



## Course Selection Guide

### **Exchange Students at École Polytechnique International Academic Exchange Program *Academic Year 2021- 2022***

Greetings from l'École Polytechnique!

This guide is dedicated to students willing to join the International Academic Exchange Program and intends to help them understand their courses' options and choose courses effectively at École Polytechnique.

Exchange students take courses with regular full-time students. They enroll in the International Academic Exchange Program (PEI) and receive ECTS credits for courses validated during their exchange period.

Exchange students enroll in **one specific level of study (undergraduate or graduate) and chose their courses in that level of study.**

We ask them to choose their courses in the same year of study (that is in the 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> year of the Bachelor program at undergraduate level; and in the 2<sup>nd</sup> or 3<sup>rd</sup> year of the *Ingénieur Polytechnicien* Program at graduate level).

Under specific conditions, exchange students may also attend courses from other levels if they meet all conditions for entry, including language and academic requirements and if the different courses schedules allow it.

## 1. Basic requirements

At undergraduate level, eligible students must have completed at least one year of their program of study in science or engineering.

At graduate level, eligible students must have completed at least two years of their program of study in science or engineering and at least three years to have access to upper level courses (see below).

Exchange students must observe the same rules as regular students from our institution about registration for courses, attendance to courses, exams, use of computers, etc.

## 2. Enrollment process

Exchange students typically take 3 to 4 scientific courses per period. In some cases, an extra 5<sup>th</sup> course may be added. We expect exchange students to register for a minimum of 20 ECTS credits per period.

Exchange students can also follow humanities, management, language courses and sport classes in their level of enrollment. These courses give ECTS credits.

## 3. Approval process

We organize the following approval process to guarantee that chosen courses meet the language and academic conditions and to let exchange students register to courses prior to arrival on campus.

- Each student is required to submit a plan of study when applying **at the end of March each year**. Mobility team and academic advisors can help them to finalize it;
- Academic exchange program advisors assess it and the selection committee approves it **before the end of May each year**;
- The courses registration is open to exchange students **from Mid-June to Mid-July**; during the registration process, we come back to students to set up their official learning agreement;
- Courses will start between **late August and Mid-September** or **in January**.

Exchange students need to register on the registration platform after their admission.

**NB: we try our best to guarantee your registration to courses but we ask you at the same time to be flexible when discussing your study plan with your home institution, as we cannot guarantee that all classes included in the course catalogue will be available and as timetables are subject to change.**

## **Content**

### **[Overview of the Curriculum at l'X](#)** **[Academic Calendar](#)**

#### **You are interested in**

- [Undergraduate level courses](#)
- [Graduate level courses](#)

#### **You would like to study**

- [Mathematics](#)
- [Applied Mathematics](#)
- [Physics](#)
- [Computer Science](#)
- [Economics](#)
- [Mechanics](#)
- [Energy](#)
- [Electrical Engineering](#)
- [Chemistry](#)
- [Biology](#)
- [Sciences for the Challenges of the Environment](#)
- [Spatial Science and Challenges](#)
- [Humanities and Social Sciences](#)
- [Innovation Management and Entrepreneurship](#)
- [Improve your language skills](#)
- [Sports](#)

#### **You would like to join us for**

- [Fall term or the whole year](#)
- [Spring term](#)

