



MINES ParisTech

Graduate School

[www.mines-paristech.eu](http://www.mines-paristech.eu)

# MINES ParisTech

230 years of history, tradition and heritage are an integral part of the identity and durability of MINES ParisTech. Our school offers graduate and post-graduate education programmes to 1300 students. The Institution holds 18 research centers, 235 talented professor-researchers, and is ranked # 1 institute for research partnerships, a unique link with companies.

We are proud to display, to maintain, to share our values built over the years.

## IN BRIEF

**1783** Foundation of Ecole Royale des Mines, in Paris

**150** Master in Science and Executive Engineering degrees awarded per year

**140** Partner universities worldwide

**100** PhD awarded per year

**30** % of international students

**2** Nobel Prize laureates (Economics & Physics)

**1** rank of MINES ParisTech in recent rankings of engineering schools by national media (for the graduates' salary, interest for employers, contractual research...)

## A FRENCH "GRANDE ECOLE"

MINES ParisTech like other French Grandes Ecoles is devoted to the training of top engineers for industries, services and research. These Schools are relative small structures (about 150 MSc graduates per year, 100 PhD graduates, 200 professors-researchers) focused on top engineering topics. Education, research and business are strongly linked in the academic programmes and research activities.

Most of the programmes are designed for graduate students with at least a BSc degree.

French "Grandes Ecoles" can be seen as excellence institute for graduate education and research, among which MINES ParisTech is one of the flagships.

## MASTER IN SCIENCE AND EXECUTIVE ENGINEERING "DIPLOME D'INGENIEUR"

Inspired by the notion of theory and practice, the training of "Mineurs" (nickname of our engineering students) is perfectly balanced with 1/3 in engineering sciences, 1/3 in economics and social sciences and 1/3 in projects and practical experience.

The students are admitted through a competitive examination, after the "classes prépara-

toires" (highly competitive Honours classes), and are joined, in the graduate 1<sup>st</sup> year, by externally qualified students from French and foreign universities and from the Ecole Polytechnique.

They acquire all the skills required for senior positions of responsibility. 84% of them have a job offer before graduation.

The "Diplôme d'ingénieur" is, in France, considered as the most exclusive degree.

## CONTACT

### INTERNATIONAL OFFICE

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# INTERNATIONAL OPPORTUNITIES

MINES ParisTech has signed more than one hundred agreements on all continents to cooperate within the frame of the Master degree in Science & Executive Engineering programme. These agreements are signed under our own name, or through the ParisTech or Paris Sciences et Lettres (PSL) Research University. MINES ParisTech is member of the ParisTech Consortium of excellent engineer schools and of the ATHENS Network.

## WHY FRENCH ?

English is no longer a foreign language to be learnt, it will be your daily work language. But with the increase of competition for the best positions, companies are interested more and more in candidates with "bonuses" like knowing 3 languages.

Moreover, French companies are well known for their technological expertise and their worldwide activities. Mastering French language can provide you some international top positions in French companies or French subsidiaries in Asia, Africa and Europe. French is the 5th most spoken language worldwide.

## PRACTICAL CONSIDERATIONS

### ■ ADMISSION PROCESS

Very selective admission process based on application file, written test and oral exams.

### ■ INSCRIPTION AND TUITION FEES

- ERASMUS students and students from partner universities are mainly exempted of inscriptions fees.
- The tuition fees are €18 000 per year. A grant is given to international students: these fees are waived.

### ■ ACCOMMODATION

The students admitted in our Master in Science and Executive Engineering will get a room in the students' residence (Maison des Mines), located near the Institute.

The monthly rent is about €200.

The "visiting" students will have a chance to get a room at the "Cité internationale universitaire de Paris".

### ■ SCHOLARSHIP

MINES ParisTech does particular effort to ensure scholarships and various financial supports for the international students.

In the past years, all the students admitted in the Master in Science and Executive Engineering got a scholarship to cover their living expenses:

- from the French government
- from companies
- from Home country institutions or bilateral programmes (Brafitec, Arfitec, CSC...)
- from MINES ParisTech Alumni Foundation.

From €600 to €2 000/month for two years



**ADMISSION:** [WWW.MINES-PARISTECH.EU/ADMISSIONS/MASTER-DEGREE-IN-SCIENCE-AND-ENGINEERING/](http://WWW.MINES-PARISTECH.EU/ADMISSIONS/MASTER-DEGREE-IN-SCIENCE-AND-ENGINEERING/)

Programme	Degree	Duration	Requirements
Master in Science and Executive Engineering / Diplôme d'ingénieur	Degree-seeking	2 years	4 years of Higher education
	Exchange student	6 to 12 months	BSc degree
Master of Science	Degree	1 to 2 years	BSc degree
Advanced Master Programme	Degree	1 to 2 years	MSc degree
PhD	Degree / Co-supervised degree	3 years	MSc degree MEng degree
Research internship	For BSc or MSc research	3 to 12 months internship	BSc degree

# MINES ParisTech Programmes



## MASTER IN SCIENCE AND EXECUTIVE ENGINEERING

The aim of this Master programme is to train high level engineers able to manage complex industrial projects and to become managers of companies. This is implemented through a multidisciplinary programme, with a high technical, scientific and

socio-economic content, leading to a strong background of fundamental knowledge and of practical skills thanks to strong participation of lecturers from enterprises and implementation of internships in companies. This programme is taught in French.

