

5.00 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>
Learning outcomes	
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 during the second quadrimester, whose evaluation is taken into account for the final grade (one third) for each session.
Teaching methods	This 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: <i>Models</i> : definitions and terminology, optimality conditions for unconstrained and constrained problems ; recognize and exploit convexity of a problem. <i>Methods</i> : line-search methods for unconstrained problems (gradient, Newton and quasi-Newton methods) ; convergence properties (local and global) ; implementation details ; introduction to other types of methods.</p>
Inline resources	https://moodle.uclouvain.be/course/view.php?id=2039
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	Learning outcomes
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Minor in Engineering Sciences: Applied Mathematics (only available for reenrolment)	MINMAP	5		
Master [120] in Computer Science and Engineering	INFO2M	5		
Additional module in computer science	APPSINF	5		
Bachelor in Mathematics	MATH1BA	5	LINFO1101	
Approfondissement en statistique et sciences des données	APPSTAT	5		
Additional module in Mathematics	APPMATH	5		
Master [120] in Computer Science	SINF2M	5		
Minor in Applied Mathematics	LMINOMAP	5		
Specialization track in Applied Mathematics	FILMAP	5		