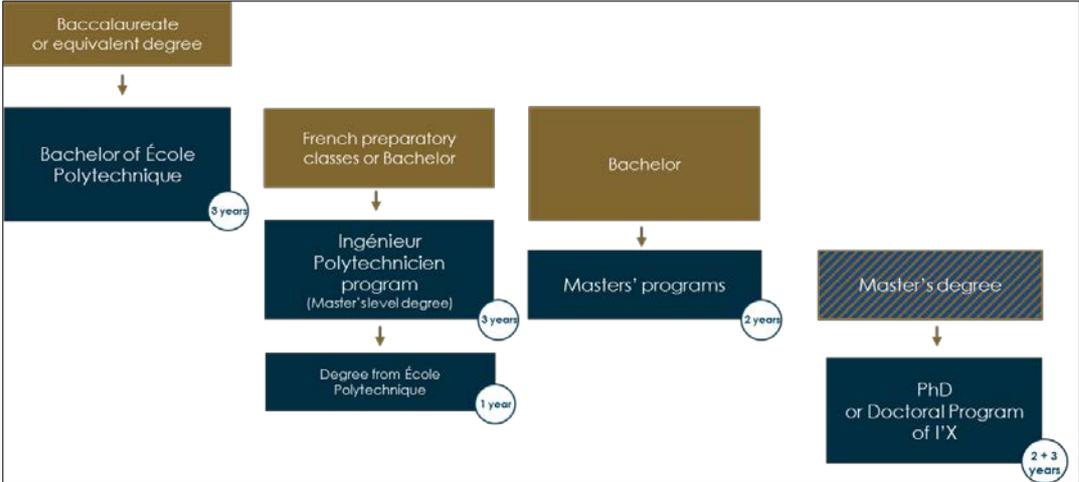
#### **Need for help?**

[Do you have any troubles in finding courses on Synapses?](#)

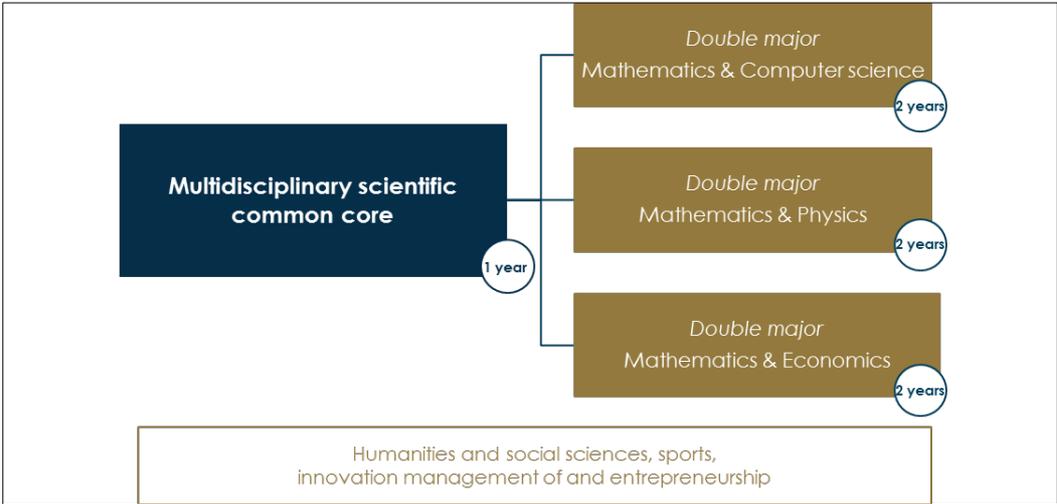
[Further Resources to help you prepare your stay](#)

Please contact us at [exchange-international@polytechnique.fr](mailto:exchange-international@polytechnique.fr)

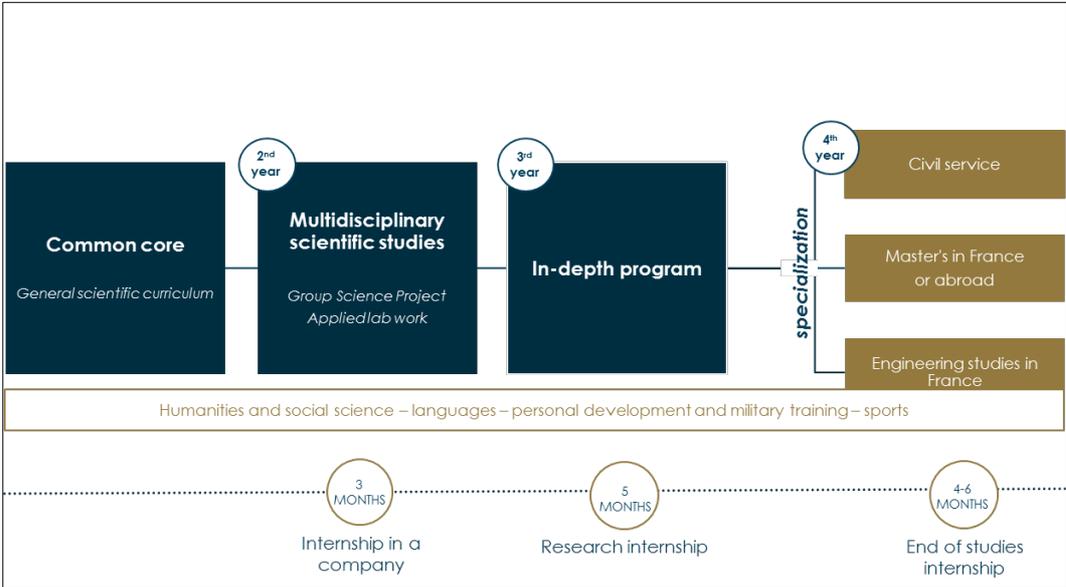
# Overview of the different Curriculum at I'X