## GRADUATE 1<sup>ST</sup> YEAR: FOCUSED MAINLY ON ENGINEERING SCIENCES

- A basis of fundamental core courses, with modules in applied mathematics and physics, economics and social sciences
- Choice of specialized courses: approximately 90 courses offered according to the following broad themes:
  - pure and applied mathematics
  - physics, mechanics, thermo mechanics, electronics
  - materials sciences, geosciences and environment
  - energy

- engineering
- economics and social sciences
- information management and communication
- Modern languages (compulsory 2 foreign languages among the 10 languages offered, French being compulsory for international students)
- Young engineer internship in industry (3 to 4 months), as “assistant executive engineer”, with frequent possibility of international placement

### DOUBLE DEGREES

More than 60 double degree agreements with partner universities available.

## GRADUATE 2<sup>ND</sup> YEAR: FOCUSED MAINLY ON MINORS

In addition to core courses (accounting and law) and to electives, students have to choose a concentration in a specific engineering field, called minor and to implement a technical project related to an industrial problem under the close supervision of a tutor from one of MINES Paris-Tech 18 research centers, leading ultimately to an internship of at least 4 months in industry, and concluding by the submission of a master thesis and its oral presentation in the presence of scientific specialists and of the industrial partners.

- Biotechnology
- Process Engineering
- Industrial Economics

- Nuclear Engineering
- Geosciences
- Geostatistics and Applied Probability
- Scientific Management
- Engineering Design and Management
- Innovation and Entrepreneurship
- Mechanical Engineering and Energy
- Information Systems Management
- Control system, Robotics, Vision & Morphology (Applied mathematics)
- Materials Sciences and Engineering
- Underground engineering and management
- Production Systems and Logistics
- Public Affairs and Innovation

	September	Autumn semester			February	Spring semester			May
GRAD. 1 <sup>ST</sup> YEAR	FIELD TRIP	CORE COURSES	MULTIDISCIPLINARY PROJECT	CORE COURSES	MINOR COURSES	CORE COURSES	MULTIDISCIPLINARY PROJECT	ASSISANT EXECUTIVE ENGINEER INTERNSHIP	
		MULTIDISCIPLINARY PROJECT		MULTIDISC. PROJECT		MULTIDISCIPLINARY PROJECT			
		LANGUAGES		LANGUAGES		LANGUAGES			
		ELECTIVES		ELECTIVES		ELECTIVES			
		SPORT		SPORT		SPORT			
GRAD. 2 <sup>ND</sup> YEAR	ASSISANT EXECUTIVE ENGINEER INTERNSHIP	MINOR COURSES	CORE COURSES	INDUSTRIAL RESEARCH INTERNSHIP	CORE COURSES	INDUSTRIAL RESEARCH INTERNSHIP			
			LANGUAGES		LANGUAGES				
			ELECTIVES		ELECTIVES				
			SPORT		SPORT				



## MASTER OF SCIENCE IN ENERGY STRATEGIES

Energy procurement was a question of secondary importance until 1974, when it became a central cost factor to be controlled and monitored. With environmental constraints and the liberalisation of markets, it has now turned into a strategic choice and a factor of uncertainty and risk for countries as well as for firms. The Master in Energy Strategies provides an understanding of energy issues as well as the capacity to define solutions, and choose and implement strategies for energy procurement and management.

The objectives are:

- To participate in drafting energy policies for their firms or countries.
- To succeed in projects involving French firms and institutional players.

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## POST MASTER PROGRAM

The postmaster non doctoral programmes, lasting one year, aim at providing initial or ongoing training, that is to say, high-level training for professional purposes.

