

5 crédits	30.0 h + 15.0 h	Q1
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Enseignants	Catanzaro Daniele ;
Langue d'enseignement	Anglais
Lieu du cours	Mons
Préalables	<i>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.</i>
Acquis d'apprentissage	<i>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) ».</i>
Modes d'évaluation des acquis des étudiants	Continuous evaluation, including an individual project with final report and final exam. Due to the particular nature of this course, the evaluation will consists of only one exam per year. Depending upon the academic calendar, the scheduling of such exam may vary from year to year and will be communicated by the lecturer in charge during the first (and mandatory) lecture of the course.
Méthodes d'enseignement	Cours magistral.
Contenu	<p>This course provides an introduction to algorithmic problem solving. Its main goal is to learn how to implement solution approaches for different type of problems involving search and optimization features. It covers the introduction to graph theory, classical algorithms on graphs, algorithmic paradigms, and data structures used to solve these problems. The course emphasizes the relationship between algorithms and programming. It pays attention on the practical importance of specific classes of optimization problems in management science and motivate the students to develop algorithms to solve them.</p> <p>The course includes in particular the following topics:</p> <ol style="list-style-type: none"> 1. Recursion 2. Fundation of data structures: Graphes 3. Basic algorithms on graphs 4. Well Solved Optimization Problems in Management Science - Part I: Spanning Trees 5. Well Solved Optimization Problems in Management Science - Part II: Shortest Paths 6. Hard Optimization Problems in Management Science - Part I - Spanning Trees with constraints 7. Hard Optimization Problems in Management Science - Part I - Shortest Paths with constraints 8. Finding the optimum via Branch-&-Bound 9. Introduction to Heuristics, Local Searches and Metaheuristics
Ressources en ligne	<ol style="list-style-type: none"> 1. Online resources for "Introduction to Algorithms". 2. Online resources for "Thinking in Java".
Bibliographie	The lectures will be integrated with some capita selecta from the following references: (1) Cormen, Thomas, Charles Leiserson, Ronald Rivest, and Clifford Stein. Introduction to Algorithms. 3rd ed. MIT Press, 2009; (2) B, Eckel. Thinking in Java, 4th Edition. Prentice Hall, 2006. (3) L. Wolsey. Integer Programming, Wiley, 1998. (4) M. Gendreau and J. Y. Potvin. Handbook of Metaheuristics. Springer, 2010.
Faculté ou entité en charge:	CLSM

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Crédits	Prérequis	Acquis d'apprentissage
Bachelier en ingénieur de gestion	INGM1BA	5	MINFO1201 ET MQANT1227	