

Course Descriptions Bachelor 2021-2022

Course Title Advanced Algorithms
 Course Code EBC2121
 ECTS Credits 6,5
 Assessment Whole/Half Grades

| Period | Start | End | Mon | Tue | Wed | Thu | Fri |
|--------|-----------|-----------|-----|-----|-----|-----|-----|
| 4 | 31-1-2022 | 25-3-2022 | X | | X | | |

Level Advanced

Coordinator Lars Rohwedder For more information: l.rohwedder@maastrichtuniversity.nl

Language of instruction English

Goals The aim of this course is to familiarize students with advanced techniques from algorithm design and analysis. The students will also learn how to translate algorithmic ideas into working codes. The students will also get an introduction into the field of algorithmic game theory.

Description In order to satisfy the Econometrics & OR curriculum, you have to choose two of the courses EBC2091, EBC2120, EBC2121, EBC2122 in period 4.

Economic entities like companies, non-governmental Organisations, and municipalities are continuously faced with difficult optimization problems. Finding good solutions to these problems is crucial for improving economic performance, and hence it comes by no surprise that the design of efficient algorithms for all kinds of optimization problems has been a flourishing area of research in computer science and operations research for many decades already.

This course will introduce fundamental techniques in algorithm design (e.g., greedy algorithms, graph algorithms, approximation algorithms) that are used to derive efficient algorithms and heuristics for various optimization problems. It will also be discussed how to translate algorithmic ideas into working code, and many exercises and small cases will be discussed.

Literature Select chapters from these two textbooks, which are available on the author's website for personal use: David P. Williamson and David B. Shmoys. The design of approximation algorithms. Cambridge University Press, 2011. Vijay V. Vazirai. Approximation Algorithms. Springer-Verlag New York, 2001.

Prerequisites Basic course in programming, basic course in linear programming, basic knowledge of combinatorial optimisation (discrete Operations Research).

Teaching methods Presentation / Lecture / Assignment / Groupwork

Assessment methods Final Paper / Written Exam / Assignment / Presentation

Evaluation in previous academic year For the complete evaluation of this course please click <http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM>

This course belongs to the following programme / specialisation

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|---|---------------------------|
| Bachelor Econometrics and Operations Research | Year 3 Core Course(s) |
| Bachelor Econometrics and Operations Research | Year 3 Elective Course(s) |