## Overview of the Bachelor Program's Structure



## Overview of the Ingénieur Polytechnicien Program's Structure



## Academic calendar

<b>Undergraduate level (calendar for the Bachelor Program)</b>			
<b>1st &amp; 2<sup>nd</sup> years</b>			
	<b>1<sup>st</sup> semester</b>	<b>2<sup>nd</sup> semester</b>	
<b>Teaching</b>	September to January	February to June	
<b>Examination</b>	End of January	End of June	
<b>3<sup>rd</sup> year</b>			
	<b>1<sup>st</sup> semester</b>	<b>2<sup>nd</sup> semester</b>	
<b>Teaching</b>	September to December	April to June*	
<b>Examination</b>	Mid-December	End of June	
<i>* Period from January to March is dedicated to the Bachelor Thesis</i>			
<b>Graduate level</b>			
<b>2<sup>nd</sup> year of Ingénieur Polytechnicien Program</b>			
	<b>1<sup>st</sup> term</b>	<b>2<sup>nd</sup> term</b>	<b>3<sup>rd</sup> term</b>
<b>Teaching</b>	August to Mid-November	Mid-November to Mid-February	Mid-February to Mid-May
<b>Examination</b>	Mid-November	Mid-February	End of May
<b>3<sup>rd</sup> year of Ingénieur Polytechnicien Program/1<sup>st</sup> year of MScT</b>			
	<b>1<sup>st</sup> term</b>	<b>2<sup>nd</sup> term</b>	<b>3<sup>rd</sup> term</b>
<b>Teaching</b>	September to December	January to March	April to August
<b>Examination</b>	Mid-December	Mid-March	Thesis defense
<b>Breaks</b>			
<b>Halloween break</b>	<b>Christmas break</b>	<b>Winter break</b>	<b>Easter break</b>
End of October (1 week)	End of December – Early January (2 weeks)	End of February (1 week)	End of April (1 week)

## You are interested in Undergraduate level courses

You can join our Bachelor Program. Courses are taught in English only and exams are to be taken in English as well. Your English proficiency must be high.

The first year of studies focuses on the acquisition of the fundamental skills and knowledge. For their second and third years, students choose between three double majors:

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

For each double major, students have the opportunity to pursue a **minor**:

- Mathematics and Physics: Minor in Biology or Chemistry
- Mathematics and Computer Science: Minor in Biology
- Mathematics and Economics: Minor in Computational Mathematics

Exchange students have access to the whole course catalog, minor included provided that they have the academic pre-requisites.

As the course load may be quite dense, **we ask you to choose your courses in the same Double Major and in the same year to avoid timetable conflicts.**

Please note that Semester 1 and Semester 3 courses go through the month of January, while those of Semester 5 end in December. Please note that Semester 6 starts in April and ends in June.

**Exchange students can carry out a Bachelor Thesis.** Please note this opportunity is open to students staying the whole year and joining the 3<sup>rd</sup> year of the program only. Final registration is subject to academic approval. Exchange students must register for it at the beginning of their application.

