

Faculty of Applied Sciences



AMCO2183 Mechanic of structures

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Jean-François Remacle
Language: French
Level: Second cycle

Aims

Given the precept of structure modeling (linear elasticity and static analysis)

Main themes

- Analysis of various classes of elastic structures
- Static finite element analysis of structures, including elastic stability
- Introduction to finite element softwares

Content and teaching methods

- Structures
 - * presentation and identification of different classes of structures
- Modelling of elastic structures
 - * one dimensional structures : beams, bars, rods, arcs
 - * deformations due to shear strains: the Timoshenko beam
 - * plane stress and plane strain states, membranes
 - * thin plates (Kirchoff model)
 - * thick plates (Reissner-Mindlin model)
 - * thin shells
- Finite Elements for Structures
 - * introduction to the calculus of variations
 - * variational principles in elasticity, energy principles, Cea's lemma, Hypercircle of Prager and Synge
 - * finite element models for different classes of structures
 - * special issues: shear locking, patch test, thin plates and C1 continuity, boundary conditions
 - * numerical implementation using MATLAB
- Numerical softwares
 - * principles, functionalities
 - * pre and post-processing, mesh generation
 - * validation and verification, error estimation
 - * applications

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

Naught

Other credits in programs

ARCH22	Deuxième année du programme conduisant au grade d'ingénieur civil architecte	(5 credits)	Mandatory
ARCH23	Troisième année du programme conduisant au grade d'ingénieur civil architecte	(5 credits)	
FSA3DS/GC	Diplôme d'études spécialisées en sciences appliquées (génie civil)	(5 credits)	
GC22	Deuxième année du programme conduisant au grade d'ingénieur civil des constructions	(5 credits)	Mandatory
GC23	Troisième année du programme conduisant au grade d'ingénieur civil des constructions	(5 credits)	
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	
MECA23	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	