UCL Université catholique de Louvain

LBRES2204

2014-2015

Integrated water management of water resources

5.0 credits	30.0 h + 22.5 h	1q

Teacher(s) :	Cogels Olivier ; Vanclooster Marnik (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus
Prerequisites :	Probability and statistics Basic modelling course. Basic computer programming course.
Main themes :	The main objective of the course is to train students in the understanding of the challenges and the use of advanced methodologies for integrated water resources management. The topics that are covered are : - Concepts and challenges of integrated water resources management at different scales (local scale, watershed, country, region, international river basin, global). - Strategic, political and institutional aspects of integrated management of water resources. Introduction in current water policies (eg water policy for sustainable development) - Analytical tools for water management. Modelling of large water resources systems (watersheds, reservoirs, perimeter, groundwater body) including technical, economic and social aspects. Implementation. Planning, optimization and evaluation of large water systems. Information systems. Decision making and integrated management of water resources.
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) M2.2 ; M2.3 ; M2.4 ; M2.5 b. Formulation spécifique pour cette activité des AA du programme (maximum 10) After the course, students should be able: - to explain the concept of integrated water resources management (IWRM); - to explain the political, institutional , legal and policy issues associated with integrated water resources management; - to develop policies, strategies and programs for sustainable development of water resources; - to illustrate the international cooperation programs in the field of IWRM in international river basins (eg the Mekong, the Nile ...); - to model a hydro- system, while considering the random nature of the flow ; - to apply optimization methods (dynamic programming, Lagrangian multipliers, linear programming, ...) in simple IWRM planning problems; - to compare the performance of a hydro- system with multiple criteria and objectives formulated by different actors; - to develop a methodology to implement policies, strategies and IWRM programs *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 :	Oral examinationwith written preparation. Evaluation criteria: quality of response to questions Report on practical work: Evaluation criteria: quality of the response to the statements, quality of presentation
Teaching methods :	Lectures and workshop (Exercises in computer room) Guided reading of the reference work.
Content :	Part I : Strategic, political and institutional issues of water management - Status of freshwater resources at global and regional scale. - Status of current practices and future needs for freshwater management at the global and regional scale. - Status of water infrastructure and investment needs. - Issues and challenges for the 21st century. - Principles of Integrated Water Resources Management (IWRM) - Institutional, political and legal aspects of water management. - Development of strategies and programs for IWRM. - International cooperation in water management. Examples of cooperation for the management of water resources: the Mekong and the Nile basin. Part II : Tools for modeling and optimization - Aspects of hydrosystem modeling.

	- Economic engineering applied to water resources system analysis. - Programming methods, planning and optimization. Lagrangian multipliers . Linear programming. Dynamic programming. - Stochastic aspects . Uncertainty analysis and sensitivity analysis. Stochastic dynamic programming. - Performance analysis. Multi-criteria analysis and integrated water resources.
Bibliography :	Slights are available on iCampus. Reference work : D. Loucks and E. Van Beek: Water Resources System Planning and Management: An introduction to methods, models and applications. UNESCO, 2005. A manual is available for the practical work.
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering > Master [120] in Civil Engineering > Advanced Master in Water Resources
Faculty or entity in charge:	AGRO