T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTY

FACULTY OF SCIENCES

MATHEMATİCS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Applications of Graph Theory	

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
4	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 teach the use of graph theory tools necessary to solve various engineering problems. Students are expected to gain the ability to model real-life problems as graph theory problems and express their ideas using graph theory terminology. Thus, it is aimed to provide students with mathematical thinking skills by using graphs.
Short Course Content	Graph definition and history, Graph types and isomorphic graphs, Matrix representations of graphs, Connectivity and trees, Indexes and chemical applications in graphs, Coloring problems and solution algorithms in graphs, Shortest path problems and solution algorithms, Matching in graphs and its applications

	Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1	Knowing the basic concepts in graph theory	2	1,2,5,6,10,11,12	A,D
2	Solving graph coloring problems	1,2,3,4,6,13,14	1,2,5,6,10,11,12	A,D
3	Solving shortest path problems	1,2,3,4,6,13,14	1,2,5,6,10,11,12	A,D
4	Making chemical applications of graphs	1,2,3,4,6,13,14	1,2,5,6,10,11,12	A,D
5	Acquiring the ability to apply graph theory and optimization algorithms	1,2,3,4,6,13,14	1,2,5,6,10,11,12	A,D
6	Modeling real-world problems within a mathematical framework and developing the ability to solve them	1,2,3,4,6,13,14	1,2,5,6,10,11,12	A,D
7	To understand and use graphs' relationships with other disciplines	2,7,9	1,2,5,6,10,11,12	A,D
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*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	Douglas West, Introduction to Graph Theory (2nd Edition)
Supporting References	1. John Clark, Derek Allan Holton, A First Look at Graph Theory 2. J. A. Bondy and U. S. R. Murty, Graph Theory with Applications 3. Jonathan L. Gross, Jay Yellon, Graph Theory and its Applications
Necessary Course Material	-

Course Schedule	
1	Graph definition and history
2	Graph types and isomorphic graphs
3	Matrix representations of graphs
4	Matrix representations of graphs
5	Connectivity and trees
6	Connectivity and trees
7	Indexes in graphs
8	Mid-Term Exam
9	Indexes and chemical applications in graphs
10	Indexes and chemical applications in graphs
11	Coloring problems and solution algorithms in graphs
12	Coloring problems and solution algorithms in graphs
13	Shortest path problems and solution algorithms
14	Shortest path problems and solution algorithms
15	Matching in graphs and its applications
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,	4
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	4
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,	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,	2
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.	1

LECTUTER(S)				
Prepared by	Ass. Prof. Temel Ermiş			
Signature(s)				

Date: 24.07.2024