INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT GENIE CIVIL ET URBANISME
CIVIL ENGINEERING AND URBANISM
INSA Campus LyonTech - 8 rue des Sports
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Mechanical Design

Structural design and modeling project

IDENTIFICATION

CODE : GCU-3-S2-EC-PMS
ECTS : 2.0

HOURS

Lectures :	0.0 h
Seminars :	0.0 h
Laboratory :	22.0 h
Project :	0.0 h
Teacher-student contact :	22.0 h
Personal work :	26.0 h
Total :	48.0 h

ASSESSMENT METHOD

- Progress reports
- Synthesis report and oral presentation

TEACHING AIDS

- computation software based on finite element method
- video records of the failure tests

TEACHING LANGUAGE

French

CONTACT

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AIMS

This module is part of the course unit : GCU-S6-STRUCT-2 and contributes to::

Competences in Engineering Science:
A1- Analyze a real or virtual system (or problem)
A2- Operate a model of a real or virtual system
A3- Implement an experimental approach
A4- Design a system that meets specifications
A5- Process data
A6- Communicate a scientific analysis or approach

Competences in Humanities, Documentation and Physical and Sports Education:
B2- Work, learn, progress autonomously
B3- Interact with others, work as a team
B4- Demonstrate creativity, innovate and undertake

Competences specific to the specialty:
C7- Building structure (design, dimension and control a¿)
C8- Civil Engineering Structures (design, dimension and control a¿)

Allows the student to work and be evaluated on the following abilities:
design and build a physical model of a bridge from a set of specifications
modelize by the finite element method to estimate its stiffness and understand how it works
interpret and analyze the results of the experimental failure test
work on a team to imagine, design, carry out, analyze and communicate your results

CONTENT

Design and construction of wood bridge specimens during the immersion week: intuitive design according to imposed specifications - realisation (by group of students).

Failure tests on wood bridge specimens with structural rigidity measure as well as strength of the specimen ; calculus of a structural performance index.
Characterisation tests for mechanical characteristics of employed materials: wood and cord.

Three successive modelling supported by theoretical curses in structural analysis methods: finite element modelling for bar and beam systems.

Synthesis allows a confrontation between experimental and numerical approaches as well as a feed-back on the intuitive initial design.

PRE-REQUISITE

Continuum solid mechanics (GCU-S5-MMC)
Structural analysis methods (GCU-S5-IAS-1)
Structures analysis methods(GCU-S6-MAS-1)