEMATICS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name		Course Code
Mathematical Modeling and Simulation II		

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
8	2	2		6

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
X				

Course Language	Course Level	Course Type
Turkish	Undergraduate	Elective

Prerequisite(s) if any	
Objectives of the Course	The aim of this course is to teach students how to write computer algorithms using simulation and modeling techniques. The course aims to develop solutions to real-world problems and to test these solutions practically in a simulation environment.
Short Course Content	To gain the ability to create mathematical models and perform simulations.

	Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1	Demonstrate a clear understanding of fundamental concepts and principles of simulation and mathematical modeling.	1,2,3,4	1,2,5	A
2	Create mathematical models to represent real-world systems and processes using appropriate equations and structures.	5,8,13,14	1,2,5	A
3	Write and utilize basic commands in simulation languages to model and analyze systems.	3,4,5,8	1,2,5	A
4	Design simulation experiments and scenarios to investigate the behavior of modeled systems under various conditions.	6,8,9	14	J
5	Assess the validity of models by comparing simulation results with real-world data and expected outcomes.	7,8,9,11	15	J
6	Use simulation and modeling techniques to develop solutions for practical problems in various domains such as engineering, logistics, healthcare, and finance.	12,13,14,15	12	G
7				
8				
9				
10				

*Teaching Methods 1:Expression, **2:**Discussion, **3:**Experiment, **4:**Simulation, **5:**Question-Answer, **6:**Tutorial, **7:**Observation, **8:**Case Study, **9:**Technical Visit, **10:**Trouble/Problem Solving, **11:**Induvidual Work, **12**:Team/Group Work, **13**:Brain Storm, **14**:Project Design / Management, **15**:Report Preparation and/or Presentation

Measuring Methods A:Exam, **B:Quiz, **C:**Oral Exam, **D:**Homework, **E:**Report, **F:**Article Examination, **G:**Presentation, **I:**Experimental Skill, **J:**Project Observation, **K:**Class Attendance; **L:**Jury Exam

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Main Textbook	"Simulation Modeling and Analysis, Averill M. Law and W. David Kelton.
Supporting References	Discrete-Event System Simulation, Jerry Banks, John S. Carson, Barry L. Nelson, and David M. Nicol. System Simulation and Modeling, Sankar Sengupta.
Necessary Course Material	Computer

Course Schedule	
1	Computer-based modeling tools
2	Computer-based modeling tools
3	Modeling process and stages
4	Linear and non-linear models
5	Modeling examples with differential equations
6	Modeling examples with differential equations
7	Creating a simple simulation
8	Mid-Term Exam
9	Use of mathematical models for simulation
10	Interpreting simulation results
11	Model validation methods
12	Mathematical modeling in engineering, physics, and economics
13	Modeling examples in health, environment, and social sciences
14	Developing simulation projects
15	Developing simulation projects
16,17	Final Exam

Calculation of Course Workload			
Activities	**Number**	**Time (Hour)**	**Total Workload (Hour)**
Course Time (number of course hours per week)	14	4	56
Classroom Studying Time (review, reinforcing, prestudy,….)	14	4	56
Homework			
Quiz Exam			
Studying for Quiz Exam			
Oral exam			
Studying for Oral Exam			
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)	14	3	42
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	10	10
Final Exam	1	2	2
Studying for Final Exam	1	20	20
	Total workload		188
	Total workload / 30		6.26
	Course ECTS Credit		6

Evaluation	
Activity Type	**%**
Mid-term	
Quiz	
Homework	50
Bir öğe seçin.	
Bir öğe seçin.	
Final Exam	50
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	**PROGRAM OUTCOME**	**Contribution**
1	The ability to apply knowledges of Mathematics and Computer Sciences,	4
2	To have sufficient theoretical and practical knowledge of Mathematics at international level,	4
3	The ability of describing, modelling and solving of mathematical problems at Mathematics and related subjects,	5
4	The skill to solve and design a problem process in accordance with a defined target,	5
5	Skills to analyze data, interpret and apply to other datum and using these data on computer,	4
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	5
7	The skill to make team work within the discipline and interdisciplinary,	5
8	The ability to improve oneself by following the developments on other modern, scientific and technological subjects as well as Mathematics and Computer Sciences,	4
9	The skill to communicate orally and in written way, in a clear and concise manner by having individual work skills and ability to independently decide and analytical thinking,	4
10	The skill to have professional and ethical responsibility,	2
11	The skill to have consciousness for quality issues and scientific research,	2
12	The skill to be sensitive to environmental issues related with problems and development of living area and consistent in the social relations,	1
13	Ability to solve problems in the working life faced to find an appropriate algoritms via mathematical modeling and to write computer programs,	4
14	The skill to developed design of software systems at different complex levels,	4
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	2

LECTUTER(S)				
Prepared by	Assoc. Dr. Özlem ERSOY HEPSON			
Signature(s)				

Date:07.07.2024