BOĞAZİÇİ UNIVERSITY

DEPARTMENT OF INDUSTRIAL ENGINEERING

SPRING 2019 - 2020

IE 310 OPERATIONS RESEARCH

Day and Time	: M 12:00 – 13:00	T 13:00 – 14:00
Classroom	: Home	Home
Instructor	: İ. Kuban Altınel	
Office/Phone	: Old Engineering Building, Ext. 6407	
Office Hours	: M 14:00 – 15:00	W 14:00 – 15:00
Teaching Assistant	: Çiğdem Karademir, Baturalp Yalçın	
Office	: Home	
Office Hours	: TBA	

Grading

- Quizzes : 20% (6 quizzes. The lowest grade will be dropped)
- Programs : 10% (6 programs. The lowest grade will be dropped)
- Midterm : 30%
  - Eligibility : Any registered student may take the midterm exam.
  - Makeup : NO MAKEUP. ABSENCE WILL BE GIVEN 0 WHATEVER THE REASON IS!)
- Final : 40%
  - Eligibility : Only registered students with a 60 overall weighted average or above, if they were given full grade at the final exam, e.g. 100, may enter.
  - Makeup : Only registered students who are eligible to take the final will be given a makeup exam if he/she fails the course or he/she is absent at the final exam with an officially accepted excuse.

Textbook: Introduction to mathematical programming, Wayne L. Winston, M. Venkataraman

References:
1. Operations research: application and algorithms, Wayne L. Winston
2. Introduction to operations research, Hamdy A. Taha

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

IE 310 TENTATIVE PLAN

1. LINEAR PROGRAMMING
   Graphical solution, Simplex algorithm, Duality, Optimality conditions, Dual Simplex method, Sensitivity analysis.

2. CONVEXITY
   Convex sets, Convex functions, Eigenvalues and eigenvectors, Gradient, Hessian, Positive definiteness.

3. NONLINEAR UNCONTRAINED OPTIMIZATION IN MANY DIRECTIONS
   Necessary and sufficient conditions, Basic search methods, Descent directions, Line search, Steepest descent method, Newton's method, Davidon-Fletcher-Powell and Broyden-Fletcher-Goldfarb-Shanno methods.

4. CONSTRAINED NONLINEAR OPTIMIZATION
   Necessary and sufficient conditions, Convex programs, Reduced gradient and generalized reduced gradient methods.

5. INTEGER PROGRAMMING
   Modeling with binary variables, Linear Programming relaxation, Cutting planes, Branch-and-bound.

IE 310 TENTATIVE PROGRAM

WEEK	MONTH	DAY	TENTATIVE DAILY OUTLINE
1	February	10M	Introduction to Operations Research and mathematical modeling
		11T	"
2		17M	Linear Programming: Graphical Solution
		18T	Convexity: Convex sets
3		24M	"
		25T	Systems of linear equalities
4	March	02M	Linear Programming: Simplex Algorithm
		03T	"
5		09M	"
		10T	"
6		16M	CORONA BREAK
		17T	CORONA BREAK
7		23M	SPRING BREAK
		24T	SPRING BREAK
8		30M	CORONA BREAK
		31T	CORONA BREAK
9	April	06M	Linear Programming: Simplex Algorithm
		07T	Linear Programming: Modeling with GAMS
10		13M	Linear Programming: Duality
		14T	"
11		20M	Linear Programming: Sensitivity Analysis
		21T	"
12		27M	Convexity: Convex functions
		28T	"
13	May	04M	"
		05T	"
14		11M	"
		12T	Unconstrained Nonlinear Optimization in many variables
15		18M	"
		19T	HOLIDAY
16		25M	HOLIDAY
		26T	HOLIDAY
17	June	01M	Constrained Nonlinear Optimization in many variables
		02T	"
18		08M	Integer Programming
		09T	"