

Bachelor of Science

École Polytechnique at a Glance

Founded in 1794, École Polytechnique is France's leading institution in science and technology.

Over two centuries, alumni have profoundly marked the history of science and industry and contributed to the great advances in their fields that have shaped the world as we know it today.

Since its founding, the university has borne a long tradition of scientific excellence. Researchers, professors and alumni from École Polytechnique have received prestigious awards and distinctions, including Nobel Prizes and Fields Medals.

Located in a world-renowned science and technology ecosystem

The École Polytechnique campus is situated less than an hour from central Paris at the heart of the Paris Saclay research and business cluster. It encompasses research facilities, numerous higher education institutions and over fifty research centers of private companies.

International Reputation



1 in France in Top 200
Most International Universities
Times Higher Education 2020



1 in France for
Student-to-staff Ratio
Times Higher Education 2018



World best small universities
Times Higher Education 2019



Graduate Employability
Rankings QS 2020

Join a World-Class Program

Our Academic Approach

The Bachelor of Science is a highly selective three-year program, taught entirely in English and tailored to academically inclined students with a very strong interest in mathematics and science. École Polytechnique's well-rounded approach to learning allows students to develop a solid academic background in science, while exploring topics unrelated to pure sciences. École Polytechnique favors small class sizes with an extremely beneficial student-to-staff ratio.

École Polytechnique's Bachelor Program is officially accredited with the rank of *Licence* (French Bachelor's equivalent) by the Ministry of Higher Education and Research.

Personal Development and Coaching

Bachelor students benefit from a personal development program. They are put into groups on day one of the Program and assigned a dedicated coach who provides support and monitors their progress. The coaches are experienced professionals who help students to develop their personal and physical skills, individually and as a group through the playing of sports and other specifically tailored activities.

Tutoring from the École Polytechnique Student Community

Tutoring sessions are held in small groups throughout the year and are led by more experienced students (*Ingénieurs polytechniciens*, Master's, PhD). The aim of the tutoring initiative is to provide Bachelor students with advice to tackle their Program curriculum and offer support when they encounter academic difficulties.

ACADEMICS

A Multidisciplinary Approach

École Polytechnique proposes a multidisciplinary approach with bidisciplinary specializations. Students joining our Program will benefit from a demanding and challenging multidisciplinary scientific curriculum focused on mathematics, computer science, economics and physics. They can also attend classes in foreign languages, biology, chemistry, humanities, and physical education. Bachelor students at École Polytechnique will have the exceptional opportunity to enter our laboratories from the very first year of the Program allowing them to familiarize themselves with the research environment and interact with the scientific community.

Three Double Majors

École Polytechnique's Bachelor Program offers students the choice of three double majors allowing them to customize their academic journey with a specialization:

- Mathematics and Economics
- Mathematics and Computer Science
- Mathematics and Physics

Three Double Majors

Double Major in Mathematics & Economics

The Mathematics and Economics track of the Bachelor Program offers a scientific approach to economics. It relies on the construction, analysis and interpretation of abstract models, as well as on the confrontation of theoretical conclusions with empirical data coming from the field or from controlled experiments. This double major requires strong quantitative skills and a taste for abstract thinking.

Double Major in Mathematics & Computer Science

The Mathematics and Computer Science track offers the opportunity to study the theory, experimentation and engineering that form the basis for the design and use of computers today. École Polytechnique provides a scientific and practical approach to computation and its applications. Students acquire a solid foundation in the culture and practice of modern programming, and the fundamental analytical and programming skills to solve everyday problems in sciences more efficiently

and effectively. They are also prepared to continue learning other programming languages and paradigms, and the theoretical foundations of computer science itself. Students also gain practical knowledge of basic mathematical algorithms and computer programming.

Double major in Mathematics & Physics

The students who choose the double major in Mathematics and Physics are taken on a journey through the concepts that have shaped our modern vision of the world. What is matter made of? What is the nature of light? What is the fabric of space and time? Not only do they get answers to these questions, but they also get a hands-on approach to these concepts in École Polytechnique's laboratories. Advanced courses on classical mechanics and classical electrodynamics, as well as introductory courses on statistical physics and quantum physics, provide the necessary theoretical background for mastering the concepts of motion, energy, fields, waves and multi-body systems. Students put to work their expanding mathematical toolbox, and exercise their capability for abstract thinking.

First Year

All students follow the same core courses, which provides them with the fundamental skills and knowledge needed for the rest of their academic career. Students discover the scientific disciplines, allowing them to choose the double major they wish to study accordingly.

