



T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTESİ

FACULTY OF SCIENCES

MATHEMATICS AND COMPUTER SCIENCES DEPARTMENT

**COURSE INFORMATION FORM**

Course Name	Course Code
Optimization Methods and Applications	

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
6	3	0		5

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

Course Language	Course Level	Course Type
Turkish	Undergraduate	Elective

<b>Prerequisite(s) if any</b>	
<b>Objectives of the Course</b>	Within the scope of this course, it is aimed for students to have knowledge about basic optimization methods and solution algorithms of optimization problems. By teaching students optimization problems and solution methods in the MATLAB, it is aimed that students gain the skills to solve optimization problems.
<b>Short Course Content</b>	Basic concepts in optimization, Some mathematical concepts, Optimization models, Optimization with Matlab, Unconstrained optimization for one variable functions with Matlab, Unconstrained optimization for multivariable functions with Matlab, Linear programming with Matlab, Constrained optimization with Matlab

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Learning basic concepts about optimization	1,2,3,5,9,13,14	1,2,5,6	A,D
2 Gaining fundamental knowledge about mathematical optimization and mathematical optimization techniques	1,2,3,6,8	1,2,5,6	A,D
3 MATLAB software can be used in numerical solution of optimization problems.	2,3,4,5,6,7,8,13,14	1,2,5,6,10,11,12,14,15	A,D
4 Gaining model building, algorithm analysis and design skills to make optimal decisions in real life problems	2,3,4,5,6,7,8,13,14	1,2,5,6,10,11,12,14,15	A,D
5 Gaining the ability to solve mathematical models	3,4,5,6,13,14	1,2,5,6,10,11,12,14,15	A,D
6			
7			
8			

\*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:Individual 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

<b>Main Textbook</b>	Mokhtar S. Bazaraa, Hanif D. Sherali, C. M. Shetty, Nonlinear Programming: Theory and Algorithms
<b>Supporting References</b>	<ol style="list-style-type: none"> <li>1. Özlem Türkşen, Optimizasyon Yöntemleri ve Matlab, Python, R Uygulamaları</li> <li>2. Nurhan Karaboğa, Optimizasyon Yöntemleri ve Matlab Uygulamaları</li> <li>3. Aysun Tezel Özturan, Optimizasyon ve Matlab Uygulamaları</li> </ol>
<b>Necessary Course Material</b>	-

<b>Course Schedule</b>	
<b>1</b>	Basic concepts in optimization
<b>2</b>	Some mathematical concepts
<b>3</b>	Optimization models
<b>4</b>	Optimization with Matlab
<b>5</b>	Unconstrained optimization for one variable functions
<b>6</b>	Unconstrained optimization for one variable functions with Matlab
<b>7</b>	Unconstrained optimization for one variable functions with Matlab
<b>8</b>	Mid-Term Exam
<b>9</b>	Unconstrained optimization for multivariable functions
<b>10</b>	Unconstrained optimization for multivariable functions with Matlab
<b>11</b>	Unconstrained optimization for multivariable functions with Matlab
<b>12</b>	Linear programming
<b>13</b>	Linear programming with Matlab
<b>14</b>	Constrained optimization
<b>15</b>	Constrained optimization with Matlab
<b>16,17</b>	Final Exam

<b>Calculation of Course Workload</b>			
<b>Activities</b>	<b>Number</b>	<b>Time (Hour)</b>	<b>Total Workload (Hour)</b>
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,...)	14	3	42
Homework	5	3	15
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)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	20	20
Final Exam	1	2	2
Studying for Final Exam	1	30	30
		<b>Total workload</b>	<b>153</b>
		<b>Total workload / 30</b>	<b>153/ 30</b>
		<b>Course ECTS Credit</b>	<b>5</b>

Evaluation	
<b>Activity Type</b>	<b>%</b>
Mid-term	35
Quiz	
Homework	15
Bir öge seçin.	
Bir öge seçin.	
<b>Final Exam</b>	<b>50</b>
<b>Total</b>	<b>100</b>

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,	5
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,	5
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,	3
8	The ability to improve oneself by following the developments on other modern, scientific and technological subjects as well as Mathematics and Computer Sciences,	5
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,	1
11	The skill to have consciousness for quality issues and scientific research,	1
12	The skill to be sensitive to environmental issues related with problems and development of living area and consistent in the social relations,	2
13	Ability to solve problems in the working life faced to find an appropriate algoritms via mathematical modeling and to write computer programs,	5
14	The skill to developed design of software systems at different complex levels,	5
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	1

LECTUTER(S)				
<b>Prepared by</b>	Ass. Prof. Temel Ermiş			
<b>Signature(s)</b>				

**Date:** 24.07.2024