CIVIL-557

Decision-aid methodologies in transportation

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Cursus	Sem.	Type
Civil Engineering	MA2, MA4	Opt.
Digital Humanities	MA2	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

The course is given by various lecturers.

Summary

Introduction to operations research algorithms for decision support in transportation systems.

Content

The course is case-study based, it will be divided into modules associated to concrete case studies. Each module will contain the following parts:
1. Presentation of the problem, outline of the process, analysis of major difficulties.
2. Formulation of the optimization problem.
3. Introduction to optimization methods.
4. Implementation using software tools.
5. Solution of a concrete problem by the lecturer, using real data.
6. Solution of similar problems by the students, using also real data.

Emphasis will be put on enhancing students' abilities to model and implement decision support methods in transportation systems. During the course the students would be introduced to the Julia programming language and to the JuMP modeling language for mathematical optimization (embedded in Julia). Programming skills are not a prerequisite, but note that most of the exercises would require programming abilities at the level taught during the exercise.

Learning Prerequisites

Required courses

Recherche opérationnelle

Learning Outcomes

By the end of the course, the student must be able to:

- Model decision processes in transportation systems as optimization problems.
- Implement and sold optimization problems using state-of-the-art solvers.
- Know aand understand various optimization approaches.

Teaching methods

Case-based Teaching and Problem-based Learning

Assessment methods

At the end of each module, each group would be required to submit a short report on a series of exercises.
A midterm exam (multiple choice questions) will take place after Easter Holidays and will account for 20% of the final grade.
At the last part of the course, each group of students would be assigned with a final project, in which they will be required to implement approaches learned during the course.
Each group would submit a report and present their project at the end of the course. Assessment would be based on the quality of the report, the quality of the presentation and an oral exam that would take place during the presentation.

Resources

Ressources en bibliothèque

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