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: Computations in 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.
ISABTP - Institut supérieur aquitain du BTP

Anglet

Gregoire David
david.gregoire@univ-pau.fr
Phone +33 559574479
M2 Computations in Coastal and Civil Engineering (CCCE)

Applications are opened from December 2018 to April 2019 from https://aap-e2s.univ-pau.fr/siaap/pub/appel/view/5

Deadline extension for applications without scholarships: 31st of May 23:59

The CCCE path 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).

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.

## SKILLS

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

## ADDITIONAL INFORMATION

## TRAINING CONTENT

<table>
<thead>
<tr>
<th>SEMESTER 1 (SEPTEMBER – JANUARY)</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics in coastal engineering</td>
<td>2</td>
</tr>
<tr>
<td>* Water wave mechanics</td>
<td></td>
</tr>
<tr>
<td>* Coastal StructuresWave modeling</td>
<td></td>
</tr>
<tr>
<td>Wave modeling 1</td>
<td>4</td>
</tr>
<tr>
<td>* Non linear shallow water equations</td>
<td></td>
</tr>
<tr>
<td>* Berkhoff equation and other wave agitation models</td>
<td></td>
</tr>
<tr>
<td><strong>Numerical project</strong> (Telemac2D, ARTEMIS, XBEACH)</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Wave modeling 2</strong></td>
<td>6</td>
</tr>
</tbody>
</table>
| * Boussinesq and Green Naghdi models  
* Wave models based on Navier-Stokes equations  
* Numerical project (BOSZ, OPENFOAM) |  |
| **Mechanics and computational modelling** | 6 |
| * Non linear behaviour of materials: Plasticity, damage  
* Numerical methods for non-linear problems  
* Case study on a Finite Element Program (Cast3M) |  |
| **Geotechnics and hydrogeology** | 6 |
| * Superficial foundations  
* Deep foundations  
* Hydrological cycle and interactions between soil and environment |  |
<p>| <strong>Language</strong> | 3 |
| * French (or Spanish) as a Foreign Language |  |
| <strong>Bibliography</strong> | 3 |</p>
<table>
<thead>
<tr>
<th>SEMESTER 2 (JANUARY – JULY)</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research internship</td>
<td>30</td>
</tr>
</tbody>
</table>

Example of research internship topics proposed in 2018-2019:

* 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

**ACCESS CONDITIONS**

Applications are opened from December to April from http://aap.e2s-uppa.eu

Deadline extension for applications without scholarships: 31st of May 23:59

Academic requirements

Applicants must hold a 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 B2 level in English

Application process

It consists of:

* a cover letter
* A copy of your passport
* a transcript of records (the previous academic year and, if possible, the first term of the ongoing one) with rankings

For large files, it is preferable to send a link to a repository (e.g. weTransfer.com)

Scholarships

Grants possibilities (ATTENTION: applications for scholarships are closed from 30/04/2019)

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

TUITION FEES

4200 euros

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

ORGANIZATIONAL UNIT

ISABTP - Institut supérieur aquitain du BTP

PLACES

Anglet

PERSON IN CHARGE

Gregoire David
david.gregoire@univ-pau.fr
Phone +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.

**OBJECTIVES**

* 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.

**SKILLS**

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.

**ADDITIONAL INFORMATION**

**TRAINING CONTENT**

<table>
<thead>
<tr>
<th>Mechanics and Physics in Porous media (MPPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1 (30 ECTS) - From September to December</td>
</tr>
<tr>
<td>Statistical thermodynamics, adsorption &amp; interfaces</td>
</tr>
</tbody>
</table>
* Statistical Thermodynamics and Thermodynamics of adsorption
* Practical approaches of adsorption properties
<table>
<thead>
<tr>
<th><strong>Characterization of porous media by direct and indirect techniques</strong></th>
<th>6 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Gas and mercury porosimetry</td>
<td></td>
</tr>
<tr>
<td>* X-ray spectroscopy and microscopy</td>
<td></td>
</tr>
<tr>
<td>* X-ray and neutron imaging techniques</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Advanced mechanics and computational modelling</strong></th>
<th>6 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Non linear behaviour of materials : Plasticity, damage</td>
<td></td>
</tr>
<tr>
<td>* Numerical methods for non-linear problems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Poromechanics, fracture and transport</strong></th>
<th>6 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Effective stress, poromechanics and fracture mechanics</td>
<td></td>
</tr>
<tr>
<td>* Permeabilities. Reactive transport</td>
<td></td>
</tr>
<tr>
<td>* Fracture mechanics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Language</strong></th>
<th>3 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>* French or Spanish as a Foreign Language</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Bibliography</strong></th>
<th>3 ECTS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Semester 2 (30 ECTS) From January to June</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Research internship</strong></th>
<th>30 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of internships offered in 2018-2019 :</td>
<td></td>
</tr>
</tbody>
</table>
* 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,
* Crystallisation-induced damage in heterogeneous rocks - Application to haloclasty. Anglet coast ISA-BTP - Anglet

ACCESS CONDITIONS

**Applications are open from December to April from** http://aap.e2s-uppa.eu

**Deadline extension for applications without scholarships: 31st of May 23:59**

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 B2 level in English

**Application process**

It consists of:

* a cover letter
* A copy of your passport
* a transcript of records (the previous academic year and, if possible, the first term of the ongoing one) with **rankings**

For large files, it is preferable to send a link to a repository (e.g. wetransfer.com)

**Learn more:** [Here](#)

**Scholarships**

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

**TUITION FEES**

- **4200 euros**

**FURTHER STUDY**

**Sectors:**

* Civil engineering
* Mechanical engineering
* Material engineering
* Chemical engineering
* Petroleum engineering

**Fields:**

* Research and R&D structures

**Positions:**

* PhD student and R&D Engineer

**ORGANIZATIONAL UNIT**

ISABTP - Institut supérieur aquitain du BTP

**PLACES**

Anglet

**PERSON IN CHARGE**

Gregoire David
david.gregoire@univ-pau.fr
Phone +33 559574479

Miqueu Christelle
christelle.miqueu@univ-pau.fr
Phone +33 559574415