



3.00 credits

20.0 h

Q2

Teacher(s)	Soares Frazao Sandra ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Basic knowledge of fluid mechanics as taught in LGCIV1051 or LMECA1321
Main themes	<ul style="list-style-type: none"> • Hydropower in the global context of energy • Identification of exploitable sites • Principles of hydraulic machinery and pre-design of turbines • Hydraulic transients and surge tanks • Local production and use of hydropower in developing countries
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: AA1.2, AA1.3, AA2.1, AA2.2, AA4.1</p> <p>More specifically, at the end of the course, the student will be able to:</p> <ol style="list-style-type: none"> 1 <ul style="list-style-type: none"> • Identify and characterize exploitable sites • Design a multipurpose installation • Design penstocks and surge tanks • Understand the choice of the turbines and their consequences <p>Transversal learning outcomes: discuss the question of energy, and in particular renewable energy, in the world</p>
Evaluation methods	Oral examination based on a list of question provided on Moodle
Teaching methods	Ex-cathedra teaching with examples of practical cases
Content	<p>The course addresses technical issues related to the design of hydroelectric production units while discussing the various impacts related to the SDGs, in particular Goal 7 "Affordable and clean energy".</p> <ol style="list-style-type: none"> 1. Hydropower in the world : past, present and future <ul style="list-style-type: none"> • Advantages and disadvantages of hydropower, environmental impacts • Selection criteria for exploitable sites • Definition of the potential of a given site • Geological and hydrogeological context 2. Hydraulics and and hydropower : <ul style="list-style-type: none"> • Fundamental notions : energy, efficiency, momentum • Headlosses in the hydraulic circuit • Water hammer and penstocks • Surge tanks 3. Hydraulic turbines : <ul style="list-style-type: none"> • Classification and general design • Similitude and specific turbine • General design of a hydropower plant 4. Alternator and power regulation 5. Micro-hydropower, hydropower in developing countries 6. Economical aspects
Inline resources	Available on Moodle

Faculty or entity in charge	GC
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Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	3		
Master [120] in Architecture and Engineering	ARCH2M	3		
Master [120] in Energy Engineering	NRGY2M	3		