List of courses available in the first year of the Bachelor Program:

Semester	Course
Fall	Linear Algebra
Fall	Introduction to Analysis
Fall	Discrete Mathematics
Fall	Physics I: Mechanics And Heat
Fall	Mathematical Methods for Physics I
Fall	Beginner's Physics Lab I
Fall	Computer Programming
Fall	Introduction to Economics
Fall	General Chemistry
Fall & Spring	Foreign Languages
Fall & Spring	Sports
Fall	Seizing my new life at university

Semester	Course
Spring	Reduction of Endomorphisms
Spring	Integral and Differential Calculus
Spring	Introduction to Numerical Analysis
Spring	Mathematical Modeling
Spring	Physics II: Electromagnetism and Light
Spring	Mathematical Methods for Physics II
Spring	Beginner's Physics Lab II
Spring	Applied Physics
Spring	Computer Programming
Spring	Introduction to Algorithms
Spring	Web Programming
Spring	Topics in Economics
Spring	Biology
Spring	Major Issues in Today's World and the Place of France
Spring	Meeting Professionals

Second Year

Starting the second year, students have chosen one of the three double majors available. They stay at École Polytechnique for the duration of the second year. Depending on the double major, different courses are offered:

Semester	Course	Mathematics & Computer Science	Mathematics & Economics	Mathematics & Physics
Fall	Euclidian and Hermitian Spaces	✓	✓	✓
Fall	Topology and Multivariable Calculus	✓	✓	✓
Fall	Introduction to Probability	✓	✓	✓
Fall	Statistics of Finite Samples	✓	✓	✓
Fall	Algorithms for Discrete Mathematics	✓	✓	
Fall	Object-oriented Programming in C++	✓	✓	✓
Fall	Design and Analysis of Algorithms	✓		
Fall	Logic and Proofs	✓		
Fall	Intermediate Microeconomics		✓	
Fall	Intermediate Macroeconomics		✓	
Fall	Classical Mechanics			✓
Fall	Wave Optics and Radiation			✓
Fall	Advanced Physics Lab I			✓
Fall	Cell Biology	✓		✓
Fall	Introduction to Reactivity	✓		✓
Fall	Introduction to Science & Technology Studies	✓	✓	✓
Fall & Spring	Foreign Languages	✓	✓	✓
Fall & Spring	Sports	✓	✓	✓
Fall	Hands-on Programs: Health or Volunteering	✓	✓	✓

Semester	Course	Mathematics & Computer Science	Mathematics & Economics	Mathematics & Physics
Spring	Quadratic Forms and Applications	✓	✓	✓
Spring	Series of Functions, Differential Equations	✓	✓	✓
Spring	Numerical Linear Algebra	✓	✓	✓
Spring	A First Step in Numerical Optimization	✓	✓	
Spring	Machine Learning	✓	✓	
Spring	Computer Architecture	✓		
Spring	Introduction to Formal Languages	✓		
Spring	Introduction to Networks	✓		
Spring	Introduction to Econometrics		✓	
Spring	Introduction to Finance		✓	
Spring	Topics in History of Economics thought since 1945		✓	
Spring	Classical Electrodynamics			✓
Spring	Introduction to Quantum Physics			✓
Spring	Waves and Heat Transfer in Geophysics			✓
Spring	Advanced Physics Lab II			✓
Spring	Atoms and Lasers			✓
Spring	Molecular Genetics	✓		✓
Spring	Environment and Energy	✓		✓
Spring	Philosophy: Science and Technology	✓	✓	✓
Spring	Speech contest	✓	✓	✓

Third Year

Courses

List of courses available in the third year:

Semester	Course	Mathematics & Computer Science	Mathematics & Economics	Mathematics & Physics
Fall	Measure and Integration	✓	✓	✓
Fall	Topology and Differential Calculus	✓	✓	✓
Fall	Algebra and Arithmetics	✓	✓	
Fall	Probability: Stochastic Processes	✓	✓	
Fall	Asymptotic Statistics	✓	✓	
Fall	Functional Programming	✓		
Fall	Constraint Logic Programming	✓		
Fall	Compilers	✓		
Fall	Computer Science Project	✓	✓	
Fall	Advanced Quantum Physics			✓
Fall	Introduction to Condensed Matter Physics			✓
Fall	Advanced Physics Lab III			✓
Fall	Solid Mechanics			✓
Fall	Advanced Microeconomics		✓	
Fall	Advanced Macroeconomics		✓	
Fall	Biology Practicals	✓		✓
Fall	Technological Tools for Chemistry	✓		✓
Fall	Masterpieces of Western Literature: Sea and Sailors	✓	✓	✓
Fall & Spring	Foreign Languages	✓	✓	✓
Fall & Spring	Sports	✓	✓	✓
Fall	Diversity Report and Active Volunteering	✓	✓	✓

