


5.00 credits

45.0 h + 20.0 h

Q1

Teacher(s)	Tancrez Jean-Sébastien ;
Language :	French
Place of the course	Mons
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>
Main themes	<p>A. Analysis of real functions of several real variables (15h + 10h)</p> <ul style="list-style-type: none"> <li>• Real functions of several real variables;</li> <li>• Limits, continuity, differentiability;</li> <li>• Introduction to multivariate convex optimization (free and constrained);</li> <li>• Necessary conditions for optimality (Fermat's theorem) and KKT conditions.</li> </ul> <p>B. Linear optimization (30h Theory + 20h Exercises)</p> <ul style="list-style-type: none"> <li>• Introduction to the solid geometry: vector planes, hyperplanes, affine spaces, affine hyperplanes;</li> <li>• Canonical and standard forms of a linear optimization problem;</li> <li>• Geometry of a linear optimization problem (polytopes and vertices);</li> <li>• Fundamental theorems for the existence of the solution: the alternative theorem (or Farka's lemma) and Fredholm's theorem;</li> <li>• Optimality conditions;</li> <li>• Simplex algorithm;</li> <li>• Duality theory: primal-dual solutions; dualisation technique; duality properties; complementary slackness theorem; sensitivity analysis; marginal values;</li> <li>• Examples of modeling classic business engineering and management problems as linear problems</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>At the end of the class, the student will be able to:</p> <p><sup>1</sup></p> <ul style="list-style-type: none"> <li>• handle matrix computing in its main applications to management;</li> <li>• model and solve an optimization problem using linear programming</li> </ul>
Bibliography	SYDSTER K., SYDSAETER K., HAMMOND P. (2005), Essential Mathematics for Economic Analysis, 2nd ed., Prentice-Hall.
Faculty or entity in charge	

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor : Business Engineering	<a href="#">INGM1BA</a>	5	<a href="#">MQANT1110</a>	
Bachelor in Management	<a href="#">GESM1BA</a>	5	<a href="#">MQANT1110</a>	