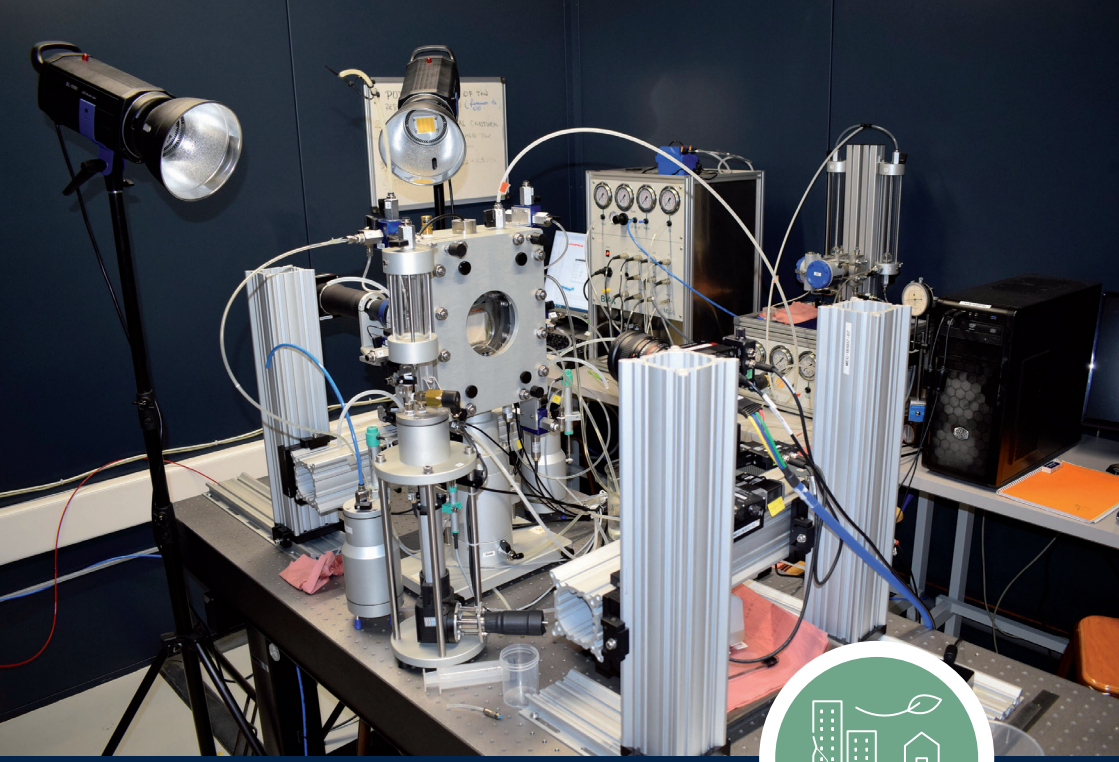


Civil Engineering

Materials and Structures in their Environment

INTEGRATED MASTER–PHD TRACK

Nantes Université

CENTRALE NANTES

Centrale Nantes offers high-potential students the opportunity to join our 'two plus three'-year Integrated Master-PhD Track in Civil Engineering, fully taught in English for a cohort of international students. This track draws on the areas of excellence of our research institutes and our existing MSc programmes to bring together two years of Master's studies and three years at PhD level.

The Civil Engineering Master's programme provides advanced scientific and technological training in materials, structures, and their interaction with the environment, with a strong focus on research. Students in the Integrated Master-PhD Track develop solid analytical, problem-solving, and project management skills, leading to diverse career opportunities. The programme is closely linked to the GeM research institute at Centrale Nantes, covering key areas such as natural materials, concrete and structures, and their interactions with the environment, the sustainability of materials, environmental geomechanics, green engineering and, more generally, the physics of multi-scale materials.

Why choose this track?