Each programme comprises a series of classes, laboratory practicals or training periods in the field, visits and lectures, followed by a six-month practical internship, focusing on a problem raised by an employer and usually taking place in a company:

### English-speaking programmes:

- Materials, processing and modeling (MAPMOD)
- International Environmental Management (ENVM)
- International Energy Management (ALEF)
- PSL Predoctoral Year Institute of Technology and Innovation (IT)

- Open Cast Mining and Quarrying (CESECO)

- Mining Geostatistics (CFSG)

### French-speaking programmes:

- Environmental Management and Engineering (IGE)
- Energy Systems Optimization (OSE)
- Gas Engineering and Management (GAZ)
- Industrial Management and Logistics Systems (MISL)
- Renewable Energy (ENR)
- Industrial Risk Management (MRI)
- Design des Matériaux et des Structures (DMS)
- Management Industriel et Excellence Opérationnelle (MILEO)

### Contact

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## PhD

Doctoral courses at MINES ParisTech have a twofold vocation : training high-level scientific PhDs, ready to join companies and to conduct innovative industrial projects and training future research-academics able to conduct research programmes aimed at academic excellence while developing partnerships with economic and social players, in the public and private sectors alike.

### Mechanical and Materials Engineering

- Materials Science and Engineering
- Mechanics
- Computational Mechanics and Materials

### Mathematics and Systems

- Mathematics and Control Engineering
- Real-time Computer Science, Robotics, Systems and Control

- Mathematical Morphology
- Computational Biology
- Control, Optimization, Prospective
- Geostatistics

### Energy and Processes

- Energy and Processes

### Economics, Management, Society

- Economics and Finance
- Management Science
- Socio-Economics and Innovation
- Science and Engineering of Hazardous Activities

### Earth Sciences and Environment

- Geosciences and Geoengineering

### Contact

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## OTHER MASTER'S

- Biomedical Engineering
- Mobility and Electric Vehicles
- Transport and Sustainable Development
- Sustainable Development, environment and Energy Economics
- Water, Soil and Waste Engineering

### Contact

masters@mines-paristech.fr

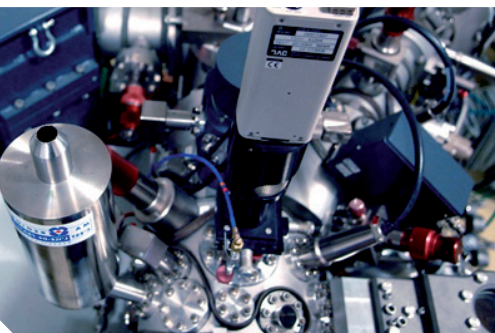


## PHD STUDENTS

400 PhD students

30% International PhD students

# RESEARCH



## WHERE THEORETICAL AND PRACTICAL QUESTIONS MEET

At MINES ParisTech, research is inspired by reality, when questions raised by companies are not solved by the existing scientific corpus, or when a practical issue triggers theoretical questioning. By essence, our researchers work on subjects both catering to concrete industrial questions and raising theoretical scientific questions.

The *raison d'être* of research at MINES ParisTech is to bring together theory and practice. To be able to tackle these double-sided topics means to develop a finely tuned knowledge of industrial partners' issues and the best academic production.

## FIELDS OF RESEARCH

### Oriented research

MINES ParisTech is a "Grande Ecole" centred on its research activities. It encompasses all fields of scientific knowledge thanks to 18 innovative research centers exploring five major fields. With 235 research academics, 400 doctoral students and 60 post-doctoral students, MINES ParisTech ranks first among the Grandes Ecoles for the volume of contractual research.

### Top-notch laboratories

The Institute's laboratories are partly associated with CNRS, INSERM, INRIA, Institut Pasteur, Institut Curie, etc. Their research, at the intersection of many fields, has led to the emergence of new disciplines (geostatistics, mathematical morphology and automatic control systems) which are now studied by the scientific community and disseminated throughout industry and the services.

### Closely linked teaching and research

The range of education programmes (engineer, master's, advanced master's and PhD) are coordinated by research academics working in the laboratories. Consequently, the students are up-to-date with the reality of technical, economic and social issues.

### A broad international dimension

Of the €30 million in research contracts, 30% involve at least one foreign partner. MINES ParisTech collaborates closely with more than 100 different countries and foreign universities.

### Earth Sciences and Environment

MINES ParisTech develops competences in geology, geophysics, geostatistics, hydrology and hydro-dynamics, geo-mechanics, chemistry, nuclear physics, and system engineering. The activities aim at the mastering of the metrology of phenomena, their modelling and choice of solution.

### Energy and process engineering

This department has developed skills in many fields that are useful for studying the transformation of matter and energy. Attention focuses on complex energy systems, particularly in transient conditions, and on controlling their environmental impacts.

- Energy efficiency (building, industry, transport)
- Decarbonization of processes and fuels (CO<sub>2</sub> capture, alternative fuels)
- Renewable energies (resource evaluation and prediction, integration optimization, environmental impacts)

### Mechanical and Materials engineering

The experimental approach combines the study of micro structures and constitution of surfaces and interfaces at all scales, of physical and electrical properties and mechanical characterization under a variety of stresses including the effect of environment and radiations. Processing and shaping aspects consider the rheology and the reactivity of materials at elevated temperatures. Experimental work is combined with numerical modelling activities resting on strong physical bases and linking all scales.

