



Master of Science (MSc)

Marine Technology



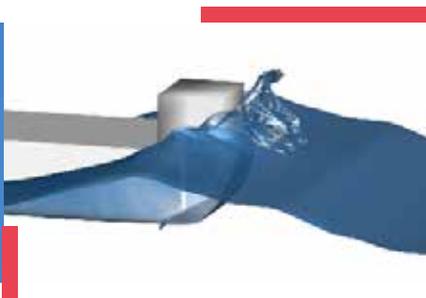
## HYDRODYNAMICS FOR OCEAN ENGINEERING

### OBJECTIVES

This MSc programme provides advanced training on the typical problems of free-surface hydrodynamics applied to ocean engineering: ship resistance, seakeeping, marine renewable energy systems, etc.

Training involves theoretical courses together with the practical use of software to solve problems through a variety of numerical methods: e.g. boundary elements under potential flow or finite differences and finite-volumes for viscous flows. The unique academic large-scale facilities available at Centrale Nantes: a towing tank and a large ocean wave tank will also contribute to the teaching programme. This way, physical, modeling, numerical and experimental aspects are studied.

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.



### SKILLS

#### Specialism-specific

- > Build and use models dedicated to hydrodynamics for ocean engineering
- > Define and perform experiments for free-surface hydrodynamics problems
- > Solve numerically free surface problems for ocean engineering applications

#### General

- > 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 be part of a project

### JOB PROSPECTS & FURTHER PHD STUDIES

**SECTOR:** Transportation, Renewable Energy, Classification societies, Civil Engineering, Research and Innovation, Consulting.

**FIELDS:** Marine Renewable Energies, Maritime Transportation, Offshore Engineering, Naval shipyards, Coastal engineering.

**JOB POSITIONS:** Research and Innovation Engineer, Design Office Engineer, Exploitation Engineer, Mechanical Engineer.





**Location**

Nantes, France -2 hours from Paris

**International campus life**

**87**  
nationalities

**43%**  
international students



**EXAMPLES OF FINAL YEAR INTERNSHIP/MASTER'S THESIS**

- > Fatigue Methodology of Floating Offshore Wind Turbine Platform & Tower in Composite Materials, Bureau Veritas Marine & Offshore
- > Speeding Up Simulation-Driven Design for a High-Speed Planing Boat, Friendship Systems (Germany)
- > Mooring Optimization for Floating Offshore Wind Turbine Based on Water Depth, EOLFI
- > Development of methodology for predicting marine vessel turning radius with overset grid technique using CFD Solver, Mauric

**FACULTY, INDUSTRIAL PARTNERS AND RESEARCH LABS**

This MSc relies on the Centrale Nantes' faculty, staff and research facilities of the LHEEA Laboratory. Centrale Nantes has several industrial partnerships such as with Bureau Veritas, Principia, H&T, Innosea, Mauric, CMA CGM, D-ICE, Ideol, Chantiers de l'Atlantique, Technip, Saipem.

**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	5
Vibrations and Differential Equations	5
Business Environment	4
Modern Languages	2
Conferences	0
M1 - SPRING SEMESTER	ECTS
Fluid Mechanics 2	5
Mechanical Design	5
Energetics	5
Propulsion	5
Hydrodynamics	5
Conferences and Initiation to Research	3
Modern Languages	2
M2 - AUTUMN SEMESTER	ECTS
General Concepts of Hydrodynamics	4
Water Waves and Sea States Modelling	4
Wave-structure Interactions and Moorings	5
Numerical Hydrodynamics	5
Experimental Hydrodynamics	5
Hydrodynamics R&D	5
Modern Languages	2
Conferences	-
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