

# **Optimization of structures**



#### 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)



#### **Optimization of structures**

· 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**

| CM | Master class   | 16h |
|----|----------------|-----|
| TP | Practical work | 8h  |

# Useful info

| Practical work |  |  |
|----------------|--|--|
|                |  |  |

24h



## Name responsible for EU

#### Lead Instructor

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