BOĞAZİÇİ UNIVERSİTY

DEPARTMENT OF INDUSTRIAL ENGINEERING

IE 310 - OPERATIONS RESEARCH
Fall 2023

Type:	CMPE required
Class/Laboratory/PS schedule:	Monday (Slot: 7) 15:00-15:50 (NH 203) Regular Lecture Wednesday (Slot: 4 & 5) 12:00-13:50 (M 1100) Regular Lecture Friday (Slot: 1 & 2) 09:00-10:50 (M 1100) PS
Instructor:	Kerem Can ÖZKISACIK, keremo@boun.edu.tr Alternative email: kerem.ozkisacik@mavenpartnersgroup.com
Office Hours:	TBA
Teaching Assistant:	TBA
Grader:	TBA
Prerequisite(s):	Math 201 or equivalent

Course Description:
This course is designed to be as an introduction to the most widely used deterministic operations research methodologies. The course will start by introducing mathematical modeling and optimization concepts and basic linear programming then move into duality theory. Emphasis will also be given to integer programming models and the branch and bound techniques. We will also discuss available software for solving these optimization problems. The last part of the course includes an introduction to non-linear optimization.

References:
Lecture notes are essential.

The following textbooks are used while preparing the lecture notes. Students may refer to the following content for a better understanding of some lectures:

1. Operations Research, (Hamdy A. Taha, 8th Edition, Prentice Hall, 2007)
2. An Introduction to Linear Programming and Game Theory, Ch.1-7 (Paul R. Thie, Gerard E. Keough,3rd Edition, John Wiley & Sons, 2008)
3. Introduction to Operations Research, (F.S. Hillier, G.J. Lieberman, 9th Edition, McGraw-Hill, 2010)

Course objectives
The primary objective of this course is to provide students with the basic tools of Operations Research in order to handle various engineering problems. Students are expected to acquire the ability of modeling real-life problems using Linear Programming and Integer Programming models. They are also provided with several algorithmic methods to solve the related models. The fundamental concepts of modeling, optimality and duality are thoroughly covered with the help of several real-life illustrations.

Notes about lectures:

- Lectures and problem sessions will be conducted at the designated classrooms.
- There will be no Live Zoom session during lecture hours. However, video recordings of the past year lectures will be available right after the lecture hour.
- Lecture notes as well as the video recordings of the past year will be shared via Moodle right after the sessions.
- Students will be expected to read the related textbook sections before the lecture.
- Office hours will be held via Zoom upon booking during the given time period.
- Some lecture hours can also be devoted to QA sessions if needed.

On-line assessment (quizzes, exams) may require you to write your answer on paper, create a PDF file from it and submit the PDF file via Moodle. Please make sure that you can create good quality, small sized PDF files (using your smart phone or computer).
For more information check https://distancelearning.boun.edu.tr

Topics To Be Covered (Time plan is tentative):

1. Week: Intro to O.R. and LP Modeling
2. Week: LP: Graphical Solution Procedure, LP: Model Formulation
3. Week: LP: Simplex Method
4. Week: LP: Simplex Method - Starting Methods
5. Week: LP: Matrix Form of Simplex, Revised Simplex, LP: Duality
6. Week: LP: Dual Simplex
7. Week: Sensitivity Analysis
8. Week: Integer Programming (IP): Modeling, IP: Cutting Plane Method
9. Week: IP: The Branch and Bound Method
10. Week: Introduction to Non-Linear Programming
11. Week: Convex functions – Unconstrained Non-Linear Optimization
12. Week: Unconstrained Non-Linear Optimization

Grading:

TBA