

# Master of Science **Big Data** IN ENGLISH

**"Information is the oil of the 21<sup>st</sup> century, and analytics is the combustion engine."**

Peter Sondergaard of the Gartner Group

Many "Big Data" programs have surfaced recently, most of which are very IT oriented. ENSAI has chosen a different road. Students learn not only the latest in Computer Science technology; they also master the statistical modeling skills that are essential to becoming a skilled data scientist.

It is ENSAI's philosophy that, just as oil in the early 1900s required refining to be useful, data also needs to be filtered, treated, and stored. But this is not enough. The internal combustion engine opened up the possibilities for using oil and increased its value. In the same way, statistical modeling uncovers valuable knowledge from data that would otherwise be useless, hereby empowering decision making.

Thanks to ENSAI's renowned expertise in Statistics and its complex and thorough approach to Big Data, close ties with the professional world have been established and graduates are highly sought after.

## WHY ENSAI?

- **Reputation**  
ENSAI is a highly-esteemed engineering school (one of the prestigious French *Grandes Écoles*) with cutting-edge expertise in Statistics, Computer Science and Economics.
- **High Employment**  
Highly-skilled graduates enjoy an exceptional employment rate.
- **Human Scale**  
The small student body for this MSc program receives a personalized welcome, and the faculty members of ENSAI's two research teams are readily available for students.
- **International Vision**  
Partnerships with prominent institutions around the world have been fostered to prepare students for international careers (eg. Humboldt-Universität zu Berlin, University of Warwick, Tongji University, Colorado State University).

## STRONG POINTS OF THE PROGRAM

- explores a unique field where Statistics and Computer Science converge
- addresses practical, real-world issues and provides a solid theoretical background
- prepares for a career with rapidly-increasing employment worldwide

## IT STATISTICAL TOOLS

Hadoop, Map Reduce, Spark  
Python, R, SAS



Accreditation:  
French Ministry of  
Higher Education  
and Research,  
2014

# COURSE OBJECTIVES

Students will:

- Learn the methodological aspects and the practical skills needed to become a data scientist in order to meet the growing needs of a large variety of companies and organizations, such as retailers, manufacturers, financial markets, insurance companies, healthcare providers, and public administrations
- Acquire the necessary tools to handle and analyze massive amounts of heterogeneous data
- Master the statistical methods vital for rapidly extracting information from multiple datasets and the IT methods suitable for stocking the data

# CALENDAR AND PROGRAM

The program includes two semesters of coursework at ENSAI, which are followed by a four to six-month paid internship in France or abroad within the professional world or academia/research laboratories.

July - August	Semester 1	Semester 2	May - October
	September - December	January - April	
*Intensive French Summer Program 6 credits	Statistics Track <b>OR</b> Computer Science Track 11 credits	Common Courses 24 credits	Internship 25 credits
	Common Courses 16 credits		
	French classes 2 credits		
		French classes 2 credits	

\* An intensive French program for non-French speakers precedes the program. These students also benefit from French classes throughout the academic year.

# CURRICULUM

## Semester 1 (two-fold)

### Statistics Track

for students with computer science backgrounds

- Advanced Topics in Probability and Statistics (45h)
- Advanced Topics in Data Analysis (40h)

**OR**

### Computer Science Track

for students with statistical backgrounds

- Advanced Computer Science (45h)
- Computer Networks (40h)

### Common courses

- Data Mining and Statistical Learning (40h)
- Databases (40h)
- High-Dimensional Statistics (40h)
- Operating Systems (40h)

**Including:**

Advanced Regression Models, Monte-Carlo Methods, Big Data Databases, Cloud Computing

## Semester 2

### Common courses

- Complex Data Modeling (40h)
- Parsimonious Representations (40h)
- Big Data Analytics Tools (40h)
- Statistical Software (40h)
- IT Security (40h)
- Final Project on Big Data (40h)

**Including:**

Functional Data Analysis, MapReduce, Penalized Regression, Hadoop Technologies, Data Visualization

**Partners:**



## Internship\*

4-6 month professional experience followed by final report and jury defense

\* If the Internship is carried out in France, by law it must be paid.



## STRONG LINKS WITH THE PROFESSIONAL WORLD

- a program involving numerous projects supervised by professionals
- the annual **ENSAI Business Forum** with over 60 participants, from start-ups to large groups, to help students find an internship and/or a future job
- the **ENSAI Career Center**, an online tool to help students kick start their future careers



## SOME OF OUR PARTNERS



## TESTIMONIALS



**Andra ANOICA** Bucharest University of Economic Studies - Romania

"The experience at ENSAI has definitely completed my academic preparation towards becoming a data scientist. I chose the Master of Science in Big Data over other programs for the Computer Science classes tailored for people with a statistical background. It was amazing learning so much in such a short amount of time. The opportunity to discover and use the newest in-demand technology and tools will give me an edge on the job market which would have been difficult to acquire otherwise."



