UCL Faculté des sciences appliquées

FSA

AMCO2183 Mécanique des structures

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Jean-François Remacle
Language: french
Level: 2nd cycle course

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
* pane 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 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)	
GC22	Deuxième année du programme conduisant au grade d'ingénieur civil des constructions	(5 credits)	Mandatory
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)	