T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTY

FACULTY OF SCIENCES

MATHEMATİCS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Optimization	

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

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 convey the mathematical fundamentals, main ideas and basic concepts of optimization theory to students. Thus, optimization problems and solution methods will be comprehended in a theoretical framework and students will be equipped with the ability to solve optimization problems.
Short Course Content	Introduction to optimization, Mathematical background, Numerical techniques in nonlinear univariate unconstrained optimization, Numerical techniques in nonlinear multivariate unconstrained optimization, Constrained optimization methods, Linear programming

	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	To be able to decide the most appropriate optimization method for an optimization problem	1,3,4,5,6,7,8,13,14	1,2,5,6	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:**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

Main Textbook	Mokhtar S. Bazaraa, Hanif D. Sherali, C. M. Shetty, Nonlinear Programming: Theory and Algorithms
Supporting References	1. Abbas Azimli, Matematiksel Optimizasyon 2. Hasan Bal, Optimizasyon Teknikleri 3. Ayşen Apaydın, Optimizasyon
Necessary Course Material	-

Course Schedule	
1	Introduction to optimization
2	Mathematical background
3	Nonlinear univariate unconstrained optimization
4	Numerical techniques in nonlinear univariate unconstrained optimization
5	Numerical techniques in nonlinear univariate unconstrained optimization
6	Nonlinear multivariate unconstrained optimization
7	Numerical techniques in nonlinear multivariate unconstrained optimization
8	Mid-Term Exam
9	Numerical techniques in nonlinear multivariate unconstrained optimization
10	Constrained optimization
11	Constrained optimization methods
12	Constrained optimization methods
13	Linear programming
14	Model building and graphical method in linear programming
15	Simplex method
16,17	Final Exam

Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
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
	Total workload		153
	Total workload / 30		153/ 30
	Course ECTS Credit		5

Evaluation	
Activity Type	**%**
Mid-term	35
Quiz	
Homework	15
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,	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)				
Prepared by	Ass. Prof. Temel Ermiş			
Signature(s)				

Date: 24.07.2024