

Faculty of Biological, Agronomic and Environmental Engineering

BRES2205 Clay and solid constructions

[22.5h+22.5h exercises] 4 credits

This course is taught in the 2nd semester

Teacher(s): Sébastien Lambot
Language: French
Level: Second cycle

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
- compute 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
- master the fundamental theory of soil mechanics to design retaining walls and earth dams

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, Crémone'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)

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Required Knowledge :
 - Soil Physics

Other credits in programs

BIR23/7A	Troisième année du programme conduisant au grade de bio-ingénieur : Sciences agronomiques (Ressources en eau et en sol)	(4 credits)
BIR23/7E	Troisième année du programme conduisant au grade de bio-ingénieur : Sciences et technologie de l'environnement (Ressources en eau et en sol)	(4 credits)