

# IE 531 Linear Programming

Spring, 2018

Instructor: Sungsoo Park ([sspark@kaist.ac.kr](mailto:sspark@kaist.ac.kr)), Building E2-2, room 4112, Tel: 3121

Office hour: Mon, Wed 14:30 – 16:30 or by appointment

TA: to be announced

Class hour: Mon, Wed 13:00 – 14:30

Class room: IE building (E2-2) #1120 (1 실)

Homepage: <http://solab.kaist.ac.kr/>

Text: "Introduction to Linear Optimization" by D. Bertsimas and J. Tsitsiklis, 1997, Athena Scientific, and class Handouts

Grading: Midterm 30 - 40%, Final 40 - 60%, Homework 10 - 20%

Contents:

We will study the art of linear optimization. The course treats, mostly, theoretical aspects of linear optimization although we will study some applications. Knowledge of linear algebra is required. Although we do not require knowledge of OR, previous exposure to the linear programming will be helpful. The purpose of the course is to prepare the students as a researcher in overall optimization areas as well as a user of linear programming in practice. Hence we will try to focus on the mathematical foundation of linear programming and on the concepts needed to understand the recent developments in optimization areas. Use of softwares (XpressMP, CPLEX) to solve the linear and integer programming problems will also be covered.

Lectures will be given in English. However, we may change it to Korean if there are no foreign students in the class.

The following is the tentative list of topics we will study, as time permits.

- Introduction and modeling (1 week)
- System of linear inequalities, polyhedral theory (4 weeks)
- Geometry of LP (1 week)
- Simplex method, Implementation (2 weeks)

- Midterm examination (1 week)
- Duality theory (2 weeks)
- Sensitivity analysis (1 week)
- Delayed column generation, Dantzig-Wolfe decomposition, Benders Decomposition (1 week)
- Core concepts of Interior Point Methods (2 weeks)
- Final examination (1 week)