Course Descriptions None 2024-2025

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

Period

Period	Start	End	Mon	Tue	Wed	Thu	Fri
4	3-2-2025	30-3-2025	X		X		

Level	Advanced
Coordinator	Andre Berger For more information:a.berger@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

Bachelor Econometrics and Operations Research	Year 3 Disciplinary Course(s)
Bachelor Econometrics and Operations Research	Year 3 Elective Course(s)