



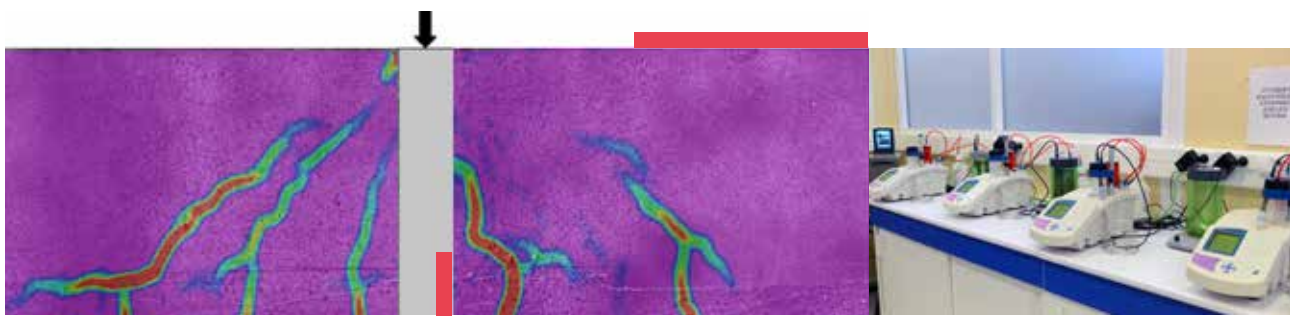
**Master**  
Civil Engineering

## MATERIALS & STRUCTURES IN THEIR ENVIRONMENT

### OBJECTIVES

This programme aims to develop scientific and technological knowledge on materials and structures in both the academic and R&D sectors. It is characterized by a high degree of scientific specialisation.

The master programme focuses on the following specialised areas: numerical modelling, constitutive laws, structural reliability, advanced experimental techniques, durability, modern concrete, geomechanics and earthquake engineering.



### SKILLS

#### Specialism-specific

- > Organize and carry out research work to understand a physical phenomenon or a new problem in civil engineering
- > Organize, complete and validate an engineering approach to address a specific problem

#### General

- > Act with professionalism, be rigorous and autonomous
- > Identify models, perform simulation and analyse results
- > Communicate comprehensive results in a meaningful way
- > Undertake bibliographic surveys from international research and professional literature
- > Manage or participate to a project

### JOB PROSPECTS & FURTHER PHD STUDIES

**SECTOR:** Civil Engineering.

**FIELDS:** Research and development.

**JOB POSITIONS:** Research and Innovation Engineer (post PhD).





**Location**  
Nantes, France -2 hours from Paris

**International campus life**

**87** nationalities  
**43%** international students



Master in Sciences, Technologies and Health

## EXAMPLES OF FINAL YEAR PROJECTS

### 5 to 6 month internship in Industry

- > Study of the deformation and temperature of cementitious materials by 3D instrumentation

### 5 to 6 month thesis in Research Labs

- > Poro-mechanical modelling of soil and rock erosion
- > Dynamic effect of capillary pressure on drying / wetting of cementitious materials
- > Analysis and modelling of stochastic degradation fields on the Île de Ré bridge: impact of uncertainties on the diagnosis
- > Soil Structure Interactions in earthquake engineering

## FACULTY, INDUSTRIAL PARTNERS AND RESEARCH LABS

### Laboratories

Courses are mainly given by researchers of the Institut de recherche en Génie civil et Mécanique (GeM, Centrale Nantes, University of Nantes, CNRS) and the Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux (IFSTTAR, Nantes). The supporting research institutes have extensive experimental test facilities for static and dynamic characterisation of materials and structures and a high tech computational centre.

### International collaboration

Université Libre de Bruxelles (Belgium), Université de Liège (Belgium), Tongji University (China), Cyprus University of Technology (Cyprus), Università degli Studi di Perugia (Italy), Alliance of Laboratories in Europe for Research and Technology (ALERT).

## OTHER PROGRAMME INFORMATION

- > Length of Studies: 2 years
- > Language of instruction: English
- > 3 semesters of courses and 1 semester of Master's thesis

### Tuition & Fees - Scholarships - Application process - Deadlines

**MORE INFORMATION AND FULL PROGRAMME:**  
[www.ec-nantes.fr/masters](http://www.ec-nantes.fr/masters)

**CONTACT:** [master.admission@ec-nantes.fr](mailto:master.admission@ec-nantes.fr)

## CONTENT AND COURSES

(A Master Degree requires the validation of 120 ECTS credits)

M1 - AUTUMN SEMESTER	ECTS
Continuum Mechanics	5
Fluid Mechanics 1	5
Algorithmics for Engineering Modelling	4
Numerical Methods	4
Vibration and Differential Equations	4
Business Environment	4
Modern Languages	4
M1 - SPRING SEMESTER	ECTS
Physical modeling	4
Constitutive Laws	5
Imaging in civil engineering	5
Geotechnical Engineering	5
Concrete and structures	5
Conferences and Initiation to Research	2
Modern Languages	4
M2 - AUTUMN SEMESTER	ECTS
Numerical Analysis	4
Mechanics of Porous Media	4
Statistics of materials and structural reliability	4
Project	2
Modern Languages	4
TRACK 1 COURSES	
Homogenization Methods in Heterogenous Media	4
Design and Behaviour of Modern Concrete	4
Durability and structural maintenance	4
TRACK 2 COURSES	
Theory of Structures	4
Earthquake Engineering	4
Large Infrastructure in Energy and Transport	4
M2 - SPRING SEMESTER	ECTS
Master Thesis or Industrial Internship	30

NB Course content may be subject to minor changes

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