



Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

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| 5 credits | 30.0 h | Q2 |
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| Teacher(s) | Catanzaro Daniele ; |
| Language : | English |
| Place of the course | Mons |
| Main themes | This course is designed to develop in the student both the ability to quantitatively analyze practical problems and to interpret and understand quantitative results in order to perform a more informed decision-making. Its aim is to introduce a broad range of optimization concepts and associated quantitative techniques with a view to helping the student appreciate the merits and limitations of these techniques as well as the data and technical requirements involved with their use. |
| Aims | <p>This course contributes to develop the following competencies.</p> <ul style="list-style-type: none"> • Knowledge • Scientific reasoning and systematic approach • Communication and interpersonal skills • Project management 1 • Leadership <p>At the end of this course, students will:</p> <ul style="list-style-type: none"> • Improve their strategical thinking skills • Acquire fundamental knowledge on the modeling of practical problems • Apply the appropriate techniques to propose a useful solution. <p>-----</p> <p><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></p> |
| Evaluation methods | Due to the COVID-19 crisis, the information in this section is particularly likely to change. The examination method (e.g., project, written exam, or other forms) will be communicated by the lecturer during the first lecture of the course, which is mandatory (either in person or remotely). |
| Teaching methods | Due to the COVID-19 crisis, the information in this section is particularly likely to change. Slided & Blackboard lectures. |
| Content | <p>This course is designed to develop both the ability to quantitatively analyze very large-scale practical problems in management science and to interpret and understand quantitative results in order to perform a more informed decision-making. Its aim is to introduce a broad range of optimization concepts and associated quantitative techniques with a view to helping the student appreciate the merits and limitations of these techniques as well as the data and technical requirements involved with their use.</p> <p>The course includes the following topics:</p> <ol style="list-style-type: none"> 1. Introduction to Quantitative Decision Making Tools 2. Large Scale Optimization: From Theory to Solutions 3. Projection, inverse projection, and their applications 4. Models and methods for Data Envelopment Analysis, Pricing, Location, Partitioning, Routing, Transportation and Network Design 5. Case studies 6. Brief introduction to integer optimization methods for machine learning |
| Bibliography | The lectures will be integrated with some capita selecta from the following references: (1) R. Kipp Martin. Large Scale Linear and Integer Optimization: A Unified Approach. Springer, 1999. (1) S. Boyd and L. Vandenberghe. Convex Optimization. Cambridge University Press 2004. (2) M. Conforti, G. Cornuejols, G. Zambelli. Integer Programming. Springer, 2014. (3) S. Heipcke. Applications of optimization with Xpress-MP. Dash Optimization, 2002. |
| Faculty or entity in charge | CLSM |

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| Teaching methods | Remote teaching |
| Evaluation methods | Remote orals |

| Programmes containing this learning unit (UE) | | | | |
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| Program title | Acronym | Credits | Prerequisite | Aims |
| Master [120] : Business Engineering | INGM2M | 5 | |  |
| Master [120] : Business Engineering | INGE2M | 5 | |  |