

ABDULLAH GÜL UNIVERSITY GRADUATE SCHOOL OF ENGINEERING & SCIENCE INDUSTRIAL ENGINEERING DEPARTMENT COURSE DESCRIPTION AND APPLICATION INFORMATION					
Course Name	Code	Semester	T+P (Hour)	Credit	ECTS
Operations Research in Healthcare Systems	IE 584	Fall - Spring	3 + 0	3	10

Prerequisites	
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Course Type	Elective
Course Language	English
Course Coordinator	Asst. Prof. Muhammed Sütçü
Course Instructor	Asst. Prof. Muhammed Sütçü
Course Assistant	
Course Objective	Review the literature on the applications of operations and design issues in planning, control, and analysis of problems arising in health and health care services including topics such as Public health, hospitals, basic care, tele-medicine, discrimination, community health, disease modeling, clinical management etc. In order to solve the problems encountered in healthcare systems, applying classical operational research such as optimization, queuing theory, and discrete event simulation and statistics, epidemic models and decision analysis models.
Course Learning Outcomes	1. Ability to define the solutions of optimization problems in healthcare area and develop insights on obtaining analytical solutions 2. Ability to interpret a problem defined in healthcare area and to translate it into mathematical language by selecting appropriate variables, parameters, objective function and constraints. 3. Determining Which type of healthcare problems can be solved by which type operations research method 4. Ability to interpret the results of the solution of the problems 5. Formulate related healthcare problems as transport, scheduling and derivatives of network models.
Course Content	Operations Research Solution Methods, Operations Managements in Healthcare Systems, application of Operations Research techniques in a project applied to Healthcare Systems

WEEKLY SUBJECTS AND RELATED PRELIMINARY PREPARATION PAGES		
Week	Subjects	Preliminary
1	Operations Research Techniques	
2	Linear Programming	
3	Linear Programming	
4	Nonlinear Programming	
5	Patient, Resource and Nurse Scheduling Optimization	
6	Operating Room, Patient Room and Doctor Scheduling Optimization	
7	Optimal Routing: Ambulance	
8	Midterm	
9	Service Planning	
10	Operations Management in Healthcare Systems	
11	Demand Forecasting in Healthcare Systems	
12	Logistics Management	
13	Project Presentation	
14	Project Presentation	
15	Final Exam	

SOURCES	
Lecture Notes	Lecture notes and slides of the course will be shared with students during the semester via CANVAS system.
Other Sources	No required textbook. Academic Papers will be shared throughout the course weekly. Supplementary Textbook: (1) Winston, W.L., Operations Research: Applications and Algorithms, Fourth Edition, Wadsworth Publishing Company, Belmont, CA, 2003 (2) Brandeau, M.L.; Sainfort, F.; Pierskalla, W.P. Operations Research and Health Care: A Handbook of Methods and Applications, 2004, Springer,

MATERIAL SHARING	
Documents	will be shared with students during the semester via CANVAS system.
Homework	will be shared with students during the semester via CANVAS system.
Exams	1 (one) midterm exam and 1 (one) final exam. 2 exams in total

EVALUATION SYSTEM		
ACTIVITIES	QUANTITY	WEIGHT
Midterm Exam	1	%20
Quiz	5	%10
Homework	5	%10
Project	1	%30
Final Exam	1	%30
TOTAL		%100
Term Activities Percentage		%70
Final Exam Percentage		%30
TOTAL		%100

Course Category	
Natural Sciences and Mathematics	%10
Engineering Sciences	%80
Social Sciences	%10

LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS RELATIONSHIP						
No	Program Qualification	Contribution Level				
		1	2	3	4	5
1	PQ1.					X
2	PQ2.				X	
3	PQ3.					X
4	PQ4.				X	
5	PQ5.				X	
6	PQ6.					X

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Activity	Duration (Hour)	Total Work Load
Course Duration (including exam week: 16x total course hours)		3	48
Out-of-class Study Time (Pre-study, practice)		3	48
Reading		5	80
Internet browsing, library work		2	32
Report Preparation		10	20
Presentation Preparation		5	10
Presentation		1	2
Homework		5	25
Midterm Exam		20	20
Final Exam		25	25
Total Work Load			310
Total Work Load / 30			10.33
Course ECTS CREDIT			10