MATH-265

Introduction to optimization and operations research

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Cursus	Sem.	Type
Chemistry	BA5	Opt.
Civil Engineering	BA3	Obl.
Environmental Sciences and Engineering	BA5	Opt.
HES - GC	H	Obl.
HES - GM	H	Obl.
Mechanical engineering	BA5	Obl.
Systems Engineering minor	H	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Remark

Les exercices sont donnés à raison de deux heures toutes les deux semaines.

Summary

Introduction to major operations research models and optimization algorithms

Content

Week 1: introduction to the course
Weeks 2 & 3: Linear optimization - introduction
Weeks 4 & 5: The simplex algorithm
Weeks 6 & 7: Networks and transhipment
Weeks 8 & 9: Shortest path and duality.
Weeks 10 & 11: Integer optimization - Branch and bound.
Weeks 12 & 13: Unconstrained non linear optimization.
Weeks 14: Questions and answers.

Learning Prerequisites

Required courses

Linear algebra
Analysis

Teaching methods

The course is organized on the concept of "flipped classroom".
Each of the six topics spans two weeks. During the first week, the students review the available material (book, videos, exercises). During the second week, the course in the class focuses on difficult aspects, examples, and responses to questions.
Exercises are also organized the same way. They are organized in class every over week.

Assessment methods

Written exam

Resources

Bibliography

Bierlaire (2015) Optimization: principles and algorithms, EPFL Press

Videos

- http://A collection of videos are made available to support the self-learning process.