
INTERNATIONAL EXCHANGE PROGRAM
TAUGHT IN ENGLISH

BIG DATA & DATA SCIENCE

**A COMBINED MATH AND COMPUTER
SCIENCE MASTER PROGRAM**



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 40000 students. There are more than 60 clubs and student societies at Mines Nancy (sports, arts, social events, professional activities...).

WHY MINES NANCY?



Antoine Henrot
Professor



Bart Lamiroy
Associate Professor

This International Program offered by Mines Nancy on «Big Data and Data Science» has the unique feature of being directed by both the Mathematics and the Computer Science Department, thus guaranteeing an outstanding level in both domains. It is associated with the Institut Élie Cartan de Lorraine and the Lorraine Research Laboratory in Computer Science and its Applications, facilities conducting world class research in these areas. The program is also sponsored by Saint-Gobain Research within the «Big Data Chair» agreement with Mines Nancy.

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.

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

ECTS

60 ECTS

Prerequisites

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

Program schedule

- Data Mining
- Machine Learning
- Scalable Distributed Architectures
- Knowledge Extraction
- Optimization
- Ethics
- IT System Management
- Tutored Project
- Industry and Business project & seminars
- 6 Months Research Internship in Partner Labs or Industry

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: Data Mining (42h - 4 ECTS)

- PCA
- Correspondance and discriminant Analysis
- Classification
- Segmentation

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

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

Module 3: Scalable Distributed Architectures (21h - 2 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: Ethics & Humanities (21h - 2 ECTS)

Module 7: IT System Management (42h - 4 ECTS)

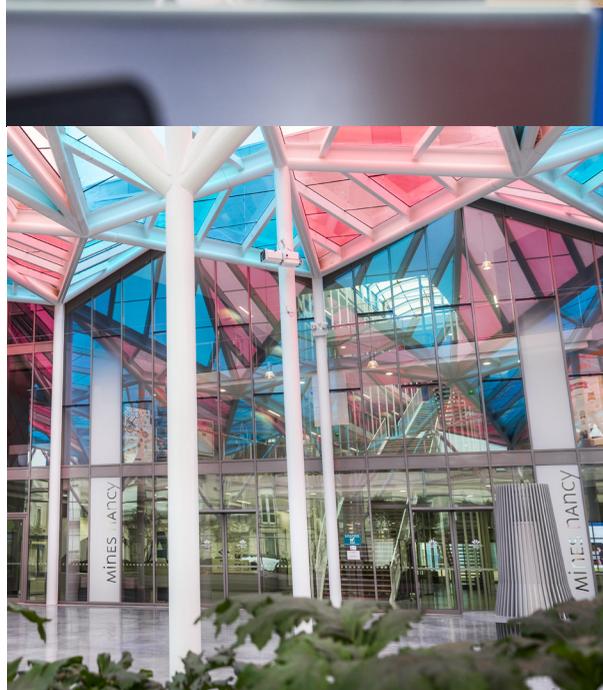
Tutored Project (100h - 8 ECTS)

Industry and Business project & seminars

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

Economics, Organization, Business seminar (1 ECTS) 1 week dedicated to seminars in the field of Economy, Organization or Business

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



HOW TO APPLY?

Application deadline

Application for enrollment in September: **30th May**

Application

- **Application form duly completed**
 - **Official transcripts** (in English)
 - **CV and cover letter** (in English)
 - **Copy of passport**
 - **Proof of Language Proficiency** (compulsory minimum B2)
- Please send your application form by email to:**
mines-nancy-scolarite-ficm@univ-lorraine.fr

Entry requirements

Candidates should have achieved at least 4 years of higher education or M1 with a solid background in mathematics, statistics, computer science, engineering science.

FEES AND FUNDING

according to 2017/2018 fee regulations

Within a bilateral agreement

Erasmus exchange students: Free

Non-EU exchange students: Free

excluding compulsory National French Health Insurance (217€ in 2017/2018)

Free movers

EU/EEA/Overseas: 6000€

excluding compulsory National French Health Insurance (217€ in 2017/2018)
excluding registration fee (615€ in 2017/2018)

Fellowships

Possible fellowships based on academic achievements, application to be submitted by april 15th.

Lifelong learning

Tuition fees: 7416€

excluding registration fee (615€ in 2017/2018)

FRENCH SUMMER SCHOOL

Date: From July until end of August 2018 or possibility to make a personalized schedule

Duration : 160 hours

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...).

- **2 months (from 02/07/2018 to 24/08/2018):**
Participation fees are 1000€. If you are enrolled at Mines Nancy or a student coming from a Partner University, fees are reduced to 800€.
- **1 month (from 30/07/2018 to 24/08/2018):**
Participation fees are 500€. If you are enrolled at Mines Nancy or a student coming from a Partner University, fees are reduced to 400€.

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

Student Mobility Coordinator

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