Advanced computational structural mechanics

Lecturer
Thierry MASSART (Coordinator)

Course mnemonic
CNST-H528

ECTS credits
4 credits

Language(s) of instruction
English

Course period
First term

Course content

A different topic will be considered in each year's course

Specific finite elements formulations (shells, incompressible materials, ...)

Optimisation methods in structural mechanics

Structural dynamics & Vibrations

Homogenisation and multi-scale methods

Objectives (and/or specific learning outcomes)

Apply computational methodologies to solve practical structural mechanics problems

Translate a structural mechanics problems into a computational model using proper assumptions

Select the proper computational approach for a given problem

Use commercial finite element packages to solve structural mechanics problems

Specific finite elements formulations (shells, incompressible materials, ...)

Design and optimization methods in structural mechanics

Structural dynamics and vibrations

Teaching method and learning activities

Lectures will be used to introduce the basic concept of the course theme

Exercises consist of projects inspired from real-life industrial problems, and will result in a written report for the assigned problems.

Contribution to the teaching profile

This teaching unit contributes to the following competences:

- In-depth knowledge and understanding of integrated structural design methods in the framework of a global design strategy
- In-depth knowledge and understanding of the advanced methods and theories to schematize and model complex problems or processes
- Reformulate complex engineering problems in order to solve them (simplifying assumptions, reducing complexity)
- Correctly report on research or design results in the form of a technical report or in the form of a scientific paper
- Present and defend results in a scientifically sound way, using contemporary communication tools, for a national as well as for an international professional or lay audience
- Think critically about and evaluate projects, systems and processes, particularly when based on incomplete, contradictory and/or redundant information
- A critical attitude towards one's own results and those of others
- The flexibility and adaptability to work in an international and/or intercultural context
- Combine computational modelling methods and experimental techniques to tackle complex structural and material analysis problems
- Integrate advanced modelling tools for the design of complex structures in civil engineering

Other information

Contact(s)

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Evaluation method(s)

Other

Evaluation method(s) (additional information)

Oral Defense of the report given concerning the exercises

Determination of the mark (including the weighting of partial marks)

The evaluation is based on the defense of the report, including justification of the modelling options chosen in relation with the information given during the course.

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the Brussels School of Engineering

MA-IREM | Master of science in Electromechanical Engineering | finalité Professional/unit 2