MASTER GÉNIE CIVIL

RÉSUMÉ DE LA FORMATION
Type de diplôme : Master
Domaine ministériel : Sciences, Technologies, Santé

PRÉSENTATION

Presentation

The aim of this master is to train scientific experts in Mechanics and Physics high potential fields such as civil engineering structures, coastal engineering, geomechanics or physics of porous media. The master develops around two shared courses: Structures of civil and coastal engineering and Mechanics and Physics in Porous Media. Those two academic courses cover a wide spectrum of interests ranging in scale from a pore to a structure.

This international master’s degree in Physics and Simulation in Civil Engineering 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 Anglet (France). ISA BTP is highly recognised by the scientific and the professional communities and certified by ISO-9001 and EUR ACE.

The program is carried out in close collaboration with SIAME and LFCR research laboratories where numerical and experimental practicals will be performed. Students will also benefit from the global research environment and administrative support of the University Pau & Pays Adour, the E2S I-site program and the research federation IPRA.

ORGANISATION DE LA FORMATION

- M2 Parcours Computations in Coastal Engineering (CCE)

PLUS D'INFOS

Effectif : 10 per course

LABORATOIRE(S) PARTENAIRE(S)
IPRA - FR2952
LFCR - UMR5150
SIAME - EA 4581

ETABLISSEMENT(S) PARTENAIRE(S)
ISA BTP Engineering School
ADMISSION REQUIREMENTS

Academic requirements

Applicants must hold a Bachelor of Engineering, Bachelor of Science or Equivalent.

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.

English Language Requirements

**Minimum required score:** CECRL B2 level in English

**Application deadline:** June 30, 2018

COMPOSANTE

Collège Sciences et Technologies pour l’Energie et l’Environnement (STEE)
ISABTP - Institut supérieur aquitain du BTP

LIEU(X) DE LA FORMATION

Anglet

RESPONSABLE(S)

Direction des études 2ème année Gregoire David
david.gregoire@univ-pau.fr
Tel. +33 559574479
The CCCE path focuses on the modeling, simulation and measurements of waves and their impact on the coast in the context of coastal risks. Topics extensively studied include, wave mechanics, wave modeling, waves interactions with structures.

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), Cast3M (finite element structure model).

This track belongs to the international master’s degree in Physics and Simulation in Coastal 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 in the field of coastal engineering and coastal risks.

The master is fully taught in English and is hosted at ISA BTP Engineering School in the French Basque coast area (Anglet, France).
* Prepare students at an advanced specialized level to meet present and future challenges in coastal engineering and coastal risks,
* Develop engineering research skills to engage in quality and successful research,
* Prepare students for leading positions in industry and government Research and Development departments.

**SAVOIR FAIRE ET COMPÉTENCES**

At the end of this program, the students in the *Computations in Coastal 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.

**INFORMATIONS SUPPLÉMENTAIRES**

**Scholarships**

* Region Aquitaine Scholarships for non-EU students
* E2S Talent's Academy Scholarships for all students

**International Welcome Desk**

**CONTENU DE LA FORMATION**

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<tr>
<th>SEMESTER 1 (SEPTEMBER – JANUARY)</th>
<th>ECTS</th>
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<td>Introduction to water waves mechanics</td>
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<tr>
<td>Modeling in Coastal Engineering</td>
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<tr>
<td>· Non linear shallow water equations</td>
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<td>· Berkhoff equation and other wave agitation models</td>
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<td>· Numerical project (Telemac2D, ARTEMIS)</td>
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<tr>
<th>Advanced modeling in Coastal Engineering</th>
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<tr>
<td>· Boussinesq and Green Naghdi models</td>
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<td>· Wave models based on Navier-Stokes equations</td>
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<tr>
<td>· Spectral wave models</td>
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<td>· Numerical project (BOSZ, SWAN, OPENFOAM)</td>
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<th>Mechanics and computational modeling</th>
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<td>· Non linear behaviour of materials : Plasticity, damage</td>
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<tr>
<td>· Numerical methods for non-linear problems</td>
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<tr>
<td>· Case study on a Finite Element Program (Cast3M)</td>
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<td>Bibliography</td>
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<td>SEMESTER 2</td>
<td>ECTS</td>
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<td>(JANUARY – JULY)</td>
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<tr>
<td>Research internship</td>
<td>30</td>
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**Example of research internship topics proposed:**

- Numerical modeling of wave transformation and reflection over the Artha breakwater
- Wave Resonance Amplifications around an Island
- Simulation and measurements of flip-through impact in wet dam breaking

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**CONDITIONS D’ACCÈS**

**Academic requirement**

Applicants must hold at least a 4-year university level in Engineering, Science or Equivalent.

