MASTER MATHEMATICS AND APPLICATIONS

IN BRIEF

Type of diploma : Master degree
Ministry field(s) : Science and Technology

PRESENTATION

The program provides excellent training in many different areas of applied mathematics developed in the laboratory of Mathematics and Applications of Pau:

**MMS Program**: PDE (partial differential equation) analysis, numerical analysis, scientific computing, high performance computing, optimization.

**MSID Program**: statistical analysis, decision computer science, computer modeling and associated computer tools.

ORGANIZATION

- M2 Mathematics, Modeling and Simulation (MMS)
- M2 Stochastic tools and Computational Methods for Decision (MSID)

ORGANIZATIONAL UNIT

Collège Sciences et Technologies pour l'Energie et l'Environnement (STEE)

PLACES

Pau

PERSON IN CHARGE

Giacomoni Jacques
jacques.giacomoni@univ-pau.fr

ADMINISTRATIVE CONTACT(S)

MORE INFO

Number of students : 30
The program offers up-to-date knowledge in areas of applied mathematics related to modeling with partial differential equations.

**OBJECTIVES**

This programme aims to provide solid skills in applied mathematics (partial differential equations analysis, numerical analysis, scientific computing and high performance computing, optimization).

- Courses focus on applications in industrial problems, fluid mechanics, waves propagation, optimal design, ...
- This programme prepares students for leading positions in private and public organisations in research and development departments.

**SKILLS**

At the end of this program, the students in "Mathematics, Modeling and Simulation Master's degree" will be able to:

* Elaborate and analyze mathematical models arising from physics, biology, geology, industry,
* Elaborate and analyze numerical schemes,
* Develop, adapt and use industrial or research numerical simulation softwares.

**ADDITIONAL INFORMATION**

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

**ORGANIZATION**

**Semester 3**

- **Compulsory Courses (Mandatory)**
  - PDE Analysis
  - Numerical Analysis of PDEs
  - High Performance Computing
- **Elective Courses (Choice: 1 Among 2)**
  - Project management for MMS and MSID
  - Méthodology
- **Elective Courses (Choice: 3 Among 7)**
  - Introduction to the numerical solution of the wave propagation problems
  - Numerical modeling of flow and transport in porous media
  - Finite Volume Methods for Hyperbolic Systems / Asymptotic Methods
  - Stochastic PDE
  - Advanced PDE
  - Industrial Softwares
  - Shape Optimisation/Fluid Mechanics

**Semester 4**

- **Compulsory Courses (Mandatory)**
  - Internship or Master's dissertation

**ACCESS CONDITIONS**

CECRL B2 level in English. Students are allowed to use English or French during exams.

**Admission Requirements**
All students who have completed four years in a higher education institutions can apply. Skills in mathematics are required for mathematical and numerical analysis.

**Limited number of students:** 30

### EXPENSES

Concerning the registration fees, the ministerial decree of 19 April 2019 sets the annual amount for non-European students enrolling in a Master's degree at €3770.

However, each French higher education institution has the possibility to partially exempt its students from these tuition fees.

For the year 2020-2021, the UPPA will apply this **partial exemption** to all non-EU students. Students benefiting from this partial exemption will pay an annual registration fee of **243** euros (2019_2020 price list as an indication).

### FURTHER STUDY

This program will enable students to pursue doctoral studies, either in an academic context or in an industrial context (collaboration between the industry and UPPA).

### PROFESSIONAL INSERTION

**Sectors:**

* Industrial or academic

**Fields:**

* Scientific computing, mathematical and numerical analysis, modelling

**Positions:**

* Engineer, Phd Student, researcher

### ORGANIZATIONAL UNIT
Collège Sciences et Technologies pour l’Energie et l’Environnement (STEE)

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This program offers advanced level courses in statistical analysis, decision computer science, computer modeling and associated computer tools.

**OBJECTIVES**

This programme aims to provide strong skills in stochastic modeling and statistical methods for data analysis, combined with the associated computer tools.

* Courses focus on applications in the industry, especially in the areas of quality control and safety analysis, but also on applications in data mining and machine learning.
* Courses are taught by academics but also by engineers

Depending on the excellency of students and their desire to pursue doctoral studies, courses about «advanced statistics» and «advanced applied probability» can be offered.

**SKILLS**

At the end of this program, the students in "Stochastic tools and Computational Methods for Decision" will be able to:

* Conduct an appropriate statistical analysis
* Apply any classical statistical methods
* Construct and analyse an experimental design
* Suggest and analyse a stochastic model
* Implement stochastic simulation methods
* Manage databases

**ADDITIONAL INFORMATION**

**Scholarships**

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

**ORGANIZATION**

**Semester 3**

- **Compulsory Courses (Mandatory)**
  - Reliability theory
  - Monte-Carlo Methods
- **Elective Courses for Industrial Applications (Mandatory)**
  - Reliability theory
  - Design of experiments
  - Data warehouse
  - Datamining
  - Project management for MMS and MSID
  - Survival Analysis
- **Elective Course for Research (Choice: 2 Among 8)**
  - Statistic modelling
  - Stochastic modeling
  - 8 ECTS à choisir parmi les autres UE du parcours

**Semester 4**

- **Compulsory Courses (Mandatory)**
  - Internship or Master's dissertation

**ACCESS CONDITIONS**

CECRL level in English,

All teaching materials will be provided both in English and French. Students are allowed to use English or French during exams.
All students who have completed four years in a higher education institution can apply.

**Limited number of students:** 30 per year

### EXPENSES

Concerning the registration fees, the ministerial decree of 19 April 2019 sets the annual amount for non-European students enrolling in a Master's degree at €3770.

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### FURTHER STUDY

Doctoral studies, either in an academic context or in an industrial context

### PROFESSIONAL INSERTION

**Sectors:**

* Industry, services, academic

**Fields:**

* Dependability and reliability analysis (RAMS), data processing, biomedicine

**Positions:**

* RAMS engineer, statistical analyst, data scientist, data processing engineer, biostatistician, PhD students
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