

Course Descriptions None 2025-2026

Course Title Mathematical Research Tools
 Course Code EBC4182
 ECTS Credits 6,5
 Assessment Whole/Half Grades

Period	Start	End	Mon	Tue	Wed	Thu	Fri
1	1-9-2025	17-10-2025		X		X	

Level Advanced
 Coordinator Andrés Perea y Monsuwé For more information:a.perea@maastrichtuniversity.nl
 Language of instruction English

Goals The goal of this course is learning how to find, classify and analyze solutions to optimization problems.
 Description In economics and business we must often solve maximization or minimization problems. Think, for instance, of a firm that wants to minimize its costs while guaranteeing a certain production level, or investors that wish to find the optimal portfolio given a certain degree of risk. How do we find the solutions to such optimization problems, and how can we classify and analyze such solutions? This will be the main objective of this course. We will concentrate on four themes: (i) optimization problems without constraints, (ii) optimization problems with equality and inequality constraints, (iii) parametrized optimization, that is, how does the optimal solution change if we change the underlying parameters in the problem, and (iv) optimization in a dynamic setting with finite and infinite horizon.

Literature * Rangarajan K. Sundaram: "A First Course in Optimization Theory", Cambridge University Press, 2011.

Prerequisites Basic level of mathematics (e.g. Sydsaetter et.al, Mathematics for Economic Analysis).

Transitional Regulations <div class="trreg"><div class="subtitle">TRANSITIONAL REGULATIONS</div><ul class="trcohorts">Master Business ResearchMaster Business Research - Operations ResearchIn 2024-2025 and 2025-2026 education and exam/resit opportunities are offered.In 2026-2027 exam/resit opportunities are offered.From 2027-2028 onwards, the course is cancelled.<table><col style="width: 200px;"><col style="width: 120px;"><col style="width: 120px;"><thead><tr><th>Academic Year</th><th>Education</th><th>Exam/Resit</th><th>Replacement(s)</th></tr></thead><tbody><tr><td>2024-2025 - 2025-2026</td><td>X</td><td>X</td><td> </td></tr><tr><td>2026-2027</td><td> </td><td>X</td><td> </td></tr><tr><td>2027-2028 onwards</td><td> </td><td> </td><td> </td></tr></tbody></table></div>

Teaching methods PBL / Lecture / Assignment

Assessment methods Participation / Written Exam

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	Master Business Research - No specialisation	In transition - Y2 Methodology Electives
	Master Business Research - Operations Research	In transition - Year 1+2 Elective Courses
	Master Business Research - Operations Research	Transitional Regulation
	Master Economic and Financial Research - Econometrics	Elective Courses
	Master Economic and Financial Research - No specialisation	Year 1 Compulsory Courses