











5 credits

30.0 h + 22.5 h

Q2

Teacher(s)	Glineur François ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	<i>The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.</i>
Aims	<i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Evaluation methods	Students will be evaluated with an individual written exam, based on the above-mentioned objectives. Students also carry out a project in small groups, whose evaluation is taken into account for the final grade.
Teaching methods	The course is comprised of lectures, exercise sessions and computer labs, as well as a project to be carried out in small groups. Consulting is available for help with the project.
Content	<p>Linear optimization: Introduction, canonical formulations, polyhedral geometry, simplex algorithm, duality et sensitivity analysis, introduction to discrete optimization (branch & bound).</p> <p>Nonlinear optimization: Models : definitions and terminology, optimality conditions for unconstrained and constrained problems ; recognize and exploit convexity of a problem.</p> <p>Methods : line-search methods for unconstrained problems (gradient, Newton and quasi-Newton methods) ; convergence properties (local and global) ; implementation details ; introduction to other methods (conjugate gradient, constrained problems, unavailable derivatives).</p>
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=9200
Bibliography	<ul style="list-style-type: none"> • Introduction to Linear Optimization, Dimitri Bertsimas and John Tsitsiklis, Athena Scientific, 1997. • Linear Programming. Foundation and Extensions, Robert Vanderbei, Kluwer Academic Publishers, 1996. • Integer Programming, Laurence Wolsey, Wiley, 1998. • Numerical Optimization, Jorge Nocedal et Stephen J. Wright, Springer, 2006. • Convex Optimization, Stephen Boyd et Lieven Vandenberghe, Cambridge University Press, 2004.
Faculty or entity in charge	MAP

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Computer Science and Engineering	INFO2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Statistic: General	STAT2M	5		
Master [120] in Computer Science	SINF2M	5		
Bachelor in Engineering	FSA1BA	5	LEPL1101 AND LEPL1102 AND LEPL1105	
Bachelor in Mathematics	MATH1BA	5		
Minor in Engineering Sciences: Applied Mathematics	LMAP100I	5		
	LSTAT100P	5		
Additional module in computer science	LSINF110P	5		
Additional module in Mathematics	LMATH100P	5		