Master’s degree in Physics and Simulation in Civil Engineering (CCCE)

Computations in Coastal and Civil Engineering (CCCE)

The program is carried out in close collaboration with LFCR and SIAME laboratories where numerical and experimental tutorials will be performed. Students are integrated in the local research environment. They benefit from facilities (laboratories’) and assist to the scientific seminars of the research teams.

Detailed Program Facts

ACADEMIC YEAR: Our full academic year runs from September to June
APPLICATION DEADLINE: Applications are opened from November to April
HOW TO APPLY: The application documents must be uploaded on the website: https://aap-e2s.univ-pau.fr

PROGRAM INTENSITY: Full-time
DURATION: 1 year
CREDITS: 60 ECTS
LANGUAGE: Fully taught in English
TUITION FEES: European: 256€/year Extra-european: 640€/year
LEVEL OBTAINED: Master
HEAD OF THE MASTER PROGRAM: Prof. David Grégoire
HEAD OF THE CCCE COURSE: Prof. Stéphane Abadie
LOCATION: College of Sciences and Technology for Energy and Environment on the Basque coast campus (Anglet, France)

Admission requirements

ENGLISH LANGUAGE REQUIREMENTS
Minimum required score CECRL B2 level in English

ACADEMIC REQUIREMENTS
Applicants must hold a Bachelor of Engineering, Bachelor of Science or equivalent.

ADMISSION REQUIREMENTS
Applicants must be fluent in English, both in writing and speaking. An applicant whose native language is not English has to take a recognized international English test. Minimum required score CECRL B2 level in English.
Applicants must hold a M1 or a 4-year Bachelor of Engineering, Bachelor of Science or equivalent.

Contact

For any supplementary information or questions related to application, please contact: master.psce@univ-pau.fr

More information: https://formation.univ-pau.fr/m-ccce


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The CCCE track focuses on the modeling and simulation of coastal engineering related processes. Topics extensively studied include, wave modeling, waves interactions with structures, soil and structure complex behavior. A specific focus is put on numerical methods and open source computational tools commonly used in this field including: Telemac 2D, Artemis, OpenFoam, BOSZ (Boussinesq wave model), XBEACH, Cast3M (finite element structure model).

This track belongs to the international master’s degree in Physics and Simulation in Civil Engineering which offers multidisciplinary key courses to achieve an advanced specialist level in the aforementioned fields. It is suited for students planning both an academic or an industrial career and provides the theoretical basis and the practical expertise required to pursue in research or R&D structures or companies.

The master is fully taught in English and is hosted at ISA BTP Engineering School in the French Basque coast area (Anglet, France).

### Student Learning Outcomes

At the end of this program, the students in the Physics and Simulation in Civil Engineering Master will be able to:

- Demonstrate mastery of a solid body of knowledge and skills in engineering science to solve relevant problems,
- Design and conduct experiments, analyze and interpret data,
- Review, analyze, and interpret the body of scientific literature, contemporary issues and innovations in physics and civil engineering area,
- Produce quality research,
- Carry out a research project to understand a physical phenomenon pertaining to civil engineering, coastal engineering, geomechanics or physics of porous media.

### Prospects for employment or further study

**SECTORS:**
- Coastal engineering

**FIELDS:**
- Research and R&D structures

**POSITIONS:**
- PhD student and R&D Engineer

### Program objectives

- Prepare students at an advanced specialized level to meet present and future challenges in coastal engineering,
- Develop engineering research skills to engage in quality and successful research,
- Prepare students for leading positions in industry and government Research and Development departments.

#### SEMESTER 1 (SEPTEMBER – JANUARY)

**Introduction to water wave mechanics**
- 4 ECTS

**Wave modeling 1**
- Non linear shallow water equations
- Berkhoff equation and other wave agitation models
- Numerical project (Telemac2D, ARTEMIS)
- 7 ECTS

**Wave modeling 2**
- Boussinesq and Green Naghdi models
- Wave models based on Navier-Stokes equations
- Spectral wave models
- Numerical project (BOSZ, OpenFoam, SWAN)
- 9 ECTS

**Mechanics and computational modelling**
- Non linear behaviour of materials : Plasticity, damage
- Numerical methods for non-linear problems
- Case study on a Finite Element Program (Cast3M)
- 4 ECTS

**Language**
- French (or Spanish) as a Foreign Language
- 3 ECTS

**Bibliography**
- 3 ECTS

#### SEMESTER 2 (JANUARY – JULY)

**Research internship**
- 30 ECTS

**Example of research internship topics:** Design of an experimental set-up to generate wave impacts based on the dam break flow, Numerical modeling of waves generated by landslide, Interaction between infragravity waves and ships in a port, Numerical study of the waves impact on a building during a surge event.
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**location:** College of Sciences and Technology for Energy and Environment on the Basque coast campus (Anglet, France).

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