Semester	Course	Mathematics & Computer Science	Mathematics & Economics	Mathematics & Physics
Spring	Topics in Differential Geometry	✓		✓
Spring	Image Analysis: Registration	✓	✓	✓
Spring	Image Analysis: Segmentation	✓	✓	✓
Spring	Numerical Methods for ODEs	✓	✓	✓
Spring	Seminar: Mathematical Models	✓	✓	
Spring	Convex Optimization and Optimal Control		✓	
Spring	Measure and Integration – Condensed	✓	✓	✓
Spring	Topology and Differential Calculus - Condensed	✓	✓	✓
Spring	Concurrent and Distributed Computing	✓		
Spring	Complexity	✓		
Spring	Computer Graphics	✓		
Spring	Thermodynamics and Statistical Physics			✓
Spring	Fluid Mechanics			✓
Spring	Introduction to Subatomic Physics			✓
Spring	Industrial Organization		✓	
Spring	Social and Environmental Responsibility of Business		✓	
Spring	International Trade		✓	
Spring	Introduction to Research Frontiers A,B		✓	
Spring	Health and Development Economics		✓	
Spring	Computational Economics		✓	
Spring	Cancer Biology	✓		✓
Spring	Mastering the Synthesis and Transformation of Molecules	✓		✓
Spring	Fundamentals of organizations	✓	✓	✓
Spring	Topics in Personal Development	✓	✓	✓

Third Year

Exchange Semester

École Polytechnique offers its students the opportunity to acquire further international experience in their third year. Bachelor students can thus spend the Fall semester abroad in a partner university. **Find out more about our list of partners on page 13.**

Bachelor Thesis

During the second semester of their third year, students work on a Bachelor Thesis, a lab-based research internship. It typically takes place over at least an eight-week period and is undertaken in a lab at École Polytechnique or at a partner institution. The thesis provides students an opportunity to pursue a directed, focused, and individual research project that immerses students in the life of a research lab. It is linked to the student's double major and is consistent with the Bachelor Program's focus on research. Students apply rigorous research methods to their project, while developing strong working relationships with research lab members, and experiencing first-hand the functioning of a lab. The Bachelor Thesis is closely supervised and monitored by a Referent Instructor at École Polytechnique and an Internship Tutor in the host organization.

For the last three months, from April to June, students come back to École Polytechnique for a half term of classes.

After the Bachelor Program

Admitted into the best universities in the world, here are **some examples** of institutions and Master's degrees that École Polytechnique Bachelor students pursue their studies in after graduating.

Double major in Mathematics & Computer Science

Columbia University Master in Vision, Graphics, Interaction and Robotics

University of Cambridge Master in Machine Learning and Machine Intelligence

École Polytechnique MSc&T Artificial Intelligence & advanced Visual Computing

Double major in Mathematics & Physics

MIT PhD track in Physics

ETH Zurich Master in Physics

Technical University of Munich Master in Quantum Science and Technology

Double major in Mathematics & Economics

University of Oxford Master in Economics

HEC Paris Master in Management

ENS Ulm Diploma of the Ecole normale supérieure in Economics

And so much more!



80%

of students continuing their studies abroad
in the **World Top 40 Universities**

An International Experience

64%

International Students

42

Nationalities

39%

International Faculty

7

Language Options

A Class with an International Profile

École Polytechnique is proud to recruit students from all around the world. The aim is to provide students with a solid international profile, allowing them to confront the challenges of the multicultural world in which they will evolve. In order to work in France or abroad, international expertise and intercultural skills are essential for future graduates.

Learning and Perfecting Foreign Languages

During the Program, all students take courses* in foreign languages:

- Beginners' courses (A1 level) are available for French, Italian, Chinese and Japanese
- Intermediate courses (A2-B1 level) are available for French, English, German and Spanish
- Advanced courses (B2-C1 level) are available for French, German, Spanish, Japanese and Chinese
- History and Culture courses are available for French and English

**These courses are subject to sufficient demand from students and can vary from one year to the next.*

Advanced English classes in the first semester are also offered to students who want to perfect their English in order to get the most out of their curriculum from day one.



