UCLouvain

llsms2031

2017

Tools for Supply Chain Management Decisions (in English)

5 credits	30.0 h	Q1

Teacher(s)	Van Vyve Mathieu ;
Language :	English
Place of the course	Louvain-la-Neuve
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.
Aims	**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. 1 **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. - - - - *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".*
Evaluation methods	**1. Continuous assessment** • Date and type of assessment (work, test, other): ... Work to be handed in for Nov 30, 2017 • Date and type of evaluation: Presentation 21-22 Dec 2017 **2. Review during Evaluation Week** • Q1: Monday 6 Nov. to Fri. 10 Nov. 17; • Q2: from Monday 19 March to Fri. 23 March 17 **3. Examination in session of examinations:** • January: Jan. 5-26, 2018 • June: 4 to 29 June 2018 Oral: No Written: yes Number of hours: 3h.
Content	The course starts with an in depth revision of the revised simplex algorithm, because it provides the computational and modeling paradigm allowing one to model and solve (sometimes using so-called decomposition methods) large scale models involving many variables. In particular, the column generation approach, which is frequently used in solving large scale problems by decomposition, is illustrated on the cutting stock problem, a classical production planning problem. Production planning are approached from a practical computational perspective. Formulated as MIP problem, they can be very difficult to solve and thereby require to maintain a certain level of aggregation. Branch and bound improvement techniques such as constraint (Branch and cut) and column (Branch and price) generation are considered. Content STRUCTURAL ASPECTS AND METHODS. Convexity. Minkowski polyhedral representation. Duality. From linear programming to convex programming. The revised simplex algorithm as a computational paradigm. Complexity of algorithms. Mixed integer programming. CUTTING STOCK AND BIN PACKING PROBLEMS. Coping with the combinatorial explosion of patterns. Column generation techniques and the related knapsack problem. Extensions of the cutting stock problem. . DECOMPOSITION APPROACHES AND DECENTRALIZATION. Handling the multidivisional model by a decomposition approach : solving repeatedly a series of divisional problems and a coordination one (the decomposition approach). Getting insight from decomposition for decentralization purposes. SUPPLY CHAIN PLANNING. LP and MIP formulations for production planning and scheduling problems. Approximate solutions of MIP problems. Improvement of the Branch and Bound approach by cutting plane and column generation. Methods : In-class activities 1Lectures 1 Exercices/PT 1 Problem based learning At home activities : 1 Readings to prepare the lecture 1 Exercices to prepare the lecture

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	Aims
Master [120] in Business Engineering	INGE2M	5		
Master [120] in Business Engineering	INGM2M	5		