UCLouvain

lneea2220

2026

Water-food Nexus : modeling and analysis

4.00 credits	22.5 h + 22.5 h	Q2

Teacher(s)	Javaux Mathieu (coordinator) ;Vanclooster Marnik ;
Language :	French
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	The students implement a mini-project related to their home watershed
Teaching methods	Theoretical course: lectures in the auditorium, supported by video clips. Exercise part: Exercises in the computer room, using open source software (Python, GEE, QGIS-SWAT, WEAP, AquaCrop ...)
Content	Part 1: Principles of environmental modeling. - What is a model: definition and modeling of a system, the definition of a model, scientific modeling stage. - Environmental models: typology of models, characteristics associated with models (spatial and temporal resolution, etc). - Calibration and validation of models, sensitivity analysis, uncertainties. - Ex-ante and ex-post simulation. - Optimisation. Part 2: Application of modeling to water management and food production. - Yield prediction model based on water availability (e.g. AquaCrop) - Water allocation model (e.g. WEAP) For both types of models, the student will be required to: - Understand the structure of the model and its limitations. - Parameterise the models using generic data (climate databases, remote sensing, etc.). - Use the model to carry out ex-ante simulations, applied to a context of southern countries, taking into account different possible evolution scenarios (climate, population, food demand). Part 3: Decision-making in complex problems. - Multi-criteria analysis methods. - Application to modelling results.
Inline resources	- Presentations on Moodle platform - Manual of reference software
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Advanced Master in Water-Energy-Food Nexus	NEEA2MC	4		🔍