

4.00 credits

20.0 h + 15.0 h

Q1

Teacher(s)	Soares Frazao Sandra ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Basic knowledge of probability and statistics, as taught in LFSAB1105, as well as some prior knowledge in hydrology (but not mandatory, as the essential elements are recalled)
Main themes	<ul style="list-style-type: none"> • Determination of design floods • Management and operation of reservoirs and floodplains • Simplified flood propagation modelling • Introduction to the problematics of droughts
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>Contribution to the acquisition and evaluation of the following learning outcomes of the programme in civil engineering: AA1.1, AA1.2, AA1.3, AA2.1, AA2.2, AA2.3, AA2.4, AA2.5, AA3.1, AA3.3, AA5.2, AA5.3, AA5.5, AA5.6, AA6.2.</p> <p>More specifically, at the end of the course, the student will be able to:</p> <ul style="list-style-type: none"> • Determine the extreme discharges for the design of spilling systems and flood mitigation plans; • Design flood retention reservoirs; 1 • Model the propagation of floods in a simplified way; • Determine the characteristics of drought events <p>Transversal learning outcomes:</p> <ul style="list-style-type: none"> • Links with events occurring in the world and critical assessment of those; • Water resource management; • Link technical and social aspects of flood mitigation planning
Evaluation methods	<p>The evaluation takes place in two parts:</p> <ul style="list-style-type: none"> • Continuous evaluation (60%) through regular assignments on the different topics of the course. Each assignment leads to a report or a presentation that is discussed with the professor during the exam session. • An oral examination (40%) about the theoretical concepts taught in the course.
Teaching methods	Lectures for the theory and practical applications of the course topics on real cases through homeworks or projects. The course is given in the classroom or online, depending on the number of registered students.
Content	<ol style="list-style-type: none"> 1. The question of floods and inundations <ul style="list-style-type: none"> • Origin of floods • Natural and man-inducing causes 2. Pre-determination of flood discharges <ul style="list-style-type: none"> • Empirical methods (historical methods, or based on the watershed dimensions) • Statistical methods (extreme value distributions) • Gradex method: rainfall-discharge relation for extreme rainfalls 3. Flood control <ul style="list-style-type: none"> • Retention reservoirs and flood attenuation • Reservoir exploitation: flow mass curve, stochastic simulation (Fiering) • Reservoir sedimentation • Flood control for hydropower reservoirs 4. Flood protection measures <ul style="list-style-type: none"> • Watershed • Floodplains 5. Flood propagation

	<ul style="list-style-type: none">• Hydrological methods (Muskingum)• Methods of cells
Inline resources	Moodle site for the course, with lecture slides and notes, and other useful documents.
Bibliography	
Faculty or entity in charge	GC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	4		