Innovations concern materials development along with associated processes and the development of original commercially available softwares for mechanical behaviour, life prediction and optimized shaping.

### Mathematics and systems

MINES ParisTech is present in automation, robotics, telerobotics, computer integrated manufacturing, logistics, mathematical morphology, image processing, on board systems, real time systems, software technologies (oriented language, constraint programming), broadband data flow analysis, distributed production and cooperative work.

### Economics, management, society

MINES ParisTech is competent in industrial economy, management and organisational sciences, cyndinics and sociology. The topics covered are:

- role of the State, regulating policies and markets,
- modernisation of public services,
- evolution of the organisation of the industry, productive systems, professions, competences,
- research and innovation policies, product design, competitiveness of companies,
- risks, information systems, organisational training, impact resistance, information of the public,
- medicine and health, experiments and politics.

# CORPORATE RELATIONS

MINES ParisTech has long-lasting links with companies, through internship placement, graduate recruitment, contractual research, lecturers from industry and services. These constant and strong links with the economic and social players guarantee employability of the graduates and our #1 rank for research partnerships.

## CAREERS

You have choices to make as many career opportunities will be opened to you after graduating from the Institute. A variety of jobs will be accessible. During your studies, you will have an opportunity to set out your career plan in close harmony with your ambitions. Whether it be industry, services or research, you will have access to the wide world.

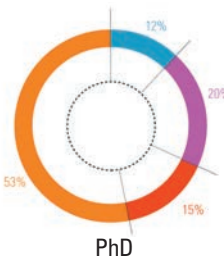
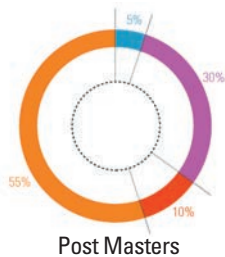
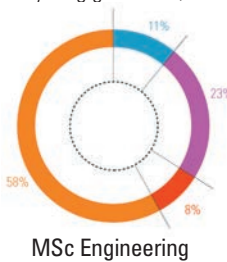
- employability, with an average annual salary of 45 000 euros, one of the highest in France for young graduates,

- several of the CEOs of the 40 leading French companies (CAC 40) are former graduates of the Institute,
- two Nobel laureates were trained at the Institute: Georges Charpak (Physics, 1992) and Maurice Allais (Economics, 1988).

We carry out a yearly survey to know what our recent graduates are doing. The answer rate for this survey is 100%.

Our latest figures show that:

- 68% are in professional activity
  - 27% are pursuing studies, either for a double-degree, a complementary master, a post-master short programme or a PhD
  - 5% are in other situations
- On the international scene: 20% start to work abroad.



- Large Firms : more than 2000 employees
- Intermediate Enterprises : from 500 to 1999 employees
- SME : from 20 to 499 employees
- Micro-Enterprises less than 20

## INDUSTRY FUNDED RESEARCH AND EDUCATION CHAIRS

MINES ParisTech was one of the first academic institutions to launch industry funded chairs in France. After a decade of development and 27 chairs created or renewed, MINES ParisTech has proved how efficient this kind of partnership can be for research, innovation, education and strategic thinking.

**Sustainable materials for energy powering**  
EDF, ENGIE, GRT GAZ

**Bioplastics**

ARKEMA, L'OREAL, NESTLE, PSA, SCHNEIDER ELECTRIC

**Eco design of buildings and infrastructure**  
VINCI

**Prospective modelization and sustainable development**

SCHNEIDER ELECTRIC, ADEME, EDF, GRT GAZ

**Theories and methods of innovative design**  
THALES, RENAULT, DASSAULT SYSTEMES, RATP, VALLOUREC

**Water for all**

SUEZ ENVIRONNEMENT

**Media and brand economics**

VIVENDI, THE LAGARDERE GROUP

**Carbon capture, transportation, and storage**

AIR LIQUIDE, EDF, ENGIE, LAFARGE, TOTAL, LE HAVRE CITY HALL

**Urban logistics**

LA POSTE, L'ADEME, THE PARIS CITY HALL

**Metal processing for aeronautics and nuclear**

DAHER

**Robotics and virtual reality**

PSA PEUGEOT-CITROËN

**Resilience and security**

AFNOR, ENGIE, SNCF, TOTAL

**Intellectual property and markets for technology**

AIR LIQUIDE, MICROSOFT, PHILIPS

**Commodity economics, finance and management**

OCP

**High temperature materials**

SAFRAN

**Drive for you: international research chair on automated driving**

PSA PEUGEOT-CITROËN, VALEO, SAFRAN

**Urban mining**

ECO-SYSTEMES

**Theory of the firm: governance & innovation capabilities**

ARTELIA, VEOLIA, BPI FRANCE, LE LAB





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