- L'Etudiant (2024) ranks Centrale Nantes as the best school in France for civil engineering specializations
- Well-respected scientific expertise of the GeM Laboratory in structural reliability and monitoring research activities
- Reinforced research activities right from year one: research projects, access to research facilities with practical work in the unique experimental test facilities
- Close supervision and mentoring by a member of faculty

OUR PROGRAMME

Master 1&2 (120 ECTS)

Master 1

- ✓ Continuum Mechanics
- ✓ Fluid Mechanics 1
- ✓ Numerical Methods
- ✓ Vibrations
- ✓ Numerical Analysis
- ✓ Tools and Methods for Research 1 & 2
- ✓ Nonlinear modeling of reinforced concrete structures
- ✓ Geotechnical Engineering
- ✓ Imaging in Civil Engineering
- ✓ Physical Modelling
- ✓ Constitutive Laws
- ✓ Languages courses

Master 2

- ✓ Coupled problems in mechanics: from mathematical formulation to numerical methods
- ✓ Mechanics of Porous Media
- ✓ Tools & Methods for Research
- ✓ Surrogate Modelling
- ✓ Languages courses

Elective courses (choose 2 out of 5)

- ✓ Design and Behaviour of Modern Concrete
- ✓ Durability and Structural Maintenance
- ✓ Homogenization Methods for Materials and Structures
- ✓ Earthquake Engineering
- ✓ Statistics of Materials and Structural Reliability

NB: course content may be subject to minor changes

The last semester of the master's programme is set aside for the master's thesis

PhD - Advantages for Phd students

- ✓ Access to specific disciplinary or interdisciplinary courses and events
- ✓ Close contact with an academic tutor
- ✓ Access to support for international mobility
- ✓ Participate in organizing summer schools and other specific events
- ✓ Engage in mentoring Master's students

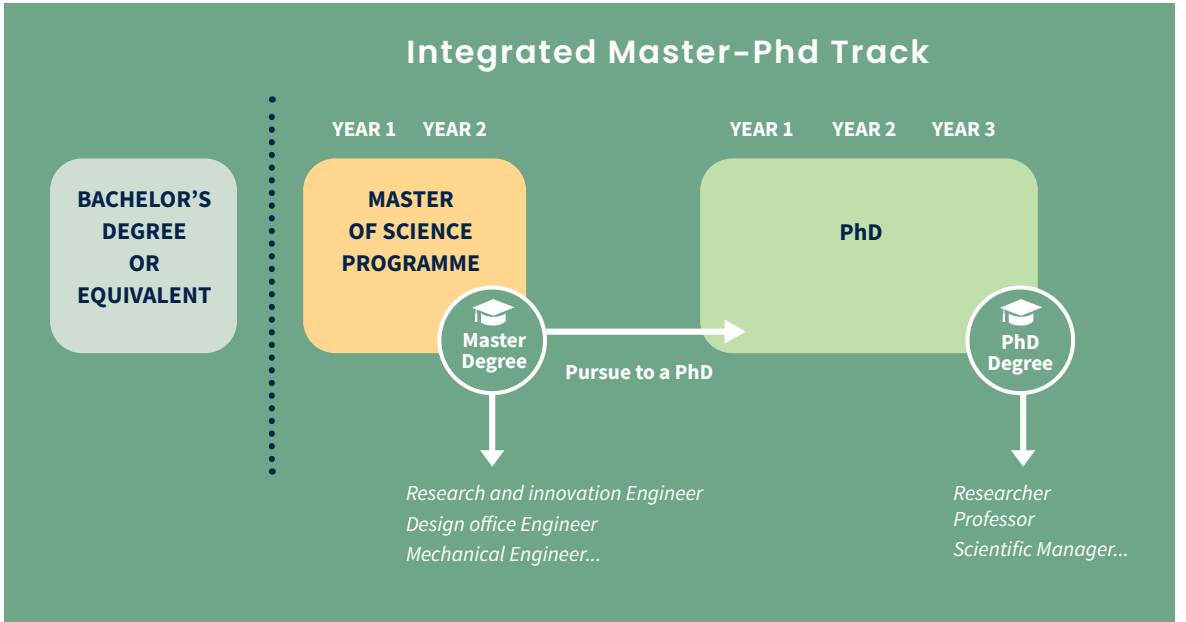
Skills

Master

- 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
- 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.

PhD

- Develop a project within a research team
- Deepen the specialized knowledge
- Develop teaching and project management skills.



