lgciv2052
2022

Hydropower plants

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	• 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	**At the end of this learning unit, the student is able to :** 1 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 More specifically, at the end of the course, the student will be able to: • Identify and characterize exploitable sites • Design a multipurpose installation • Design penstocks and surge tanks • Understand the choice of the turbines and their consequences Transversal learning outcomes: discuss the question of energy, and in particular renewable energy, in the world
Evaluation methods	Oral examination based on a list of question provided on Moodle
Teaching methods	Ex-cathedra teaching with examples of practical cases
Content	1. Hydropower in the world : past, present and future • Selection criteria for exploitable sites • Definiton of the potential of a given site • Geological and hydrogeological context 2. Hydraulics and and hydropower : • Fundamental notions : energy, efficiency, momentum • Headlosses in the hydraulic circuit • Water hammer and penstocks • Surge tanks 3. Hydraulic turbines : • 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

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		🔍