


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](#)  [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.

MORE INFO

Number of students : 30

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)

Secrétariat de Mathématiques
secretariat-mathematiques@univ-pau.fr

M2 Mathematics, Modeling and Simulation (MMS)

PRESENTATION

MORE INFO

Number of students : 30

Internship : (5 months)



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

OBJECTIVES

This program 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 program 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

TRAINING CONTENT

MASTER 2 - MMS

SEMESTER 1

- PDEs Analysis 6 ECTS
- Numerical Analysis of PDEs 6 ECTS
- High Performance Computing 4 ECTS

ELECTIVES

- Shape optimization 4 ECTS
- Advanced PDE analysis 4 ECTS
- Waves 4 ECTS
- Porous Media 4 ECTS
- Finite Volume Methods for Hyperbolic Systems 4 ECTS
- Stochastic PDE 4 ECTS
- Industrial Software 4 ECTS
- Fluid Mechanics 4 ECTS
- French or english as a foreign language 2 ECTS

SEMESTER 2

- Internship 5 to 6 months 30 ECTS

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 / Asmptotic Methods
 - Stochastic PDE
 - Advanced PDE
 - Industrial Softwares
 - Shape Optimisation/Fluid Mechanics

Semester 4

- *Compulsory Courses (Mandatory)*
 - Internship or Master's dissertation
- *M2 MMS Course selection 2020-2021 (Choice: 3 Among 4)*
 - Introduction to the numerical solution of the wave propagation problems
 - Finite Volume Methods for Hyperbolic Systems / Asmptotic Methods
 - Stochastic PDE
 - Shape Optimisation/Fluid Mechanics

ACCESS CONDITIONS

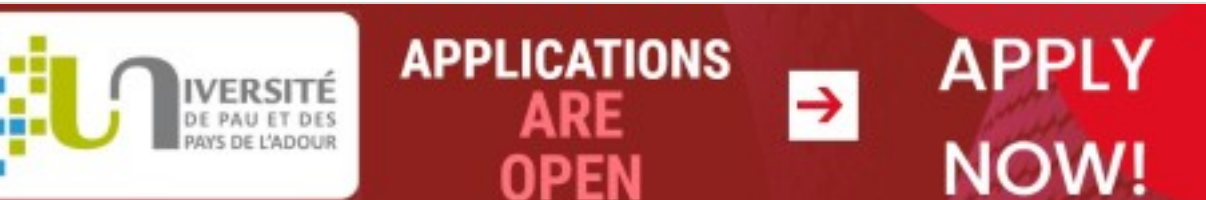
CECRL [B2](#) level in English. Students are allowed to use English or French during exams.

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

INSCRIPTION MODALITIES



EXPENSES

Administrative tuition in France is determined at a national level. The French Ministerial Order of April 19, 2019, amended on June 9, 2020, sets university tuition for a Master Program as follows: European nationals: **€243**, extra-European nationals: **€3770**.

For academic year 2021-2022, the Board of Directors has extended its policy of automatically providing **partial reduction of these fees at the UPPA**. As a result, extra-European nationals will be granted automatic partial reductions such that **they will be able to pay the same enrollment fees as European nationals**.

Extra fees:

In addition to academic tuition, most students must pay a student body fee (CVEC, which cost €92 in 2020-2021).

*NB: Admitted candidates in any course of study who have taken a break of more than two years from their studies will enroll via the UPPA's **Continuing Education service** ([Formation Continue](#) / FORCO). They are exempt from the CVEC, however they may be subject to a different tuition scale.*

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)

PLACES

Pau

PERSON IN CHARGE

Daniela Capatina
daniela.capatina@univ-pau.fr

Tordeux Sébastien
sebastien.tordeux@univ-pau.fr

Guessab Allal
allal.guessab@univ-pau.fr

Giacomoni Jacques
jacques.giacomoni@univ-pau.fr

ADMINISTRATIVE CONTACT(S)

Secrétariat de Mathématiques
secretariat-mathematiques@univ-pau.fr

M2 Stochastic tools and Computational Methods for Decision (MSID)

PRESENTATION

MORE INFO

Number of students : 20

Internship : (5-6 months)



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
- * [EIFFEL Scholarship of Excellence](#)
- * [E2S Talents' Academy Scholarships](#) for all students
- * Specific Master's scholarship

TRAINING CONTENT

MASTER 2 - MSID

SEMESTER 1

- * French 2 ECTS
- * Reliability theory 4 ECTS
- * Survival analysis 4 ECTS
- * Design of experiments 4 ECTS
- * Statistical process control 2 ECTS
- * Tools for engineering reliability 4 ECTS
- * Datamining 2 ECTS
- * Deep learning 2 ECTS
- * Advanced machine learning 2 ECTS
- * Data challenge 2 ECTS
- * Literature review 2 ECTS

SEMESTER 2

- * Research or applied project 10 ECTS
- * Internship 20 ECTS

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 Reseach (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

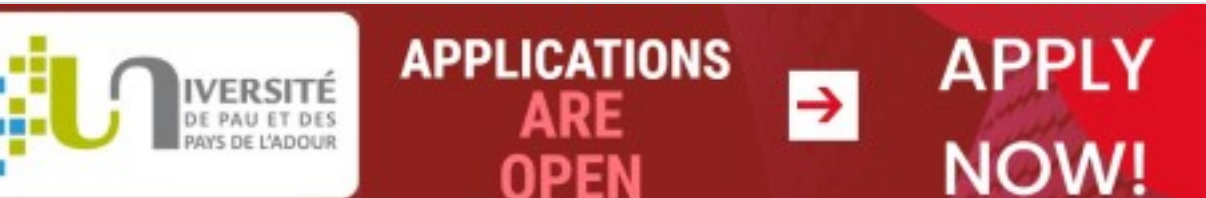
CECRL  level in English,

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

INSCRIPTION MODALITIES



EXPENSES

Administrative tuition in France is determined at a national level. The French Ministerial Order of April 19, 2019, amended on June 9, 2020, sets university tuition for a Master Program as follows: European nationals: **€243**, extra-European nationals: **€3770**.

For academic year 2021-2022, the Board of Directors has extended its policy of automatically providing **partial reduction of these fees at the UPPA**. As a result, extra-European nationals will be granted automatic partial reductions such that **they will be able to pay the same enrollment fees as European nationals**.

Extra fees:

In addition to academic tuition, most students must pay a student body fee (CVEC, which cost €92 in 2020-2021).

*NB: Admitted candidates in any course of study who have taken a break of more than two years from their studies will enroll via the UPPA's **Continuing Education service** ([Formation Continue](#) / FORCO). They are exempt from the CVEC, however they may be subject to a different tuition scale.*

FURTHER STUDY

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

PROFESSIONAL INSERTION

Sectors:

- * **Industry, services, academic**

Fields:

- * **Transportation, Aeronautics, Space**
- * **Energy (oil, gas, nuclear renewal etc...)**
- * **Pharmaceutics and medicine**
- * **banking and insurance companies**

Positions:

- * **RAMS engineer, statistical analyst, datascientist, data processing engineer, biostatistician, PhD students**

ORGANIZATIONAL UNIT

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

PLACES

Pau

PERSON IN CHARGE

MAITRE DE CONFERENCES DES UNIVERSITES Paroissin
Christian
christian.paroissin@univ-pau.fr
Phone +33 559407569

ADMINISTRATIVE CONTACT(S)

Secrétariat de Mathématiques
secretariat-mathematiques@univ-pau.fr