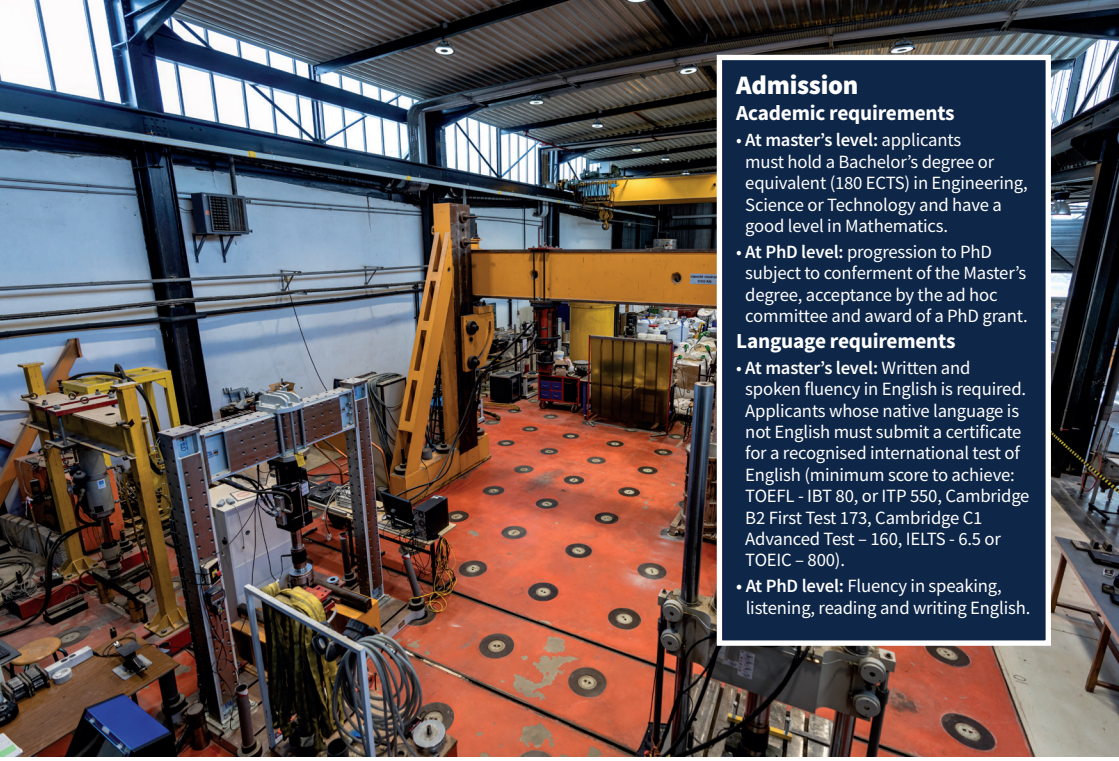
Career Opportunities

Sectors

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

Fields

Civil Engineering, Design, Research and development.



Admission

Academic requirements

- **At master's level:** applicants must hold a Bachelor's degree or equivalent (180 ECTS) in Engineering, Science or Technology and have a good level in Mathematics.
- **At PhD level:** progression to PhD subject to conferment of the Master's degree, acceptance by the ad hoc committee and award of a PhD grant.

Language requirements

- **At master's level:** Written and spoken fluency in English is required. Applicants whose native language is not English must submit a certificate for a recognised international test of English (minimum score to achieve: TOEFL - IBT 80, or ITP 550, Cambridge B2 First Test 173, Cambridge C1 Advanced Test – 160, IELTS - 6.5 or TOEIC – 800).
- **At PhD level:** Fluency in speaking, listening, reading and writing English.

REINVENT ENGINEERING

CENTRALE NANTES

Contact

Programme coordinator
Giulio Sciarra
admission@ec-nantes.fr

Project supported by the French National Research Agency as part of the «Investissements d'Avenir» programme
FRANCE 2030
ANR-20-SFRI-0014

DIPLÔME NATIONAL DE MASTER CONTRÔLÉ PAR L'ÉTAT

DIPLÔME NATIONAL DE DOCTORAT CONTRÔLÉ PAR L'ÉTAT

Designed by: Studio Carré Vert : 06 88 50 81 33. Photo: ©ECN

Nantes Université

CENTRALE NANTES

GeM
Institut de Recherche en Génie Civil et Mécanique