UCLouvain

# mqant1329

*2018*

# Optimisation

| 5 crédits | 30.0 h + 15.0 h | Q1 |
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| Enseignants | Catanzaro Daniele ;Meskens Nadine ; |
| Langue d'enseignement | Anglais |
| Lieu du cours | Mons |
| Préalables | *Le(s) prérequis de cette Unité d'enseignement (UE) sont précisés à la fin de cette fiche, en regard des programmes/formations qui proposent cette UE.* |
| Acquis d'apprentissage | *La contribution de cette UE au développement et à la maîtrise des compétences et acquis du (des) programme(s) est accessible à la fin de cette fiche, dans la partie « Programmes/formations proposant cette unité d'enseignement (UE) ».* |
| Modes d'évaluation des acquis des étudiants | Students are assessed individually in order to test the competences announced above.<br>The final written exam involves both (i) solving exercises similar to those proposed during the course and the tutorials and (ii) understanding and applying the theory to a specific case.<br>Please note that, depending upon the academic calendar, the content of such exam may be subjected to changes from year to year and from session to session. More details will be communicated by the lecturer in charge during the first (and mandatory) lecture of the course. |
| Méthodes d'enseignement | Cours magistral. |
| Contenu | This course aims to introduce to the foundations of continuous and discrete optimization as well as the main computing techniques to tackle and solve an optimization problem.<br><br>Table of Contents: Part I (Continuous Optimization): Continuity, differentiability in n dimensions, conditions for differentiability, gradient, Jacobian and Hessian matrices, necessary conditions for optimality, free extrema and extrema under constraints, convex sets, convex functions, convex optimization problems, Lagrangian duality, descent methods, rudiments of smooth and non-smooth nonlinear optimization. Part II (Discrete Optimization): Introduction to integer and combinatorial optimization; polyhedral combinatorics: formulations and convex hulls; optimality conditions, relaxations and relationships among relaxations; well-solved problems; branch and bound. |
| Bibliographie | The lectures will be integrated with some capita selecta from the following references: (1) S. Boyd and L. Vandenberghe. Convex Optimization. Cambridge University Press 2004. (2) L. A. Wolsey. Integer Programming. Wiley Interscience, 1988. (3) M. Conforti, G. Cornuejols, G. Zambelli. Integer Programming. Springer, 2014. (4) Bagirov, M. Karmitsa and M. M. Mäkelä. Introduction to non smooth optimization. Springer 2014. (5) F. F. Clarke. Optimization and nonsmooth analysis, Siam 1987. |
| Faculté ou entité en charge: | CLSM |

| Programmes / formations proposant cette unité d'enseignement (UE) | | | | |
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| Intitulé du programme | Sigle | Crédits | Prérequis | Acquis d'apprentissage |
| Bachelier en ingénieur de gestion | INGM1BA | 5 | MQANT1227 | 🔍 |