linma2470
2017

Stochastic modelling

5 credits	30.0 h + 22.5 h	Q2

Teacher(s)	Chevalier Philippe ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Introduction to stochastic models in operations research. Study of renewal processes, Markov chains, Markov Processes, Markov Decision Processes. Applications to inventory models, queuing models, branching processes, random walks, etc.
Aims	*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	Students will be evaluated through a written exam based on the objectives of the course. The exam consists in exercices applying the concepts viewed in the course. Many examples of questions of previous exams are solved during the exercice sessions. The students will have to build a simulation model in order to analyse and understand the behavior of a congested stochastic system. This assignment is done in groups.
Teaching methods	The course consists in weekly lectures and 11 exercice sessions. One of the courses will be devoted to the student presentations of their simulation projects and another session will host a practioner to present a real world application of the course contents.
Content	• Poisson processes and their properties • Markov chains with a finite number of states • Renewal processes and stopping rules • Markov chains with an infinite number of states • The notion of reveribility • Markov processes • Birth and death processes • Queueing theory and networks of queues • Fluid models for queues • Various applications, such as inventory management, replacement, reliability and job shop modeling.
Inline resources	http://icampus.uclouvain.be/claroline/course/index.php?cid=INMA2470
Bibliography	Lecture recommandée : livre "Stochastic Processes: Theory for applications" de R. Gallagher, 2013, disponible en ligne : http://www.rle.mit.edu/rgallager/notes.htm
Faculty or entity in charge	MAP

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Data Science Engineering	DATE2M	5		🔍
Master [120] in Mathematical Engineering	MAP2M	5		🔍
Master [120] in Computer Science and Engineering	INFO2M	5		🔍
Master [120] in Computer Science	SINF2M	5		🔍
Master [120] in data Science: Information technology	DATI2M	5		🔍