**If you want to add one course at graduate level,** you can ask for it. It will be subject to academic approval to check if you have the basic academic and linguistic prerequisites to follow courses in an upper level. Please note that calendars are not similar and exams may be set up the same day. In any case, exchange students are responsible for checking the compatibility of their schedules.

## You are interested in Graduate level courses

You can join the 2<sup>nd</sup> and 3<sup>rd</sup> years of our *Ingénieur* polytechnicien Program and ask to add up to 2 courses per period in the **first year** of a one of our Masters of Science and Technology (MSc&T).

### Ingénieur polytechnicien Program - Year 2

Courses are taught in French only and exams are to be taken in French as well. Your French proficiency must be high.

Year 2 is divided into 3 periods and provides a multidisciplinary scientific education.

**Exchange students are advised to choose 3 or 4 scientific courses per period.**

**Exchange students can choose only one Applied Laboratory Module (MODAL)** during their Exchange period. Please note that this project is subject to numerus clausus but do not hesitate to ask for it and we will help you to find the right project at the right time of the year.

**You can ask to add one to a maximum of two courses from the 3<sup>rd</sup> year (3A) or from a Master of Science and Technology (MSc&T).** In that case, please note that for enrollment into a MSc&T, you should have completed at least three years of undergraduate program. Due to numerus clausus, it will be subject to academic approval to verify if you have the academic and linguistic prerequisites to follow courses in an upper level. Please note that calendars are not similar and exams may be set up the same day. In any case, exchange students are responsible for checking the compatibility of their schedules.

**Restriction:** Group Science Projects are not open to exchange students.

## Ingénieur polytechnicien Program - Year 3

Courses are taught in French and/or English depending on the subject.

Year 3 is divided into 3 terms: the first two terms consists in scientific courses and have a duration of 3 months each while the third term is dedicated to a scientific research internship (for a duration up to 6 months). The exchange student can join us for 1, 2 or 3 terms.

Courses are divided into scientific concentrations. Exchange students are asked **to choose 4 courses per term only and in the same concentration track**, one of them is a Practical Lesson (called EA or “Enseignement d’Approfondissement”). **One course can be chosen in another concentration track if the timetable allows it.**

Please be aware that Practical lessons are subject to numerus clausus.

**Students can undertake a research internship in Spring term** if he or she stays the whole year and if the internship is completed at an École Polytechnique’s laboratory. **Please note that you cannot do a research internship and follow courses at the same time.**

**If you want to add one to two courses in the 2<sup>nd</sup> year (2A) or in a Master of Science and Technology (MSc&T)**, you can ask for it. Please note that for enrollment into a MSc&T, you should have completed at least three years of undergraduate program. Due to numerus clausus, it will be subject to academic approval. Please note that calendars are not similar and exams may be set up the same day. In any case, exchange students are responsible for checking the compatibility of their schedules.

## Master of Science and Technology (MSc&T)

Courses in the Masters of Science and Technology are exclusively taught in English.

Provided that they have completed at least three years of undergraduate study, exchange students can ask to enroll in one to two courses taught as part of the first year of a Master of Science and Technology. Please note that due to numerus clausus, final enrollment is subject to academic approval.

### Restriction:

- Enrollment is limited to two courses maximum per period.
- The Master of Science and Technology **Data Science for Business Program** is not open to exchange students.
- Exchange students cannot enroll in courses taught as part of **the 2<sup>nd</sup> year of a Master of Science and Technology**.

## You would like to study Mathematics - Physics – Computer Science – Economics

A wide range of courses in Mathematics, Physics, Computer Science and Economics are available within **the Bachelor and the *Ingénieur Polytechnicien* programs.**

**Please note that you should have relevant academic knowledge for your chosen classes.**

### At undergraduate level

The Bachelor of Science is an intense program leading to a double major either in Mathematics & Physics, or in Mathematics & Computer Science or in Mathematics & Economics.

Mathematics at the Center of the Program: the Mathematics courses given in École Polytechnique's Bachelor Program are designed to fit any subsequent specialization streams (Physics, Economics, Computer Science).

