



2<sup>ND</sup> AND 3<sup>RD</sup> YEAR SPECIALISATION

# OCEAN: HYDRODYNAMICS AND MARINE ENGINEERING

Provide the students with the scientific and technical knowledge in hydrodynamics and ocean engineering to allow them to address societal issues linked mainly to energy (offshore oil, marine renewable energies) and maritime transport (building of environmentally-friendly ships and transport of offshore wind turbines).



## COURSE CONTENT

- > General Concepts of Hydrodynamics
  - > Water Waves and Sea States Modeling
  - > Wave-Structure Interactions & Ship Stability
  - > Numerical Hydrodynamics 1
  - > Moorings & Manoeuvrability
  - > Experimental Hydrodynamics
  - > Lifting Profiles
- > Numerical Hydrodynamics 2
  - > Ship Structure & Maritime Economy
  - > Fluid-Structure Interactions
  - > Focus on Optimization, Sailing Ship & Simulations
  - > Marine Renewable Energy & Oil&Gas
  - > Project 1 and 2





## INDUSTRY SECTORS

- > Offshore oil
- > Marine Renewable Energies
- > Naval engineering
- > Maritime transport
- > Research (private or public sector)
- > Coastal engineering
- > Numerical simulation in hydrodynamics and fluid mechanics

## CAREER PROSPECTS

- > R&D engineer
- > Installation and operations engineer (MRE offshore)
- > Project engineer
- > Quality engineer
- > Production management engineer
- > Supply chain manager

## TEACHING STAFF

### HEAD OF SPECIALISATION:

Félicien Bonnefoy

### CENTRALE NANTES LECTURERS:

Sandrine Aubrun, Félicien Bonnefoy, Isabelle Calmet, Antoine Ducoin, Guillaume Ducrozet, Pierre Ferrant, David Le Touzé, Zhe Li and researchers from the Research Laboratory in Hydrodynamics, Energetics & Atmospheric Environment (LHEEA)

### EXTERNAL SPEAKERS:

**Academics:** Université de Nantes, École navale (Brest), ICAM Nantes

**Naval architecture:** HT2

**Marine Renewable Energies:** Innosea, EDF-EN, Naval Group

**Offshore oil:** Principia, Total, Saipem, Subsea 7

### CONTACT:

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## EXAMPLES OF PREVIOUS PROJECTS

- > Numerical simulation of cylinders for riser sizing (HydrOcean)
- > Numerical study of the aerodynamic performance of a vertical axis wind turbine (LHEEA)
- > Influence of anchor modelling on the performance of a wave energy convertor (Innosea)
- > Design and build of two electrically propelled boats (Hydrocontest student competition)
- > Exploratory study for the deterministic measurement and prediction of sea states (LHEEA)
- > Architecture of a floating wind farm (LHEEA)
- > Characterization of the small wave tank (LHEEA)

## EXAMPLES OF PREVIOUS INTERSHIPS

- > Hydrodynamic study of a sailing project, K-epsilon, Sophia Antipolis.
- > Naval design and engineering studies, Marc Lombard, La Rochelle.
- > Study of models using coastal environment software MIKE FM (DHI, Denmark)
- > Offshore data analysis and study of anchor line fatigue (Exeter University, UK)
- > Modelling of the dynamic behaviour of an anemometer (Ecole Navale, Brest)
- > Calculation in the naval field, Segula Engineering, Saint-Herblain.
- > Study of an offshore facility (Innosea, Edinburgh, UK)

