Summary
This course introduces the theory and application of modern optimization from an engineering perspective.

Content
The following topics will tentatively be covered in the course:
1. Introduction
2. Convex Sets
3. Convex Functions
4. Convex Optimization Problems
5. Separation Theorems
6. Duality
7. Optimality Conditions
9. Convexifying Nonconvex Problems
10. Stochastic Programming
11. Robust Optimization

Learning Prerequisites
Important concepts to start the course
Students are assumed to have good knowledge of basic linear algebra and analysis. Some familiarity with linear programming or other optimization paradigms is useful but not necessary.

Learning Outcomes
• Formalize decision problems in management science and engineering as mathematical optimization models
• Solve the resulting models with commonly used optimization software and to interpret the results
• Assess / Evaluate the computational complexity of different classes of optimization problems and use modeling techniques to make specific optimization problems more tractable
• Model and solve decision problems affected by uncertainty

Teaching methods
Classical formal teaching interlaced with practical exercises.

Assessment methods
• Participation in class
• Final exam

Resources
Bibliography

- Aharon Ben-Tal and Arkadi Nemirovski, Lectures on Modern Convex Optimization, SIAM, 2001
- R. Tyrrell Rockafellar, Conjugate Duality and Optimization, SIAM, 1974

Ressources en bibliothèque

- Conjugate Duality and Optimization / Rockafellar
- Linear and Nonlinear Programming / Luenberger
- Convex Optimization / Boyd
- Introductory lectures on convex optimization : a basic course / Nesterov
- Lectures on modern convex optimization : analysis, algorithms, and engineering applications / Ben-Tal