UCLouvain

lgeo2130

2021

Fundamentals of geographic and environmental modelling

5.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Deleersnijder Eric ;Vanwambeke Sophie ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	Elementary calculus and statistics
Main themes	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
Learning outcomes	
Evaluation methods	The course is evaluated continuously through various assignments associated to practicals and a written/oral exam. The continuous evaluation is worth 60% of the final marks and the exam 40%.
Teaching methods	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.
Content	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.
Inline resources	Slides, lecture notes and additional reading material on Moodle.
Other infos	Prerequisites LGEO1342 - Geographical Information Systems (or similar); LGEO1341 - Statistical modelling (or similar); Mathematics (or similar)
Faculty or entity in charge	GEOG

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Geography : General	GEOG2M	5		
Master [60] in Geography : General	GEOG2M1	5		
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] in Agriculture and Bio-industries	SAIV2M	5		