Course Specifications
Valid as from the academic year 2016-2017

Optimisation Techniques (E004120)

Course
Valid as from the academic year 2016-2017

Course offerings and teaching methods in academic year 2019-2020

A (semester 2) Dutch seminar: coached exercises 30.0 h
lecture 30.0 h

B (semester 2) English guided self-study 60.0 h

Lecturers in academic year 2019-2020

Philips, Wilfried TW07 lecturer-in-charge

Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>Programme</th>
<th>Credits</th>
<th>offering</th>
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<tbody>
<tr>
<td>Brugprogramma Master of Science in Bioinformatics (main subject Engineering)</td>
<td>6</td>
<td>B</td>
</tr>
<tr>
<td>Master of Science in Electrical Engineering (main subject Communication and Information Technology )</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Master of Science in Bioinformatics (main subject Engineering)</td>
<td>6</td>
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<tr>
<td>Master of Science in Computer Science Engineering</td>
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Teaching languages

Dutch, English

Keywords

linear programming, optimisation, integer and binary programs, network flows

Position of the course

To familiarize the students with the most important optimization problems with discrete and continuous variables: to teach the students to formulate these problems mathematically starting from a practical problem definition, and to solve them with appropriate algorithms.

Contents

- Introduction: Overview
- Graph algorithms: spanning trees, shortest paths, dynamic programming
- Linear programs: basic principles, simplex algorithm, internal search, duality and sensitivity, multi-objective problems
- Discrete optimisation: lumpy linear programs, methods, assignment problems, routing problems
- Non-linear programs with continuous variables: principles, improving search, constrained programs, important special cases
- Network flows: flow-improving paths and cycle-cancelling, network simplex

Initial competences

Working knowledge of Dutch.

Final competences

1. Understanding concepts such as relaxation, dualisation of constraints, partial solutions...
2. Being able to develop an algorithm starting from basic principles.
3. Having insight into algorithms and the conditions under which they can be applied.
4. Having insight into the possible solutions and the possible locations of optima.

Conditions for credit contract

(Approved)
Access to this course unit via a credit contract is determined after successful competences assessment.

Conditions for exam contract:
- This course unit cannot be taken via an exam contract.

Teaching methods:
- Guided self-study, lecture, project, seminar: coached exercises

Extra information on the teaching methods:
- Classroom lectures; Classroom problem solving sessions; Project

Learning materials and price:

References:
- zie http://telin.rug.ac.be/~philips/optimalisatie/optimalisatie.php#Studiemateriaal

Course content-related study coaching:

Evaluation methods:
- end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period:
- Written examination, open book examination

Examination methods in case of periodic evaluation during the second examination period:
- Written examination, open book examination

Examination methods in case of permanent evaluation:
- Report

Possibilities of retake in case of permanent evaluation:
- Examination during the second examination period is not possible

Extra information on the examination methods:
- During examination period: written open-book exam; written closed-book exam
- During semester: graded project reports. Second chance: Not possible
- Frequency: 1x

Calculation of the examination mark:
- Evaluation throughout semester as well as during examination period

(Approved)