UCLouvain

lgeo2130

2017

Geographic modelling

5 crédits	30.0 h + 30.0 h	Q2

Enseignants	Deleersnijder Eric ;Vanwambeke Sophie ;
Langue d'enseignement	Anglais
Lieu du cours	Louvain-la-Neuve
Préalables	Elementary calculus and statistics
Thèmes abordés	At the end of this course, the students will be able to: · Identify and characterize a model and understand the mathematics of a process-based model; · Translate a physical, environmental and/or spatial process into mathematical language; · Grasp all steps of a modelling process, from the statement of a question to the validation of results; · Start engaging with professionals of environmental modelling and management in various settings. Contribution to the acquisition and evaluation of the following learning outcomes of the programme in geography (general and climatology): · AA 1.1, AA 1.2, AA 1.4, AA 1.6, and particularly AA.1.7 and AA 1.8 · AA 3.3, AA 3.4 · AA 4.1, AA 4.2 · AA 5.5 · AA 6.1, 6.2 Most importantly, these learning outcomes are central to this course: · AA 4.3, AA 4.4, AA 4.5
Acquis d'apprentissage	*La contribution de cette UE au développement et à la maîtrise des compétences et acquis du (des) programme(s) est accessible à la fin de cette fiche, dans la partie « Programmes/formations proposant cette unité d'enseignement (UE) ».*
Modes d'évaluation des acquis des étudiants	Homeworks and practical reports; written exam.
Méthodes d'enseignement	Classroom lectures and practical sessions, involving active learning methods. All lectures are in English. The course material and practical notes are in English and French "
Contenu	The course includes two parts. The first half focuses on differential models. The second half looks into spatial modelling and modelling practice. The course starts by a general introduction on modelling. The following topics are dealt with: · How to model? The various steps of modelling; · Typology of models; · Differential models: linear ordinary differential problems (e.g. first order decay); · Differential models: non-linear ordinary differential problems (e.g. population modelling, prey-predator populations, epidemiological model); · Differential models: space-time dependency; · Spatial models: making space explicit, self-organising systems (e.g. epidemic diffusion, erosion processes); · Spatial models: interacting, spatially-explicit objects: agent-based models (e.g. land use change) How to model? Model validation.
Ressources en ligne	Slides, lecture notes and additional reading material on Moodle (https://moodleucl.uclouvain.be/?lang=en)
Bibliographie	Although none of them is mandatory reading, the following books are useful sources of information: Mulligan M., Wainwright J., 2004, Modelling and model building, In: Environmental modelling. Finding Simplicity in Complexity, Wainwright J., Mulligan M. (eds.). Chichester: Wiley. Smith J., Smith P., 2007, Environmental modelling. An Introduction. Oxford: Oxford University Press Kot M; 2001, Elements of Mathematical Ecology, Cambridge University Press

Faculté ou entité en charge:	GEOG

Programmes / formations proposant cette unité d'enseignement (UE)

Intitulé du programme	Sigle	Crédits	Prérequis	Acquis d'apprentissage
Master [120] : bioingénieur en gestion des forêts et des espaces naturels	BIRF2M	5		
Master [120] : bioingénieur en sciences agronomiques	BIRA2M	5		
Master [60] en sciences géographiques, orientation générale	GEOG2M1	5		
Master [120] : bioingénieur en chimie et bioindustries	BIRC2M	5		
Master [120] en sciences géographiques, orientation générale	GEOG2M	5		
Master [120] : bioingénieur en sciences et technologies de l'environnement	BIRE2M	5		
Master [120] en sciences agronomiques et industries du vivant	SAIV2M	5		