Studying Abroad

Bachelor students can go abroad for a semester in the third year. Here is the list of universities with which École Polytechnique has a partnership in place:

Asia Pacific



Peking University, *China*
Shanghai Jiao Tong University, *China*
Hong Kong University of Science and Technology, Hong Kong, *China*
National Chiao Tung University, Taiwan, *China*
Korea Advanced Institute of Science and Technology, *South Korea*
POSTECH, *South Korea*
Seoul National University, *South Korea*
Keio University, *Japan*
Tokyo Institute of Technology, *Japan*
University of Tokyo, *Japan*
Kyoto University, *Japan*
University of Melbourne, *Australia*

America



Dalhousie University, *Canada*
University of Toronto, *Canada*
McGill University, *Canada*
Georgia Tech, *USA*
University of California, Berkeley, *USA**
University of California, San Diego, *USA*
Tecnológico de Monterrey, *Mexico*
Pontificia Universidad Católica de Chile, *Chile*
Universidad de Chile, *Chile*

Europe - Middle East



Technical University of Denmark, *Denmark*
King's College, *UK*
École Polytechnique de Bruxelles, *Belgium*
Technical University of Munich, *Germany*
Ecole Polytechnique Fédérale de Lausanne, *Switzerland*
ETH Zurich, *Switzerland*
Bocconi University, *Italy*
Politecnico di Milano, *Italy*
American University of Beirut, *Lebanon*
High School of Economics, *Russia*

* For all universities with which we have exchange agreements, students only have to pay the standard tuition fees to École Polytechnique, except for a very limited number of universities with an asterisk where tuition fees from the partner university also apply.

World-Class Research

480

Researchers
and professors



39%

International
Faculty

24

Academic
and Research
Chairs



23

Research
Laboratories



570 PhD

and post-doctoral
students



1,400

Publications
per Year



Driving Tomorrow's Science and Technological Innovation

At the heart of a vibrant scientific community, our students interact with internationally renowned scientists, engineers, managers, entrepreneurs and CEOs of major companies.

The Research Center

The École Polytechnique's Research Center combines the most fundamental aspects of research with the pursuit of progress in the main applied fields in order to meet future scientific, technological and societal challenges. Bachelor students have the opportunity to discover the laboratory environment from day one of their Program, providing an exceptional learning experience. Laboratories are open to all students for projects.

Internships

Once in the Program, students have the opportunity to do a 4- to 8-week internship every summer in a lab or in a company. This opportunity enables students to experience both the corporate and research worlds.

Entrepreneurship and Innovation

The Drahi X-Novation Center is dedicated to entrepreneurship and innovation at École Polytechnique. This unique space provides students with a business incubator and accelerator where startups can expand and improve their business models. Bachelor students can take advantage of this center, which fosters creativity and promotes experimentation from their first-year onwards.

For instance, one third-year student, Alexis, arrived to École Polytechnique with a strong basis in 3D printing and computer aided design, and during his first year, students from graduate programs taught him how to use a laser cutter and a digital embroidering machine. He has in turn taught these valuable skills to other students. The Drahi-X is a place where different student populations come together to share ideas and learn from each other, as well as from entrepreneurs and professionals. It's the ideal spot to exchange tips and tricks, and to let your imagination run wild, while having access to cutting-edge technology.



The École Polytechnique Experience

Conveniently located only 20 kilometers south of Paris, our campus is nestled among 160 hectares of nature, with easy access to one of the world's most exciting cities. On our campus, no matter what your interest might be, you'll find a way to get involved.

On-campus Accommodation

All students for the Bachelor Program are housed on campus for the duration of the Program, which allows students to fully partake in our vibrant community, while developing team spirit and solidarity. Students (including international students) can be eligible to receive a monthly housing allowance from the French government.

The Bachelor Student Organization

The Bachelor student organization (L'ORE) contributes to every aspect of Bachelor students' life on campus, including events, sports, orientation, student trips, social events, and so on. The L'ORE helps new students figure out everything there is to know about the campus and makes sure that student life is as exciting as they could have imagined. It also manages the creation of student committees designed for and by Bachelor

students, in order to foster a diverse, dynamic and inclusive student life that fits with their schedule and workload!

International Student Office

At École Polytechnique, we have a dedicated office whose job is to make sure that all international students have the support they need before arriving and for the duration of their study Program.

