UCL Université catholique de Louvain

LBRES2206

2010-2011

Material resistance and earth-made constructions

5.0 credits	30.0 h + 22.5 h	1q

Teacher(s) :	Lambot Sébastien ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	- Fundamentals of strength of materials and elasticity : stresses in materials, Mohr's circle, deformations (Hooke's law, elastic beam deflection, Castigliano's theorem), tensile stress, compressive stress, shear stress, bending, torque, effort diagrams, hyperstaticity, designing principles, security coefficient. - Calculation of structures : support reactive forces, stresses in bars, solving isostatic structures (matrix method, Crémona's method, section method), solving hyperstatic structures, the clipping method, displacements of nodes, instability. - Assembly principles in metallic construction : calculation of screws, calculations of welds. - Rebar concrete technology : concrete constituents, physical and mechanical characteristics, design of beams and tiles in rebar concrete, design of longitudinal and transversal armatures, rectangular and T sections. - Fundamentals of soil mechanics for the design of retaining walls and earth dams : stresses in the soil, resistance to shearing, the breaking criterion of Mohr-Coulomb, deformation (compressive stress, consolidation and collapse) - Fundamentals of soil mechanics for computing soil compaction, settlements and their dynamics, and foundations: the consolidation process, methods of settlement prediction, rate of settlement analysis.
Aims :	After this course, the student should be able to: - master the fundamental theory of strength of materials and their mechanical behavior such as stress, deformation, strain and stress-strain relations - calculate isostatic et hyperstatic structures - master the basics of assembly in metallic structures (screwing and welding) - design tiles and beams with rectangular and T sections in rebar reinforced concrete - understand the fundamental theory of soil mechanics to design retaining walls and earth dams - calculate soil compaction and settlements, and rates of settlement, under structures of various shapes and sizes. - capable of performing basic analytical procedures in these situations to obtain the engineering quantity desired given the formuli, tables, and the soil properties and understand their limitations. *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".*
Other infos :	Required Knowledge : - Soil Physics
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO