BOĞAZİÇİ UNIVERSITY
Department of Industrial Engineering

Course Syllabus

Academic year	2015-2016 / Fall
Course Code, Title, and Credit	IE 310; Operations Research; (3+0+2) 4 credits.
Prerequisites	MATH 201 Matrix Theory or equivalent.
Lecture Hours and Places	Monday 11:00 - 11:50 (3rd slot); M1100 Monday 12:00 - 12:50 (4th slot); M1100 Wednesday 16:00 - 16:50 (8th slot); M1100 Thursday 11:00 - 11:50 (3rd slot); M3100 Thursday 12:00 - 12:50 (4th slot); M3100
Lecturer	Assist. Prof. Dr. Hakan Yaşarcan
Lecturer E-mail	hakan.yasarcan@boun.edu.tr
Lecturer Office	M4084; South Campus – Engineering Faculty Building; 4th floor.
L. Office Phone	+ 90 212 359 4629
L. Office Hours	Tuesday 15:00 - 15:50 (7th slot) Tuesday 16:00 - 16:50 (8th slot) Friday 14:00 - 14:50 (6th slot)
Teaching Asst.	Şeyma Gürkan, B.Sc.
T.A. E-mail	seyma.gurkan@boun.edu.tr
T.A. Office	SESDYN Lab. (M3230); South Campus – Engineering Faculty Building; 3rd floor.
T.A. Office Phone	+ 90 212 359 7343
T.A. Office Hours	Monday 15:00 - 15:50 (7th slot) Monday 16:00 - 16:50 (8th slot) Friday 13:00 - 13:50 (5th slot)
Quiz Grader	Mert Gürkan
Q. Grader E-mail	mert.gurkan@boun.edu.tr

Assignment Grader	Cihan Ceyhan
A. Grader E-mail	ceyhancihan@yahoo.com
Course Objectives	Besides technical details, today's engineers should have many other concerns in developing solutions to engineering problems; they need to develop environmentally friendly, socially responsible, and economically feasible solutions. As a natural consequence of these diverse concerns, these solutions must simultaneously satisfy many technical and non-technical constraints. The main purpose of this course is to familiarize students with the problems of deterministic nature that can be addressed by Operations Research, to help them construct complex mathematical models involving many constraints that identify a feasible solution space, and to teach them search methods aiming to obtain the best solution. In view of this purpose, the most widely used deterministic Operations Research methodologies will be covered throughout the semester. At the end of the course, students will hopefully gain the knowledge and capability to formulate, analyze, and solve mathematical models of real-world problems, which will guide and support their decision-making processes in today's competitive and complex environment.
Text Book	Introduction to Mathematical Programming: Operations Research Volume One (Fourth Edition) *Wayne L. Winston* and *Munirpallam Venkataramanan* Published by Cengage Learning ©2003 ISBN-10: 0534359647 and ISBN-13: 9780534359645
Lecture Notes	Lecture notes are essential.
Course Evaluation	Score 1 = (0.10×Quiz Average + 0.10×Assignment Average + 0.35×Midterm Exam Result) / 0.55 Score 1 values will be used to rank students. Students who get reasonably high Score 1 values will earn the right to take the final exam. Students who get low Score 1 values will not earn the right to take the final exam and will automatically receive F from this course. Score 2 = (0.10×Quiz Average + 0.10×Assignment Average + 0.35×Midterm Exam Result + 0.45×Final Exam Result) Score 2 values will be used to rank students who receive the final exam. Students who get reasonably high Score 2 values will manage to earn a passing letter grade such as AA, BA, BB, CB, CC, DC, or DD. Students who get low Score 2 values will receive F. Students who receive F based on their Score 2 values will have the right to attend to the final make-up exam. New Score 2 values will be calculated for those students who receive the final make-up exam by replacing "Final Exam Result" with "Final Make-up Exam Result". If their new Score 2 values are satisfactory, they will receive DD. Otherwise, their grade will be F. Students who earn the right, but do not attend to the final exam will also have the right to take the final make-up exam given that they have a valid reason. Their letter grades (AA, BA, BB, CB, CC, DC, DD, or F) will be assigned based on the new Score 2 values they will receive.
Exams	There will be one midterm exam and many quizzes during the semester and a comprehensive final examination at the end. All examinations will be of closed-book/closed-notes type. More specific information will be provided before each exam. The instructor and teaching assistant will not answer exam related questions of the students on the exam day and also on the day before the exam day.

Assignments	There will be several group assignments during the semester. Therefore, students are urged to form groups of 3 students as soon as possible. More specific information regarding the assignments will be provided as needed.
Attendance and Participation	The topic is new to the students and each lecture will depend on the previous lectures. Absenteeism may result in total failure and, therefore, should be avoided. Students are encouraged to ask questions because student participation is an important factor in learning.
Course Outline	**WEEK 1 (28.09.2015 Monday, 30.09.2015 Wednesday, and 01.10.2015 Thursday)** > Course Organization and Overview > Introduction to Operations Research and Mathematical Modeling > Introduction to Linear Programming **WEEK 2 (05.10.2015 Monday, 07.10.2015 Wednesday, and 08.10.2015 Thursday)** > Introduction to Linear Programming (continued) > Linear Programming: Graphical Solution > Convex Sets **WEEK 3 (12.10.2015 Monday, 14.10.2015 Wednesday, and 15.10.2015 Thursday)** > Systems of Linear Equalities > Linear Programming: The Simplex Algorithm **WEEK 4 (19.10.2015 Monday, 21.10.2015 Wednesday, and 22.10.2015 Thursday)** > Linear Programming: The Simplex Algorithm (continued) **WEEK 5 (26.10.2015 Monday)** > Linear Programming: The Simplex Algorithm (continued) > Linear Programming: Matrix Form of Simplex > Linear Programming: Revised Simplex method **WEEK 6 (02.11.2015 Monday, 04.11.2015 Wednesday, and 05.11.2015 Thursday)** > Linear Programming: Big-M Method > Linear Programming: Two-Phase Method **WEEK 7 (09.11.2015 Monday, 11.11.2015 Wednesday, and 12.11.2015 Thursday)** > Linear Programming: Degeneracy > Linear Programming: Modeling with GAMS > Linear Programming: Duality **WEEK 8 (16.11.2015 Monday, 18.11.2015 Wednesday, and 19.11.2015 Thursday)** > Linear Programming: Duality (continued) > Linear Programming: The Dual Simplex Method **WEEK 9 (23.11.2015 Monday, 25.11.2015 Wednesday, and 26.11.2015 Thursday)** > Linear Programming: Sensitivity Analysis **WEEK 10 (30.11.2015 Monday, 02.12.2015 Wednesday, and 03.12.2015 Thursday)** > Introduction to Integer Programming > Integer Programming: The Branch-and-Bound Method **WEEK 11 (07.12.2015 Monday, 09.12.2015 Wednesday, and 10.12.2015 Thursday)** > Integer Programming: The Branch-and-Bound Method (continued) > Introduction to Non-Linear Programming > Convex Functions **WEEK 12 (14.12.2015 Monday, 16.12.2015 Wednesday, and 17.12.2015 Thursday)** > Unconstrained Nonlinear Optimization in One Variable **WEEK 13 (21.12.2015 Monday, 23.12.2015 Wednesday, and 24.12.2015 Thursday)** > Unconstrained Nonlinear Optimization in Many Variables (if time permits)

WE WISH YOU ALL A NICE AND SUCCESFUL SEMESTER!