INTERNATIONAL GRADUATE PROGRAM
TAUGHT IN ENGLISH

BIG DATA & DATA SCIENCE

A COMBINED MATH AND COMPUTER SCIENCE POSTGRADUATE CERTIFICATE PROGRAM

MINESnancy
ARTEM

1 MEET THE EXPERTS

Learn from internationally renowned faculty involved in top class laboratories at the forefront of innovation.

2 ACQUIRE AVANCED SKILLS...

...to tackle engineering challenges with highly selective combined Math and CS Curriculum based on a combination of theoretical, computational and experimental methods.

3 PERSONALIZED TUTORING

Personalized Tutoring in Small Groups.
Individual and personalized support throughout the mobility.

4 RESEARCH AND INNOVATION

Benefit from our close collaboration with a world class research environment:
Institut Élie Cartan de Lorraine & Lorraine Research Laboratory in Computer Science and its Applications.

8 REASONS FOR STUDYING AT MINES NANCY!

5 PREPARE YOUR FUTURE CAREER

75% of students hired before graduation: Mines Nancy offers close interaction with industry, through lectures given by our industrial partners and the possibility to perform either academic or industrial research projects.

6 LIVE A MULTICULTURAL EXPERIENCE

This English curriculum is open to and popular with local French students. You will also mix with students from all around the world, as 25% of the students at Mines Nancy come from abroad with origin from over 20 different countries.

7 MINES NANCY WELCOME PACK

The teachers, staff and students of Mines Nancy are looking forward to welcoming you. Many services are provided and social events are organized for international students to help you settle in and feel comfortable. An optional French summer school is also available for you to feel even more at ease.

8 ENJOY NANCY

Nancy is renowned throughout the world for its Unesco-listed Place Stanislas. This Capital of Lorraine is a wonderfully charming and dynamic city with more than 60,000 students. There are more than 60 clubs and student societies at Mines Nancy (sports, arts, social events, professional activities...).

WHY MINES NANCY?

Sandie Ferrigno
Associate professor

This one-year International Program offered by Mines Nancy on «Big Data and Data Science» is directed by the GIMA department (Industrial Engineering and Applied Mathematics). It is associated with the facilities of the IECL and Loria research laboratories which carry out world-class research in the fields of Statistics and Computer Science.

The «Big Data and Data Science» curriculum is both a Master level program for the French students at Mines Nancy, and a track for foreign exchange students. While the courses are given in English for convenience, students are entirely integrated with French students during sessions and have the opportunity to fully experience French way of life and studies.

This program offers the enrolled students an in-depth focus on the mathematical foundations of Data Mining and Numerical Optimization underpinning Machine Learning and Knowledge Extraction theories and techniques, as well as an overview of the technical architectures supporting high performance distributed data processing and computation.

EMBRACE THE WORLD OF DATA!

The digital transformation of the world economy provides us with tremendous amounts of data. The capacity to leverage these data and transform them into information is offering a wide range of opportunities for new markets, services and improved decision making.

Cutting edge research in Applied Mathematics (Statistics and Optimization) and Computer Science (Machine Learning, Knowledge Mining, High Performance Computing) has been competing with corporate stakeholders **to develop tools and techniques for the management of these data troves.**

The aim of this program is **to confront these techniques and their applications, as well as their more fundamental underlying theories** to modern issues of data science.

At the end of the year, **the students will be able to work in many areas** as data scientists endorsed by one of the most prestigious French Graduate Schools Of Science, Engineering and Management.

PROGRAM ID

Language

English

Duration

2 semesters:

- **1 semester course:** September - February
- **1 semester internship:** March - August

Prerequisites

Equivalent of European Master 1 level in Applied Mathematics or Computer Science with excellent academic records.

ECTS

60 ECTS

Program schedule

- **Large scale Statistics**
- **Machine Learning**
- **Scalable Distributed Architectures**
- **Knowledge Extraction**
- **Optimization**
- **Spatial Statistics**
- **Information theory**
- **Tutored Project**
- **Industry and Business project & seminars**
- **6 Months Research Internship in Partner Labs or Industry**
- **Artem Workshops**

PROGRAM

Aims and skills

This program offers the enrolled students an in-depth focus on the mathematical foundations of Data Mining and Numerical Optimization underpinning Machine Learning and Knowledge Extraction theories and techniques, as well as an overview of the technical architectures supporting high performance distributed data processing and computation.

