

## DA 507 – Modeling and optimization

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### Meeting Times and Locations

Saturday	9:00 am-12:00 pm
Wednesday	7:00 pm – 10:00 pm

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### Instructors

<i>Kerem Bülbül</i>	<a href="mailto:bulbul@sabanciuniv.edu">bulbul@sabanciuniv.edu</a>
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### Course Description, Aim and Content

In today's economy, business professionals make decisions which may prescribe the course of actions whose extent may vary from day-to-day operations to strategies that influence the future of their companies. Although analytical modeling tools have been out there a very long time, they were typically judged to be useless and cumbersome in the past in the context of business decision making processes. With the advances in computing power, information collection and data processing technologies, analytics has become of very critical interest in this context, and modeling tools have turned out to be essential in implementing analytics.

In this course, we cover various analytical modeling tools with a particular focus on optimization models. Each tool is to be covered to an extent where decision makers will be able to

- identify the necessity of analytical modeling
- realize the use of optimization models in data analytics
- distinguish the type of models that could be used for a particular decision problem
- lead/participate in a team of problem solvers

in the course of business decision making processes.

Examples of modeling and optimization techniques from other courses will be covered. Case studies from real-life businesses will be delivered by professionals who are employing such tools and techniques.

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### Topics

Decision Making Processes - Analytical Models

Mathematical Programming and Deterministic Models

Linear programming problems and formulations

Solution methods for linear programming problems

Solution interpretation and sensitivity analysis

Integer programming problems and formulations

Network problems and network modelling

Stochastic Models

Stochastic modelling and analysis

Simulation modelling and analysis

Extensions and Challenges in Decision Making with Analytical Models (tentative)

Multi-criteria decision making

Decision analysis

Data envelopment analysis and analytical hierarchy process

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**Grading**

Assignments (4)	20%
Midterm	30%
Final	50%

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**References**

Model Building in Mathematical Programming, H. P. Williams, 4<sup>th</sup> edition, John Wiley & Sons, 1999. ISBN-13: 978-0471997887

Operations Research: Applications and Algorithms, W. L. Winston, 4<sup>th</sup> edition, Cengage Learning, 2003. ISBN-13: 978-0534380588

Optimization Models For Decision Making: Volume 1, Katta G. Murty, Internet Edition, [http://ioe.engin.umich.edu/people/fac/books/murty/opti\\_model/](http://ioe.engin.umich.edu/people/fac/books/murty/opti_model/).

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**Announcements and SUCourse**

Students are responsible for all announcements made during the regular class meetings. Students should follow the SUCourse site for this class regularly as they are responsible for all announcements and postings on this site.

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This document may be modified during the semester (Fall 2014-2015) due to unforeseen reasons.