# UCLouvain

## mqant1227
### 2024

# Mathematics for Management 2

| 5.00 credits | 45.0 h + 20.0 h | Q1 |
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| Teacher(s) | Tancrez Jean-Sébastien ; |
| Language : | French |
| Place of the course | Mons |
| Prerequisites | *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.* |
| Main themes | A. Analysis of real functions of several real variables (15h + 10h)<br><br>• Real functions of several real variables;<br>• Limits, continuity, differentiability;<br>• Introduction to multivariate convex optimization (free and constrained);<br>• Necessary conditions for optimality (Fermat's theorem) and KKT conditions.<br><br>B. Linear optimization (30h Theory + 20h Exercises)<br><br>• Introduction to the solid geometry: vector planes, hyperplanes, affine spaces, affine hyperplanes;<br>• Canonical and standard forms of a linear optimization problem;<br>• Geometry of a linear optimization problem (polytopes and vertices);<br>• Fundamental theorems for the existence of the solution: the alternative theorem (or Farka's lemma) and Fredholm's theorem;<br>• Optimality conditions;<br>• Simplex algorithm;<br>• Duality theory: primal-dual solutions; dualisation technique; duality properties; complementary slackness theorem; sensitivity analysis; marginal values;<br>• Examples of modeling classic business engineering and management problems as linear problems |
| Learning outcomes | **At the end of this learning unit, the student is able to :**<br><br>1  At the end of the class, the student will be able to:<br><br>• handle matrix computing in its main applications to management;<br>• model and solve an optimization problem using linear programming |
| Bibliography | SYDSTER K., SYDSAETER K., HAMMOND P. (2005), Essential Mathematics for Economic Analysis, 2nd ed., Prentice-Hall. |
| Faculty or entity in charge | CLSM |

## Programmes containing this learning unit (UE)

| Program title | Acronym | Credits | Prerequisite | Learning outcomes |
|---|---|---|---|---|
| Bachelor : Business Engineering | INGM1BA | 5 | MQANT1110 | 🔍 |
| Bachelor in Management | GESM1BA | 5 | MQANT1110 | 🔍 |