Preparing your arrival

All non-EU students receive personalized advice about visa procedures in relation to their country of residence, as well as the insurance they will need to take out in order to be fully covered for their personal belongings and healthcare.

During your stay in France

- Welcome to France Information Sessions.
- Organization of events throughout the year with the Bachelor team.
- Giving general advice on aspects of living in France and supporting students with any administrative procedures they may have to manage, such as visa renewals.



Outstanding Sports Facilities that Make On-campus Life Unique

Sports remain a key strength of the École Polytechnique experience. Our students enjoy outstanding facilities, enabling them to play a large range of sports and to develop skills such as leadership, teamwork and fair play.

Physical Education Classes

Students have two mandatory hours of sports per week and also have the opportunity to play the sport of their choice in their free time, usually over the weekend. They benefit from outstanding facilities and a wide range of sports: such as climbing, swimming, boxing, bodybuilding, rowing, judo, badminton tennis, etc.

Although the curriculum of the Bachelor Program is very demanding, some athletes and well-organized students still find some time to practice sports with students from the other programs. Some also take part in sporting events and competitions on campus.



The Sports Club

Students can benefit from incredible indoor sports facilities, ranging from swimming pools and gyms, to a climbing wall and fencing room. Outdoors, a wide variety of sports infrastructure is also on offer with fields for team sports, as well as horseback riding and rowing on our very own lake!

École Polytechnique's Sports Club is open to all students for an annual fee of just €25.

Admission Criteria

General Admission Requirements

Applicants must meet one of the following requirements

- They must currently be enrolled in their last year of secondary education, which must be completed before the start of the Bachelor Program.
- Or have recently graduated from secondary education (either currently taking a year off or be currently enrolled in post-secondary education).

Students are firstly selected on their strong academic background, especially in mathematics and science. École Polytechnique also values exemplary, extensive achievement in any intellectual or creative endeavor. This includes accomplishments in extracurricular activities such as performing arts or athletics, scientific competitions, internships, leadership in your school or community, volunteering, etc.

Specific Admission Requirements

Admission to École Polytechnique's Bachelor Program is highly competitive and is designed for top students with very high potential, who are capable of following a rich and demanding curriculum.

Applicants to the Program should also meet the following specific requirements:

- have an overall strong academic average
- have taken advanced mathematics courses, and at least one advanced science course
- have a good level of English (Common European Framework of Reference for Languages level C1).

Admissions requirements by high school curriculum

French Baccalaureate:

For students taking the Baccalaureate exam in 2021 and after: advanced Mathematics and another scientific subject to be chosen in *I^{ère}* and to be kept in *Terminale*. The third optional subject for *I^{ère}* is up to the student.

International Baccalaureate:

Mathematics and at least one science course should be Higher Level.

North American education:

Honors or AP classes in Mathematics and at least one scientific subject are preferred.

British-patterned education:

A-level program: Mathematics and at least one science course should be Higher Level.

Other curriculum:

Other curriculums are also accepted if applicants have studied mathematics at high level and another scientific subject.



How to Apply?

Your application must be submitted online and must include the following:

1. Scanned copies of your transcripts for the last four academic years, completed and in progress (i.e. if you are currently in 12th Grade, please provide your transcripts from 9th, 10th and 11th Grade)
2. Contact details of two references (at least one of which is academic)
3. Personal statements (form to be completed in the online application)
4. CV/Resume (form to be completed in the online application)

Shortlisted applicants are invited to a 50-minute interview via videoconference.

The interview is conducted entirely in English and is divided in 2 parts:

20 minutes: general scientific culture and motivation for joining the Program

30 minutes: mathematics questions based on the secondary education curriculum

Admissions decisions are based on the quality of the application file and the interview score.

Admissions Calendar

There are three rounds of admission this year.

Students who have not been offered admission for one round cannot reapply for subsequent rounds.

Rounds	Application Deadlines	Interview Dates (for shortlisted candidates only)	Final Admission Results
First round	September 17, 2020 to October 28, 2020	Mid-December 2020 to January 2021	January 2021
Second round	December 17, 2020 to January 20, 2021	February to mid-March 2021	April 2021
Third round	March 18, 2021 to April 21, 2021	May 2021	June 2021

Students can **alternatively** apply via Parcoursup (France's standardized higher education application website - in French only). Go to Parcoursup's website www.parcoursup.fr for more information and deadlines.

