UCLouvain

minfo1302

2026

Coding Project

The version you're consulting is not final. This course description may change. The final version will be published on 1st June.

6.00 credits	30.0 h + 15.0 h	Q1

Teacher(s)	Catanzaro Daniele ;
Language :	English
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	This course provides an introduction to mathematical modeling of computational problems. It covers the common algorithms, algorithmic paradigms, and data structures used to solve these problems. The course emphasizes the relationship between algorithms and programming. It pays particular attention on the practical importance of specific classes of optimization problems in management science and motivate the students to develop algorithms to solve them.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 This course contributes to develop the following competencies. • Knowledge • Scientific reasoning and systematic approach • Project management • Leadership At the end of this course, students will: • Improve their strategical thinking skills • Acquire fundamental knowledge on the modeling and the resolution of practical problems • Apply the appropriate techniques to propose a useful solution.
Evaluation methods	The evaluation consists of • An python project, which is mandatory and assigned once a year. All students must complete it at the scheduled time. A passing grade on the project is required to proceed to the next step. **Achieving a passing score is required to move on to the next step**. • An individual exam, written and closed-book. If the student obtains a passing grade on the Python project, the **final grade** is calculated as a weighted average of the individual exam grade (65%) and the project grade (35%). These percentages may vary from year to year depending on the nature and difficulty of the project. Full details, including any adjustments, are provided by the lecturer during the first **mandatory** class session. In the case of an exam retake, the above rules may be modified. Any changes will be announced in due time by the lecturer.
Teaching methods	Interactive whiteboard lectures and exercises in the computer rooms. **Attending the course is strongly adviced and mandatory for the very first lecture.**
Content	This course introduces to algorithmic problem solving. Its main goal is to learn how to model practical problems arising from management engineering by using the most appropriate and efficient data structures, as well as how to implement the most efficient solution approaches by using classical algorithmic and graph theory. The course emphasizes the importance of both digitalization and the relationship between algorithms and programming, as well as the aspects related to project management and problem solving skills by means of the development of a final coding project aimed at solving a specific problem assigned each year. The problem may arise potentially by any area of management engineering or computer science; it may enjoy potentially any routing, partitioning, coloring, location, telecommunication, sustainable logistics and supply chain management, portfolio, scheduling, data mining or business analytics features, and may have any general structure. The students will have to work in group to tackle and solve it in the most efficient way as well as to be ready to defend their work during the examination session. The course includes in particular the following topics:

	1. Algorithms and Algorithmic Analysis 2. Induction, Recursion, and Search 3. Fundation of data structures: Trees and Graphes 4. Basic algorithms on graphs 5. Brute-force search 6. Introduction to complexity classes 7. Well Solved Optimization Problems in Management Science - Part I: Spanning Trees 8. Well Solved Optimization Problems in Management Science - Part II: Shortest Paths 9. Hard Optimization Problems in Management Science - Part I - Spanning Trees with constraints 10. Hard Optimization Problems in Management Science - Part I - Shortest Paths with constraints **The participants to this course are strongly encouraged to pass the previous LSM bachelor courses in computer science before approaching this one and are assumed to be familiar with basic Python libraries such as Pandas and NumPy.**
Inline resources	Please, refer to the slides of the course as well as to the official channel in Microsoft Teams.
Bibliography	Please, refer to the slides of the course.
Other infos	The main language of this course is English.
Faculty or entity in charge	CLSM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor : Business Engineering	INGM1BA	6	MINFO1201	🔍