

**BOĞAZİÇİ UNIVERSITY**  
**DEPARTMENT OF INDUSTRIAL ENGINEERING**  
**SPRING 2024 – 2025**  
**IE 203 OPERATIONS RESEARCH II**

Day and Time	: M 12:00 – 13:00	T 9:00 – 11:00	Th 11:00 – 13:00
Classroom	: VYKM 1	M 1170	M 1170 (P. S.)
Instructor	: İ. Kuban Altinel		
Office/Phone	: M4034, Ext. 6407		
Office Hours	: M 13:00 – 15:00	W 14:00 – 16:00	
Teaching Assistant	: Burak Nur Erdem		
Office	: Assistants office, 4 <sup>th</sup> floor		
Office Hours	: TBA		
Grading			
Quizzes	: 10% per quiz (2 quizzes, no makeup)		
Midterm	: 35% Closed book.		
Makeup	: Together with final makeup for students with a provable important excuse.		
Final	: 45%, Closed book.		
Makeup	: Only registered students will be given a makeup exam if he/she is absent at the final with an officially accepted excuse.		
Course Objectives	: By the completion of the course, the students will be able to formulate mixed-integer linear programming problems, formulate nonlinear optimization problems, apply linearization techniques, solve nonlinear optimization problems using analytical and/or numerical methods, formulate problems as dynamic programming problems, understand and analyze stochastic processes, use stochastic analysis to make optimal decisions under uncertainty		
Textbook:	There is no textbook.		
References:	1. Operations research: application and algorithms, W.L. Winston, 2004 2. Operations Research, An Introduction, H. Taha, 2007 3. Nonlinear Programming: Theory and Algorithms, M.S. Bazaraa, H. D. Sherali, and C. Shetty, 2006 4. Introduction to Probability Models, S. Ross, 2003		

THEY ARE ALL AVAILABLE **ON RESERVE** AT THE LIBRARY.

**IE 203 TENTATIVE PLAN**

**1. INTEGER LINEAR PROGRAMMING**

Modeling examples, Convex sets, Branch-and-bound method, Valid inequalities, Cutting plane algorithm.

**2. NONLINEAR PROGRAMMING**

Modeling examples, Convex functions, Gradient, Hessian, Eigenvalues and eigenvectors, Positive definiteness, Unconstrained and constrained nonlinear optimization.

**3. DETERMINISTIC DYNAMIC PROGRAMMING**

Shortest path problem, Resource allocation problems, Equipment replacement problem.

**4. STOCHASTIC PROCESSES**

Markov chains, Exponential distribution, Poisson process, Queuing theory

### IE 203 TENTATIVE PROGRAM

WEEK	MONTH	DAY	TENTATIVE DAILY OUTLINE
1	February	10M	Integer Programming: modeling and examples
		11T	"
2		17M	Convexity: convex sets
		18T	Integer Programming: branch-and-bound method
3		24M	"
		25T	Integer Programming: valid inequalities
4	March	03M	Integer Programming: cutting plane method
		04T	"
		06Th	QUIZ I
5		10M	Nonlinear Programming: modeling and examples
		11T	"
6		17M	Convexity: convex functions
		18T	Nonlinear Programming: one dimensional minimization
7		24M	Nonlinear Programming: unconstrained minimization
		25T	"
8		31M	HOLIDAY
		April	01T
9			07M
		08T	" (MIDTERM)
10		14M	Deterministic dynamic programming
		15T	"
11		21M	Markov chains
		22T	"
12		28M	SPRING BREAK
		29T	SPRING BREAK
13	May	05M	Exponential distribution and Poisson process
		06T	"
		08Th	QUIZ II
14		12M	Queuing theory
		13T	"