**Moustapha OUSMANE BAWA GAOH** West African Institute of Statistics and Applied Economics - Cameroon

"After studying Statistics I was looking to specialize in the field of Data Science. After some research, ENSAI seemed the obvious choice and I am delighted to have opted for this program. The atmosphere in the classroom is warm and friendly, the equipment top-notch and readily accessible, teachers from many walks of life with different backgrounds share their expertise, and the end result corresponds to what the professional world is seeking, therefore opening up numerous internship possibilities. Furthermore, thanks to the international nature of the MSc, students from different horizons and nationalities thrive side by side."



**Shashank SHARMA** Visveswaraiah Technological University - India

"During the course of my professional career at Samsung, I felt a growing need to upgrade my skill sets in Data Analysis, and after studying some of the basic concepts of Data Analysis, I realized that attending a school of Statistics would be the right choice for me to upgrade my skills."

ENSAI is one of the few schools of Statistics worldwide to offer the MSc in Big Data program for applied science engineers. Moreover, the school's course curriculum is unique and covers all aspects of the Big Data field in a very comprehensive manner. Reinforcement of concepts through practical projects ensures that students understand the basic concepts required to succeed in the Big Data field. Moreover, the school's faculty members and administrative staff are very helpful, and are eager to address students' queries and concerns."

## PROFESSIONS Graduates of the program are skilled *Data Scientists*

In addition to **doctoral possibilities** in research, graduates have numerous career opportunities in international corporations and data start-ups in, amongst others, the following areas:

Business Analytics

Digital Marketing

Healthcare Industry

Industrial Applications

Risk Management

Social Networks Analysis



Place du Champ-Jacquet - Rennes



Pink Granite Coast - Brittany



## LOCATION

ENSAI is located on the Ker Lann Campus, near the cosmopolitan city of Rennes, France. Only 90 minutes from Paris by train, Rennes is known for its many cultural events and festivals, as well as being a lively student city with two major universities and a number of graduate schools. Rennes is the capital of Brittany, a region renowned for some of France's most spectacular coastline and landscapes.

## ACCOMODATION

All Ker Lann Campus residence halls are open to ENSAI students

→ [www.campuskerlann.com/categorie/logement](http://www.campuskerlann.com/categorie/logement)

Many of ENSAI's foreign students are warmly welcomed at Résidence University.

Foreigners who follow the intensive summer French program are hosted within families.

## COST

- 8,000 € (includes tuition, registration, and fees for entire program)
- + 1,500 € for intensive Summer French program (for foreigners not possessing B2 CEFR minimum level in French)

*N.B. Possibility for reduction in program cost for applicants from partner institutions*

## COST OF LIVING

Estimated monthly expenses: **€600-€900**

**€25 - €35**  
Smartphone  
/ Data plan

**€200 - €350**  
Rent (net)

**€35**  
Electricity

**€250 - €350**  
Food

**€30**  
Public  
transportation

**€50 - €100**  
Other expenses

**€400 - €550**  
(+ security deposit equal to one month's rent),  
minus roughly €200 (French rent subsidies: CAF)

(on-campus student lunch meals: €3)

(laundry, clothing,  
entertainment, etc)

## ADMISSION AND LANGUAGE REQUIREMENTS

- All applicants must have a minimum of 4 years of higher education (at least a 4-year BSc, or the first year of an MSc). Strong mathematical and computer science backgrounds are required.
- Applications are pre-selected based on candidates' degrees, level, and skills. Final admission is granted following a personal interview (in person or via videoconference).
- **Language 1: English** (all coursework and examinations)
  - Minimum level of B2 CEFR
  - Common certificates accepted (eg. TOEIC, TOEFL, IELTS, Cambridge CAE)
- **Language 2: French** (practical life)
  - No minimum level. Admitted students with French skills may be exempt from language courses

→ Full procedures, applications and deadlines available at [www.ensai.fr](http://www.ensai.fr) under "Admission > MSc in Big Data"

## ENSAI

Campus de Ker Lann - Rue Blaise Pascal - BP 37203 - 35172 Bruz Cedex - France

Tel: **+33 (0)2 99 05 32 44/08** - Fax: **+33 (0)2 99 05 32 05** - Email: [masterbigdata@ensai.fr](mailto:masterbigdata@ensai.fr)

[www.ensai.fr](http://www.ensai.fr)

