



Master of Science (MSc)
Civil Engineering

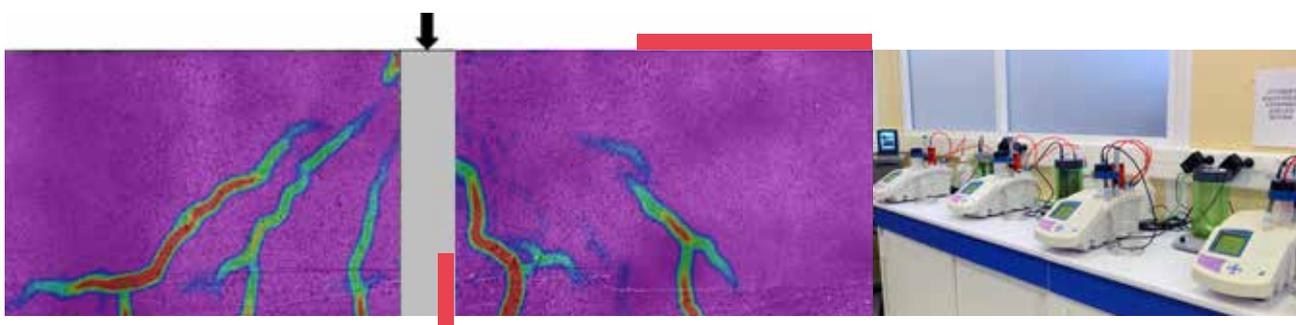
MATERIALS & STRUCTURES IN THEIR ENVIRONMENT

OBJECTIVES

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

Students applying for this MSc programme can also apply to join the Integrated Master-PhD Track, which brings together the two years of the Master's degree and three years of PhD studies.



Graduate programme | Master of Science (MSc)

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

SECTORS: Civil Engineering, Sustainable design, Engineering and environmental geology, Consulting.

FIELDS: Civil Engineering, Design, Research and development.

JOB POSITIONS: Civil Engineer, Environmental Engineer, R&D Engineer.



Location

Nantes, France - 2 hours from Paris

International campus life

87 nationalities
43% international students



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EXAMPLES OF FINAL YEAR INTERNSHIP/MASTER'S THESIS

- > Permeability evolution of granular soils in an internal erosion context (GeM Institute)
- > Improving the spatial monitoring of rainfalls for flood assessment (GeM Institute)
- > Performance assessment of inerter-based vibration absorbers for deep water fixed-based monopile wind turbines (INNOSEA SAS)
- > Structural Analysis and Design of a Tensegrity Footbridge (EIFFAGE BIEP)
- > Use of crushed sand in hydraulic concrete (Eurovia)
- > Study of the absorption/adsorption of sulphates in synthetic C-(A)-S-H during the external sulphate attack on cementitious material (GeM Institute)
- > Behaviour of reinforced concrete structures under real fire conditions (IRSN)

FACULTY, INDUSTRIAL PARTNERS AND RESEARCH LABS

Laboratories

This MSc relies on the staff and the research facilities of the Research Institute in Civil and Mechanical Engineering (GeM), at Centrale Nantes and Nantes University. Researchers at the Gustave Eiffel University (Nantes) are also involved in the programme.

The supporting research institutes have extensive experimental test facilities for static and dynamic characterisation of materials and structures.

International collaboration

Université Libre de Bruxelles and Université de Liège (Belgium), Università degli Studi di Perugia, Università di Roma La Sapienza (Italy), The Hong Kong Polytechnic University, Tongji University (China), Cyprus University of Technology (Cyprus), 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

CONTACT: 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 | 5 |
| Vibrations and Differential Equations | 5 |
| Business Environment | 4 |
| Modern Languages | 2 |
| Conferences | 0 |
| M1 - SPRING SEMESTER | ECTS |
| Physical modeling | 4 |
| Constitutive Laws | 5 |
| Imaging in civil engineering | 5 |
| Geotechnical Engineering | 5 |
| Concrete and structures | 5 |
| Mathematical Methods in Civil Engineering | 4 |
| Modern Languages | 2 |
| M2 - AUTUMN SEMESTER | ECTS |
| Numerical Analysis | 5 |
| Mechanics of Porous Media | 5 |
| Statistics of materials and structural reliability | 4 |
| Project | 2 |
| Modern Languages | 2 |
| 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 Infrastructures of Energy and Transport | 4 |
| M2 - SPRING SEMESTER | ECTS |
| Master Thesis or Industrial Internship (paid)* | 30 |

*In France, for internships exceeding 2 months a minimum legal level of remuneration (approximately €600 per month) is fixed by the government. In some professional branches, this amount may be higher.

Students on the Integrated Master-PhD Track follow an adapted version of the above course structure with a limited choice of modules, and the inclusion of a research module and supervised research project.

NB Course content may be subject to minor changes

École Centrale de Nantes. Direction de la communication. Septembre 2023