Application fees: An application fee of €95 is required upon application submission. This can be paid by credit card or bank transfer.

The Admissions Team: If you have already started an application and require further assistance, please do not hesitate to contact our Admissions Team at: bachelor-admissions@polytechnique.fr

Tuition Fees

Tuition Fees

Annual tuition fees the 2021-2022 academic year (Class of 2024):

> €12,500 per year for EU students

> €15,600 per year for students from outside the EU

Financial Aid

At École Polytechnique, we admit the most talented undergraduate students from all over the world and we strive to attract and reward the very best students, regardless of their financial situation. To this end, eligibility for excellence scholarships and tuition waivers is reserved for students who are admitted with honors in each round of admission. There are two categories of financial aid: merit-based and need-based. These categories are not mutually exclusive.

Merit-based financial aid

Excellence Scholarship

The École Polytechnique Foundation offers a limited number of scholarships based on academic excellence to help us attract and reward the very top students worldwide. Each scholarship award is €4,000 per year paid in 10 monthly installments. The Excellence Scholarship's renewal is subject to academic success and attendance in the Program.

Need-based financial aid

Tuition Waivers

École Polytechnique offers tuition waivers based on students' financial needs. Tuition waivers range from €1,000 to €10,600/€13,600 (depending on your personal tuition fees). Please note that even the highest tuition waiver requires a €1,400 annual tuition fee. Tuition waivers only cover tuition costs; any other expenses are the responsibility of the student.

Women in Science Scholarship

Historically, women have been underrepresented in scientific fields of study. At École Polytechnique we take this issue seriously and strive to promote gender equality. To this end, the École Polytechnique Foundation has created a specific scholarship for exceptional female students admitted to the Program. The scholarship award is €4,000 and paid in 10 monthly installments and only offered during the first year.

Available to all girls, not only admitted with honors.

Interest Free Loans via the École Polytechnique Foundation

Students who have a fiscal warrantor in France can apply to an Interest Free Loan through the École Polytechnique Foundation (limited number).

Available to all students, not only admitted with honors.



Get in touch:

bachelor-contact@polytechnique.fr
programmes.polytechnique.edu



Programs

Bachelor of Science

Ingénieur Polytechnicien Program

Masters

PhD Track

Summer Schools

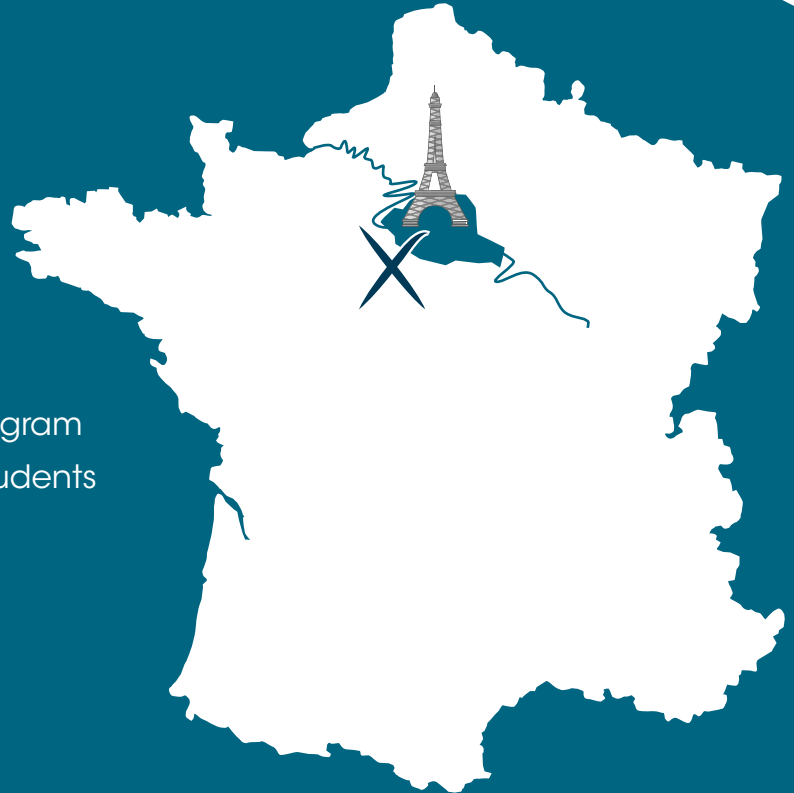
Executive Master

Executive Education

E-Learning

International Academic Exchange Program

Internship Program for International Students



École Polytechnique

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