

Course Descriptions Bachelor 2021-2022

| Course Title | Optimisation | | | | | | | | | | | | | | | | |
|---|---|------------|-------|-----|-----|-----|-----|-----|-----|---|-----------|------------|---|--|---|--|---|
| Course Code | EBC2105 | | | | | | | | | | | | | | | | |
| ECTS Credits | 6,5 | | | | | | | | | | | | | | | | |
| Assessment | Whole/Half Grades | | | | | | | | | | | | | | | | |
| Period | <table><tr><th>Period</th><th>Start</th><th>End</th><th>Mon</th><th>Tue</th><th>Wed</th><th>Thu</th><th>Fri</th></tr><tr><td>1</td><td>30-8-2021</td><td>15-10-2021</td><td>X</td><td></td><td>X</td><td></td><td>X</td></tr></table> | Period | Start | End | Mon | Tue | Wed | Thu | Fri | 1 | 30-8-2021 | 15-10-2021 | X | | X | | X |
| Period | Start | End | Mon | Tue | Wed | Thu | Fri | | | | | | | | | | |
| 1 | 30-8-2021 | 15-10-2021 | X | | X | | X | | | | | | | | | | |
| Level | Intermediate | | | | | | | | | | | | | | | | |
| Coordinator | Stan van Hoesel, Janos Flesch For more information:s.vanhoesel@maastrichtuniversity.nl; j.flesch@maastrichtuniversity.nl | | | | | | | | | | | | | | | | |
| Language of instruction | English | | | | | | | | | | | | | | | | |
| Goals | <ul style="list-style-type: none">* Students can find the right method to solve a given mathematical problem.* Students can apply the linear and nonlinear optimization methods to concrete mathematical problems.* Students can validate the method and the solution, depending on the mathematical problem.* Students learn the concepts and solution method (the simplex method) for linear constrained optimization problems.* Students can apply the linear optimization method to problems in game theory and network flow problems.* Students learn the concepts and solution methods for nonlinear unconstrained and constrained optimization problems.* Students learn the definition of concave and convex functions, their characterizations, and their importance in nonlinear optimization problems.* Students can recognize concave and convex functions by applying their characterizations.* Students can clearly present their solutions of mathematical problems in groups. | | | | | | | | | | | | | | | | |
| Description | Optimisation problems arise in all fields that econometricians encounter, such as operations research, game theory, statistics, micro- and macroeconomics and finance. The aim of this course is to show the methodology for solving constraint optimisation problems both for linear and non-linear problems. These methodologies are also known as Linear and Non-Linear Programming, respectively. The following topics and techniques will be treated: the standard simplex method, duality, sensitivity analysis, the primal-dual simplex method, the network simplex method, first and second order necessary and sufficient conditions, the Lagrangian-function, Kuhn-Tucker conditions and constraint qualification. Besides this, special attention is paid to the application of these methodologies in practical problems. | | | | | | | | | | | | | | | | |
| Literature | <ul style="list-style-type: none">* Vanderbei, R.J., Linear Programming: Foundations and Extensions, 4th ed., Springer, 2014, ISBN 978-1-4614-7629.* Sydsaeter K, Hammond P, Seierstad A, Strom A (2008): Further mathematics for economic analysis. Essex UK, Prentice Hall (2nd edition). ISBN: 978-0-273-71328-9. | | | | | | | | | | | | | | | | |
| Prerequisites | Basic algebra (for linear programming), and advanced calculus (for nonlinear programming). Exchange students need to be aware that very specific pre-knowledge is required for this course. A solid background in mathematics is necessary. Students should be aware of the following concepts: Algebra: working knowledge of vector computing and matrices (including inverse matrices). Linear equations, and find the solutions of a set of equations etc. Function theory on the level of optimisation of functions of multiple variables under side conditions (Lagrange multipliers) | | | | | | | | | | | | | | | | |
| Teaching methods | An advanced level of English. PBL / Lecture | | | | | | | | | | | | | | | | |
| Assessment methods | Attendance / 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 | Bachelor Econometrics and Operations Research Year 2 Compulsory Course(s) | | | | | | | | | | | | | | | | |