**English Language 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

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**DROITS D’INSCRIPTION ET TARIFICATION**

640 euros for Non-EU students
POURSUITE D'ÉTUDES

Prospects for employment or further study

**Sectors:** Civil engineering, coastal engineering, geomechanics, physics of porous media

**Fields:** Research and R&D structures

**Positions:** PhD student and R&D Engineer

COMPOSANTE

Collège Sciences et Technologies pour l'Energie et l'Environnement (STEE)
ISABTP - Institut supérieur aquitain du BTP

LIEU(X) DE LA FORMATION

Anglet

RESPONSABLE(S)

Direction des études 2ème année Gregoire David
david.gregoire@univ-pau.fr
Tel. +33 559574479
Understanding the mechanics, the physics and their couplings appearing in fluid-filled porous media is a keystone for solving forthcoming challenges in Energy and Environment. Indeed, porous media are ubiquitous in many natural and industrial systems of interest in various fields of engineering such as: Civil Engineering, Mechanical Engineering, Chemical Engineering, Material Engineering, Petroleum Engineering, or Food Industry, to mention only a few.

The MPPM course focuses on the Mechanics and Physics in Porous Media. It encompasses their experimental characterisation by indirect porosimetry and direct imaging, poromechanical behaviour modelling, transport properties estimation, fluid-solid couplings and the properties of confined fluids in porous media.

This international master’s degree offers multidisciplinary key courses to achieve an advanced specialist level in all areas involving porous media such as geomechanics or physics of porous materials. 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, in R&D structures or in companies.

**OBJECTIFS**

* Prepare students at an advanced specialized level to meet present and future challenges in (geo)mechanics or physics of porous media,
Develop engineering research skills to engage in quality and successful research,
Prepare students for leading positions in industry and government Research and Development departments.

SAVOIR FAIRE ET COMPÉTENCES

At the end of this program, the students in the Master of Mechanics and Physics in Porous Media will be able to:

* Justify a solid expertise in mechanics or physics of porous materials,
* Design and conduct experiments, analyze and interpret data,
* Review, analyze, and interpret the body of scientific literature, contemporary issues and innovations in physics and mechanics area,
* Plan and define a research or R&D project to understand a physical phenomenon pertaining to mechanics or physics of porous media.

INFORMATIONS SUPPLÉMENTAIRES

Scholarships

* Region Aquitaine Scholarships for non-EU students
* E2S Talent's Academy Scholarships for all students

CONTENU DE LA FORMATION

Mechanics and Physics in Porous media (MPPM)

Semester 1 (30 ECTS) - From September to December

<table>
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<tr>
<th>Statistical thermodynamics, adsorption &amp; interfaces</th>
<th>6 ECTS</th>
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<td>* Statistical Thermodynamics and</td>
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<td>Course</td>
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<tr>
<td>Thermodynamics of adsorption * Practical approaches of adsorption properties</td>
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<td>Characterization of porous media by direct and indirect techniques</td>
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<td>* Gas and mercury porosimetry</td>
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<td>* X-ray spectroscopy and microscopy</td>
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<tr>
<td>* X-ray and neutron imaging techniques</td>
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<tr>
<td>Advanced mechanics and computational modelling</td>
<td>6 ECTS</td>
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<tr>
<td>* Non linear behaviour of materials : Plasticity, damage</td>
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<tr>
<td>* Numerical methods for non-linear problems</td>
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<tr>
<td>Poromechanics, fracture and transport</td>
<td>6 ECTS</td>
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<tr>
<td>* Effective stress, poromechanics and fracture mechanics</td>
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<tr>
<td>* Permeabilities. Reactive transport</td>
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<tr>
<td>* Fracture mechanics</td>
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<td>3 ECTS</td>
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Semester 2 (30 ECTS) From January to June
Research internship

Examples of internships offered in 2018-2019:

* Use of sea-shells for environmental-friendly concretes and high-performance cement-based grouts,
* Hydrogen storage in innovative hybrid materials,
* Size effect on strength and fracture energy,
* Cristallisation-induced damage in heterogeneous rocks - Application to haloclasty. Anglet coast ISA-BTP - Anglet

30 ECTS

CONDITIONS D'ACCÈS

Academic requirements

Applicants must hold an M1 (1st year of a master degree) or a 4-year Bachelor of Engineering, Bachelor of Science or equivalent.

English Language 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 level in English

DROITS D'INSCRIPTION ET TARIFICATION
640 euros for Non-EU students.

See details here: Campus France

POURSUITE D’ÉTUDES

Prospects for employment or further study

Sectors: Civil engineering, coastal engineering, geomechanics, physics of porous media

Fields: Research and R&D structures

Positions: PhD student and R&D Engineer

COMPOSANTE

Collège Sciences et Technologies pour l’Energie et l’Environnement (STEE)
ISABTP - Institut supérieur aquitain du BTP

LIEU(X) DE LA FORMATION

Anglet

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