Optimization of structures

ECTS credits
2 credits

Semester
Fall

In brief

> **Course langage:** French

Presentation

Prerequisites

None

Learning objectives

• Acquire the theoretical bases necessary for the formulation of an optimization problem in structural mechanics
• Know and know how to implement the main classes of design problems
  -- through simple and academic examples;
  -- through a number of industrial applications by learning a professional optimization software (OptiStruct).
• Discover the methods being developed in the field of optimization

Description of the programme

• Issues in structure optimization
• The main classes of problems
• Introduction to the basic theoretical notions of differentiable optimization in finite dimension and to the algorithmic principles of numerical optimization
• Introduction to optimal control
• Parametric optimization
• Geometric optimization
• Topological optimization (SIMP, homogenization, penalization)
• Handling and parameterization of an industrial code (OptiStruct)

• Other methods (level lines, genetic algorithms...) and new trends

Generic central skills and knowledge targeted in the discipline

• Know how to formulate an optimization problem
• Know how to choose and implement the appropriate algorithm
• Know how to use and parameterize a calculation software for an optimization
• Know how to analyze and criticize the results of the calculation

How knowledge is tested

• CC1: MCQ (33%)
• CC2: Report on FreeFEM practical work (33%)
• CC3: Report on OptiStruct practical work (34%)

Bibliography

Course materials in PDF

Teaching team

Jean-Marie Rossi

Sustainable Development Goal

Responsible consumption and production

Total des heures		**24h**
CM	Master class	16h
TP	Practical work	8h

Useful info

Name responsible for EU

Lead Instructor

Jean-Marie Rossi

✉ jean-marie.rossi@centrale-med.fr