



Mention Marine sciences International master program in marine physics

Physical oceanography, geophysics and naval hydrodynamics are based upon a common foundation of physics, mechanics, and applied mathematics. The Marine Physics masters offers a two years intensive program with fundamental lectures, advanced courses, internships and research projects. The program is held at the University of Brest in collaboration with engineering schools, Ifremer and research laboratories at IUEM. The training provides career opportunities in research and academia in oceanography, climate science, geophysics and in applications such as operational oceanography, naval hydrodynamics, observation and monitoring of the coastal and deep sea environment, exploitation of marine mineral resources

Organization

2 years master program with 3 specializations:

- Marine Geophysics
- Physics of the Ocean and the Climate
- Naval Hydrodynamics

Each year is credited with 60 ECTS. The masters starts in early September.

Courses highlight

- Geophysical fluid dynamics: a framework to understand ocean physics
- New remote sensing methods and observing systems for the ocean and solid earth
- Strong mathematical training: advanced calculus and numerical methods

Internships

The internship is an important aspect of the program.

- It can be done in Brest area in one of the many laboratories in marine science: Ifremer, University of Brest, CNRS, ENSTA Bretagne, CETMEF, IRD, SHOM.
- It can be done abroad (USA, Germany, UK etc.). Brest University has an active and vivid collaboration with the University of Cape Town (South Africa) and promotes the exchange of students.

How to apply?

Application procedure begins in December:

- Download the application from the web site
- Fill it and send it back
- Answer will be returned within a couple of weeks

Prerequisites

Bachelor in either Physics, Mechanics or Applied Mathematics

Contact

Institut Universitaire Européen de la Mer (IUEM) à Brest Technopôle

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More information

<https://www-iuem.univ-brest.fr/la-formation/master-sml/mention-marine-sciences/>

Marine Geophysics Speciality

Master 1

- ▶ Mechanics of deformable media
- ▶ Fluids
- ▶ Applied mathematics
- ▶ Signal analysis: theory and practice
- ▶ Numerical analysis
- ▶ Physics for the Earth Sciences
- ▶ Earth's models
- ▶ Measurements at sea
- ▶ Project
- ▶ Language
- ▶ Issues and challenges in Marine Sciences
- ▶ Marine Sciences in Europe
- ▶ Scientific programming
- ▶ Internship (2 months)

Master 2

- ▶ Motions and deformations in the Earth
- ▶ Earth potential fields
- ▶ Marine seismic surveys (coastal and off-shore)
- ▶ Geographics Information Systems
- ▶ Language
- ▶ Job finding skills
- ▶ Options (2 or 3 from the list below)
 - Detection and monitoring of natural resources
 - Water cycle in the deep Earth
 - Land and sea remote detection
- ▶ Sedimentary hydrodynamics
- ▶ Internship (4 to 6 months)

Physics of the Ocean and Climate Speciality

Master 1

- ▶ Fluids
- ▶ Applied mathematics
- ▶ Signal analysis: theory and practice
- ▶ Numerical analysis
- ▶ Measurements at sea
- ▶ Introduction to ocean and atmosphere
- ▶ Introduction to geophysical fluid dynamics
- ▶ Projects
- ▶ Language
- ▶ Issues and challenges in Marine Sciences
- ▶ Marine Sciences in Europe
- ▶ Scientific programming
- ▶ Scientific oral

Master 2

- ▶ Geophysical fluid dynamics
- ▶ Descriptive oceanography
- ▶ In situ observations
- ▶ Languages
- ▶ Job finding skills
- ▶ Internship (from Mars to September)
- ▶ Options (typically 5)
 - Theories of the ocean circulation
 - Climate dynamics and the carbon cycle
 - Instabilities, vortex and geostrophic turbulence
 - Coastal and estuary dynamics
 - Surface waves
 - Land and sea remote detection
 - Sediment dynamics
 - Numerical modeling of the ocean

Naval Hydrodynamics speciality (Co-sponsored with ENSTA Bretagne)

Master 1

- ▶ Fluids
- ▶ Applied mathematics
- ▶ Signal analysis: theory and practice
- ▶ Signal analysis: advanced course
- ▶ Numerical analysis
- ▶ Ship stability, ship architecture
- ▶ Experimental techniques
- ▶ Projects
- ▶ Language
- ▶ Issues and challenges in Marine Sciences
- ▶ Marine Sciences in Europe
- ▶ Scientific programming
- ▶ Scientific oral

Master 2

- ▶ 3D Turbulence
- ▶ Surface waves
- ▶ Computational fluid dynamics
- ▶ Resistance, propulsion and manoeuvrability
- ▶ Ship stability
- ▶ Hydrodynamics of lifting bodies
- ▶ Advanced numerical methods
- ▶ Language
- ▶ Job finding skills
- ▶ Business and companies culture
- ▶ Internship (from March to September)