UCLouvain

llsms2031
2022

Tools for Supply Chain Management Decisions

5.00 credits	30.0 h	Q1

Teacher(s)	Van Vyve Mathieu ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	This course is reserved for students with a bachelor's degree in business engineering or students with equivalent quantitative method skills.
Main themes	This course is aimed at providing an understanding of the structures behind supply chain optimization problems as well as an understanding of the methodological aspects of the corresponding solution techniques.
Learning outcomes	**At the end of this learning unit, the student is able to :**
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	During their programme, students of the LSM Master's in management and Master's in Business engineering will have developed the following capabilities : **KNOWLEDGE AND REASONING**
	• Master highly specific knowledge in one or two areas of management : advanced and current research-based knowledge and methods.
	A SCIENTIFIC AND SYSTEMATIC APPROACH
	• Conduct a clear, structured, analytical reasoning by applying, and eventually adapting, scientifically based conceptual frameworks and models,to define and analyze a problem.
	• Consider problems using a systemic and holistic approach : recognize the different aspects of the situation and their interactions in a dynamic process.
Evaluation methods	**1. Continuous assessment (by groups of 2 students)**
	• one homework about solving an integer optimization problems using different formulations (25% of the grade).
	• one presentation of a scientific article (25% of the grade);
	2. Written exam (50% of the grade)
Content	The course is an advanced course in mixed-integer linear programming, with a special emphasis on the distinction between problems, models and algorithms. The objectives of the course include:
	- to be familiar with the classical problems: knapsack problem, assignment problem, travelling salesman problem, facility location problemn lot-sizing problem, spanning tree problem etc...
	- to be able to distinguish between easy and hard problems (complexity theory)
	- to have an in-depth understanding on the functionning of modern MIP solvers and the branch-and-cut algorithms.
	- to understand the difference between weak and strong formulations
	- understand the main ideas of the advanced algorithms: lagrangean relaxation, cutting planes, extended formulations, column generation, decomposition.
	- understand the concepts of heuristics, approximations algorithms and meta-heuristics.
Inline resources	All slides are available on the Moodle of the course.
Bibliography	Integer Programming, L.A. Wolsey, Wiley; 2nd Edition.
Other infos	Prerequisites (ideally in terms of competencies) Introduction to operations management, production management and operations research. Basic knowledge of LP (simplex algorithm and duality), and MILP (branch and bound). Introduction to computer programming and algorithms. First course in linear algebra Evaluation : Homeworks (teams of two or three) and an oral exam in English with written preparation. Support Course slides and hand-outs. References : To be given during the classes. Corporate features : 1 case study Skills : 1 writing skills 1 team work 1 problem solving 1 decision making 1 critical thinking Techniques and tools for teaching and learning : 1 IT tools 1 modelling 1 quantitative methods 1 mathematics

Faculty or entity in charge	CLSM

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