

IE 443

Multi-objective Decision Analysis

Guidelines on the Course Project

For the course project you are expected to repeat the quantitative analysis performed in an article using bi-objective (multi-objective) optimization in various operational research (OR) applications. The applications include but are not limited to location, transportation, workforce assignment, scheduling, health care resource allocation and energy systems planning. You may also consider bi-objective formulations of the well-known classical OR problems that arise in various applications, such as knapsack, bin-packing or generalized assignment.

- You will find three articles discussing an OR application that involves multi-(bi) objective mathematical modeling. Determine an application area that you are interested in (e.g. vaccine scheduling) or a classical problem that you would like to focus on (such as multi-dimensional knapsack problems).
- You are expected to repeat the analysis performed in the article. You may either use the solution procedure suggested in the article or use one of the approaches discussed in class.
- If the model is too complicated, you can make simplifying assumptions and/or solve smaller instances of the problem discussed. (For example, if the article considers a bi-objective facility location setting and solves it for a network with 100 nodes, you may solve it for a problem instance with only 20 nodes.)
- You may solve the mathematical models using any solver/platform that you prefer (MATLAB, Java-CPLEX, CPLEX Optimization Studio, Xpress etc.).

The project will be done in groups of 3. You will pick the articles yourself. Please form your group and choose three articles (article 1 should be your most preferred article) and e-mail the names of the group members and the names of the articles to your teaching assistant Tuğba Denktas (tugba.denktas@bilkent.edu.tr) by **November 11**. I will then check the articles and assign one of your chosen articles to you or request a change of the selection (each group should work on a different article, in case multiple groups choose the same three articles the assignments will be made on a first-come, first-served basis).

Some websites that can be used to find the articles are as follows:

<http://www.scopus.com/>

www.webofknowledge.com

Outputs: You are expected to prepare a report (not exceeding 3 pages) and a presentation of maximum 10 minutes. The presentation is expected to be a summary of your report.

Report format: Make sure that you have at least the following sections:

- Problem definition and the mathematical model(s)
- Description of the solution method used
- Computational experiments
- Discussion

Deadline: The deadline for the reports is **December 19**. The presentations will take place in the last week of the semester. The exact schedule of the presentations will be announced later.