Name of the course:
Introduction to Optimization Systems

Name of the Professor and contact information:
Name: Prof. Dr. Achim Koberstein
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Office Hours: by appointment

Prerequisites:
Completed basic studies (until and including the 3rd semester), good knowledge and serious interest in quantitative methods

ECTS-Credits:
6

Grading and form of assignment:
Successful written exam (120 min)

Course description:
Based on quantitative models from the field of applied mathematical optimization this module conveys the core technologies in the field of model based optimization systems and prescriptive analytics.
Outline:
1. Introduction to Optimization Systems
2. Linear Models and Optimization
3. Solution Software and Modeling Languages
4. Mixed-integer Linear Models and Optimization
5. Solution Methods for LPs and MIPs
6. Special MIP-Models
7. Optimization under Uncertainty

Aim of the module (expected learning outcomes and competencies to be acquired):
The participants learn to model and analyze complex decision situations in business organizations. They acquire the capability to apply special modelling techniques and select appropriate solution methods to solve the models and investigate the generated solutions. Furthermore, they will get to know basic architectures of model based optimization system and state-of-the-art modelling and solver software building the core parts of such systems.

Reading list:
Suhl, Mellouli: Optimierungssysteme, Springer 2006. (in German)
Williams: Model Building in Mathematical Programming, John Wiley and Sohns 1999.

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Kallrath, Wilson: Business Optimization using Mathematical Programming, Macmillan Press 1997.
Heipke: Applications of optimization with Xpress-MP, Dash Optimization Ltd., 2000.

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