

**DEPARTMENT of INDUSTRIAL ENGINEERING
COURSE CATALOGUE FORM**



Course Code: INDE4003				Course Title: Operations Research Modeling Applications			
Semester	L + R + L	Credits	AKTS	Language	Category	Instructional Methods	Prerequisites
6	3 + 0 + 0	3	6	English	Required	Lecture	INDE2002
Course Objectives			The aim of the course is to provide the students to gain knowledge about various applications of operations research and to improve their modeling skills. Bu dersin amacı, öğrencilerin değişik yöneylem araştırması uygulamaları hakkında bilgi edinmelerini ve modelleme becerilerini geliştirmelerini sağlamaktır.				
Course Content			Overview of modeling concepts and optimization techniques. Various application areas: typical implementation problems. Practical points and obstacles encountered in applying operations research models to real life problems. Article presentations. Cases. Mini-projects with computer implementations.				
Course Learning Outcomes			Upon successful completion of the course, the student is able to 1. Demonstrate mathematical modeling skills to solve various applications of operations research. [2] 2. Discuss different modeling applications. [8] 3. Demonstrate presentation and technical writing skills. [7] 4. Develop user interface designs for optimization-based software products. [3] [Note: Numbers in brackets are indicating the related program outcomes]				
ISCED Category of the course			52 Engineering				
Textbook			Probability & Statistics for Engineers & Scientists, R. E. Walpole, R. H. Myers, S. L. Myers, K. Ye, Pearson.				
Supplementary Material			Statistics for Engineering and the Sciences, W. Mendenhall, T. Sincich, Pearson.				

COURSE PLAN

Week	Topics	Laboratory / Tutorial Work
1	Foundations: Overview of LP/NLP/IP, BB algorithm,	
2	Special models (transportation, knapsack, set covering, travelling salesman, routing, facility layout,)	
3	Optimization tools (GAMS/CPLEX, Gurobi, different licenses),, Decision support systems (DSS), implementation	
4	Modeling techniques (hard vs soft constraints, ether-or constraints)	Quiz
5	Modeling techniques(linearization of min max objective function)	Quiz
6	Modeling techniques(fixed-charge modeling; linearization of the multiplication of two variables, ...)	Quiz
7	Case 1 (Interfaces article)	Different application areas, models and modeling techniques
8	Case 2 (Interfaces article)	
9	Case 3 (Interfaces article)	Quiz
10	Case 4 (Interfaces article)	
11	Case 5 (Interfaces article)	
12	Case 6 (Interfaces article)	Quiz
13	DSS design presentations	
14	DSS design presentations	

COURSE ASSESSMENT SYSTEM

	Activities	Contribution (%)
Semester Activities	Semester Written Exams	45
	Homework	-
	Reports	-
	Labs	-
	Seminars	-
	Presentations	-
	Term Project	25
	Other (attendance, field trip etc.)	5

FINAL EXAM	25
Total	100

CONTRIBUTION of the COURSE on INDUSTRIAL ENGINEERING PROGRAM OUTCOMES

	Program Outcomes	Low	High
1	Adequate knowledge in mathematics, science and subjects pertaining to Industrial Engineering; ability to use theoretical and applied knowledge in these areas in complex engineering problems.		
2	Ability to identify, formulate, and solve complex Industrial Engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.		X
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving problems encountered in engineering practice; ability to employ information technologies effectively.		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.		
6	Ability to work efficiently individually and in intra-disciplinary / multi-disciplinary teams.		
7	Knowledge of Turkish and English languages; ability to communicate effectively orally, inscriptive and visually by using these languages (via business methods such as reports, presentations and instructions).		X
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	X	
9	Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.		
10	Knowledge about business life practices (management activities such as project, risk, change and quality etc.); awareness in entrepreneurship, innovation; knowledge about sustainable development.		
11	Knowledge about the global and social effects of engineering practices on health, environment, economics and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.		

ECTS-WORK LOAD TABLE

COURSE ACTIVITIES	Quantity	Time (hr)	Work Load (hr)
Lectures	14	3	42
Final Exam (Preparation included)	1	20	20
Semester Written Exams (Preparation included)	1	15	15
Out of class study time	14	3	42
Homework			
Reports	1	5	5
Labs			
Seminar			
Presentations	1	3	3
Term Project	1	25	25
Total Load (hr)			152
ECTS Credits of the course (Total Work Load / 25)			6

Revision/Date 5/02/2020	Coordinator / Prepared By Demet Özgür Ünlüakın	Approved By Çağlar Aksezer
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