UCL Université catholique de Louvain

LINMA2491

2013-2014

Operational Research

5.0 credits	30.0 h + 22.5 h	2q

Teacher(s) :	Papavasiliou Anthony ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=LINMA2491
Prerequisites :	LINMA1702 (Optimisation methods and models I)
Main themes :	-- Mathematical background (duality, KKT optimality conditions, monotone operators) -- Mathematical programming models and languages -- Applications: finance, logistics, risk management, energy
Aims :	In reference to the AA standard, this course contributes to the development, acquisition and evaluation of the following learning outcomes: -- AA1.1, AA1.2, AA1.3 -- AA2.2, AA2.5 More specifically, at the end of the course students will be able to: -- Use mathematical programming models in order to formulate decision-making problems under uncertainty and develop algorithms for solving these models Acquired learning: -- Implement decomposition algorithms for solving large-scale optimization problems in two mathematical programming languages: AMPL and/or Mosel -- Identify and implement the most appropriate solution algorithms for specific classes of optimization problems under uncertainty that arise in finance, energy and logistics *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 :	-- Written or oral exam, depending on the size of the class -- Course project and/or homework assignments (to be determined)
Teaching methods :	2 hours of magistral courses per week, and 2 hours of training sections per week. Homeworks and term projects will be evaluated by the instructor and/or the teaching assistant.
Content :	-- Stochastic programming models -- Value of perfect information and the value of the stochastic solution -- The L-shaped method in two and multiple stages -- Multi-cut L-shaped algorithm -- Stochastic dual dynamic programming -- Scenario selection and importance sampling -- Lagrangian relaxation -- Stochastic integer programming

	-- Monotone operators, proximal point algorithms and progressive hedging
Bibliography :	-- Course notes -- Printouts from textbooks or archived journals will be provided during lectures. The following textbook will be followed closely for most of the course: John Birge, Francois Louveaux, "Introduction to Stochastic Programming"
Cycle and year of study :	> Master [120] in Mathematical Engineering
Faculty or entity in charge:	MAP