



Bachelor's courses School of Business and Economics

VU University Amsterdam - Student- & Onderwijszaken - Exchange programme Vrije Universiteit - 2019-2020

Operations Research III

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| Course code | E_EOR3_OR3 () |
| Period | Period 4 |
| Credits | 6.0 |
| Language of tuition | English |
| Faculty | School of Business and Economics |
| Coordinator | dr. N.K. Olver |
| Examinator | dr. N.K. Olver |
| Teaching staff | dr. ir. R.A. Sitters, dr. N.K. Olver |
| Teaching method(s) | Lecture, Seminar |
| Level | 300 |

Course objective

A student who successfully completes the course will have an understanding of the techniques of combinatorial optimization and integer programming, and be ready to apply them to problems encountered in practice.

Course content

- * The notion of efficiency in algorithms; distinguishing between tractable and computationally "hard" problems.
- * The correctness and efficiency of key algorithms in combinatorial optimization will be shown rigorously. Problems studied will include: minimum spanning tree, maximum flow, minimum cost flow, and matching.
- * Formulation of problems as integer programs; the notion of the strength of a formulation; the central role of integral formulations.
- * The main techniques and theory used in commercial integer programming solvers such as Gurobi will be investigated in detail. A main focus will be on the powerful cutting-plane method.
- * Column generation, Lagrangian relaxation, modelling of disjunctions, and other problem-tailored techniques will be discussed.
- * Experience in the use of integer programming solvers will be gained.
- * Basic knowledge of Python will be gained.

Form of tuition

Lectures (4 hours/week) and Tutorials (2 hours/week). In tutorials, exercises on the theory as well as programming exercises will be discussed.

Type of assessment

Theory assignments - group assessment
Programming assignments - group assessment
Final exam – individual assessment

Entry requirements

Courses in Linear Algebra and Linear programming.

Recommended background knowledge

It is expected that students are familiar with the contents of Operations Research I - and in particular linear programming - at the start of the course.

Programming is done in Python. No Python knowledge is needed. However, some amount of programming experience (in any language) is certainly helpful.

Remarks

The course is suitable to be taken in an exchange program.