UCLouvain

linma2415

2020

Quantitative Energy Economics

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 22.5 h	Q2

Teacher(s)	De Maere d'Aertrycke Gauthier (compensates Papavasiliou Anthony) ;Papavasiliou Anthony ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	• Electricity market design • Modeling of energy markets • Operations research applications in energy markets • Contemporary problems (renewable energy integration, demand response integration, capacity investment and risk management)
Aims	With reference to the AA (Acquis d'Apprentissage) reference, this course contributes to the acquisition of the following learning outcomes: • AA1.1, AA1.2, AA1.3 • AA2.2, AA2.5 At the end of the course, students will have learned to: 1 • explain the architecture of energy markets, ranging from real-time to forward markets • formulate mathematical programming models that describe energy markets and regulatory interventions in these markets • formulate mathematical programming models that describe risk management practices in the energy sector • implement mathematical programming models that describe energy markets and risk management practices using AMPL • provide economic interpretations to the results of mathematical programming models for energy markets - - - - *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	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Written and/or oral exam | Regular assignments
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** 2 hours lecture per week and 2 hours working exercies. Assignements will be evaluated by the teacher or the teaching assistant.
Content	• Place of energy system in the economy, energy mix and public objectives of decarbonization : solutions and challenges • Organisation and modelisation of electricity market : production, transmission, investissement • Social cost of carbon. Organisation and modelisation of CO2 emission market. Introduction to general equilibrium model. • Economic : Corporate finance and computation of investment financing . Economic Equilibrium theory (perfect and imperfect competition) Impact of externalities, Risk quantification, coalition theory and stability • Mathematics: Optimisation/Duality (complementarity conditions), Nash equilibrium, Convex hull
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=5003
Bibliography	• Impressions de manuels ou articles fournis au cours. Quelques lectures qui pourraient être utiles en tant que support : Steven S. Stoft, "Power System Economics" / Daniel S. Kirschen, Goran Strbac, "Power System Economics"
Other infos	None

Faculty or entity in charge	MAP

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Mathematical Engineering	MAP2M	5		