Program Schedule

Module 1: Large Scale Statistics (41h-2.5 ECTS)

- **PCA**
- **Correspondance and discriminant Analysis**
- **Classification**
- **Segmentation**

Module 2: Machine Learning (21h-2.5 ECTS)

- **Classification**
- **Dimensionality Reduction**
- **Feature Extraction & Feature Learning**
- **Deep Learning**

Module 3: Scalable Distributed Architectures (21h-2.5 ECTS)

- **High Availability, High Throughput, Distributed Storage**
- **Scalable Distributed Computing**
- **MapReduce**
- **NoSQL**

Module 4: Knowledge Extraction (21h-2 ECTS)

- **Symbolic data mining**
- **Knowledge representation**
- **Pattern extraction**
- **Formal Concept Analysis**

Module 5: Optimization (36h - 4 ECTS)

- **Theoretical results for unconstrained and constrained optimisation**
- **Gradient methods**
- **Penalization, duality**
- **Formal Concept Analysis**

Module 6: Spatial Statistics (36h-2.5 ECTS)

Module 7: Information theory (21h-2.5 ECTS)

Tutored Project (100h - 5.5 ECTS)

Industry and Business project & seminars

Artem Insight (2 ECTS) 1 week dedicated to the development of a project proposed by a company or an organization

Ateliers Artem (4 ECTS) About twenty workshops are offered each year, one day a week between September and April.

For more information: http://www.alliance-artem.fr

Research Internship (30 ECTS)
6 Months Research intership in Partner Labs or industry

HOW TO APPLY?

Application

If you live in one of the following countries, you have to apply on Etudes en France platform from November to March :

Algeria, Argentina, Benin, Brazil, Burkina Faso, Burundi Cameroon, Chile, Republic of the Congo, South Korea, Ivory Coast, Egypt, United States, Gabon, Guinea, Haïti, India, Indonesia, Iran, Japan, Kuwait, Lebanon, Madagascar, Mali, Morocco, Mauritius, Mauritania, Mexico, Niger, Nigeria, Peru, Senegal, Democratic Republic of Congo, Russia, Saudi Arabia, Senegal, Singapore, Taiwan, Tchad, Togo, Tunisia, Turkey and Vietnam.

www.pastel.diplomatie.gouv.fr/etudesenfrance/dyn/public/authentification/login.html

If you live in a a country not listed above, you have to apply on the e-candidat platform: https://ecandidat.univ-lorraine.fr

FEES AND FUNDING

Within a bilateral agreement

Erasmus exchange students: Free

Non-EU exchange students: Free

>>Please note that the Big Data & Data Science program isn't a graduating program for exchange students.

Free movers

EU/EEA/Overseas: 4500€

excluding registration fee (243€ in 2022/2023)

Fellowships

Possible fellowships based on academic achievements.

Lifelong learning

Tuition fees: 4500€

excluding registration fees: 243€ in 2023/2024

FRENCH SUMMER SCHOOL

Date: From mid-July to the end of August or possibility to make a personalized schedule
Duration: 6 weeks

On an optional basis, Mines Nancy proposes a French Summer School to provide international students with the necessary skills in French. International students will also improve their knowledge of French culture and French patrimony. These courses are also tailored for engineering studies (methodological tools, professional language...).

The fee includes tuition fee and a part of cultural visits expenses. The fee does not include travel, accommodation, meals and other living expenses.

- **If you are a student from a partner university of Mines Nancy and/or have been admitted to the school for the upcoming academic year:** the total cost is 600€ (or 100€ per week)
- **If you are a student admitted to another French or foreign university:** the total cost is 750€ (or 125€ per week).

Payments are made by bank transfer.

For more information:

WELCOME PACK

Mines Nancy offers individual and personalized support throughout the mobility.

- **Accommodation & administration support**
- **Personalized welcome from the railway station to accommodation**
- **Help with arrival in Nancy**
- **Educational mentoring**
- **Buddy programme**
- **International week end**
- **Social & cultural activities**
- **Intercultural Days**

CONTACTS

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IMT Grand Est

ARTEM

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