We expect our students to have an excellent command in Mathematics and a strong interest in this field.

## At graduate level

- ✓ To find out more on the list of courses available in the 2<sup>nd</sup> year of the *Ingénieur Polytechnicien* Program
- ✓ To find out more on the list of courses in the 3<sup>rd</sup> year of the *Ingénieur polytechnicien* Program

**The brochures of each concentration track are available on the above link.**

Should you want to join

- **the Mathematic concentration track**, please find further information here (in French)

Please consult the description of each course on Moodle to know more about the academic prerequisites.

Please note that all courses are taught in French.

- **the Physics concentration track**, please find further information here (in French)

Please consult the description of each course on Moodle to know more about the academic prerequisites.

Please note that all courses are taught in French.

- **the Computer Science concentration track**

Please consult the brochure and we strongly advise you to choose your courses in only one specialization (courses mostly taught in English)

Please consult the description of each course on Moodle here to know more about the academic prerequisites.

- **the Economics concentration track**, please consult the brochure.

Courses are entirely taught in English.

Candidates for the 3<sup>rd</sup> year of *Ingénieur polytechnicien* Program should have a strong command of Mathematics and quantitative methods to apply for this track.

That means that candidates should have followed at least one course in Microeconomics (or in some cases even in Econometrics) **and** should have a background in Mathematics, Applied Mathematics, or even Computer Science or Theoretical Physics.

Please refer to each course on the Moodle platform here to find out more on the academic prerequisites.

## You would like to study Chemistry, Biology

**Please note that you should have relevant academic knowledge for your chosen classes.**

## At undergraduate level

As part of their curriculum, Bachelor students have the opportunity to study a minor in Biology or Chemistry. This option gives students the opportunity to broaden their knowledge outside of their chosen field. Exchange students can ask to follow one of these courses only if they have the academic pre-requisites.

These minors consist in a few courses available to student enrolled either in the mathematics & physics double major or in the mathematics & computer science double major. Should you want to obtain more ECTS credits, we advise you to apply for an exchange at graduate level (if you meet the entry requirements).

## At graduate level

- ✓ To find out more on the list of courses available in the 2<sup>nd</sup> year of the *Ingénieur polytechnicien* Program
- ✓ To find out more on the list of courses in the 3<sup>rd</sup> year of the *Ingénieur polytechnicien* Program

**The brochures of each concentration track are available on the above link.**

Should you want to join

- the **Chemistry concentration track**, [please find further information here](#) (in French)

Courses are entirely taught in English.

Please consult the description of each course on Moodle to know more about the academic prerequisites.

- the **Biology concentration track**, please consult the brochure.

Courses are mostly taught in English.

Please consult the description of each course on Moodle to know more about the academic prerequisites.

## You would like to study Applied Mathematics, Mechanics, Energy, Electrical Engineering, Spatial Science

**Please note that you should have relevant academic knowledge for your chosen classes.**

**At undergraduate level**, you can find some relevant courses in the above-mentioned fields but should you want to obtain more ECTS credits, we advise you to apply for an exchange at graduate level (if you meet the entry requirements).

**At graduate level**

- ✓ To find out more on the list of courses available in [the 2<sup>nd</sup> year of the \*Ingénieur polytechnicien\* Program](#)
- ✓ To find out more on the list of courses [in the 3<sup>rd</sup> year of the \*Ingénieur polytechnicien\* Program](#)

**The brochures of each concentration track are available on the above link.**

Should you want to join

- the **Applied Mathematics concentration track**, [please find further information here](#)

Please note that half of the courses are taught in English

- [Please find here](#) some links to the presentations of the **Mechanics concentration track**, the **Energy concentration track**, and the **Sciences for the Challenges of the Environment concentration track**, all managed by the Department of Mechanics.

Depending on the track, some courses or most of the courses are taught in English.

- the **Electrical Engineering concentration track**, please find further information here

Please note that this track offers a multidisciplinary approach and gathers courses from the Physics Department, from the Computer Science Department and from the Applied Mathematics Department.

The courses are entirely taught in English.

- the **Spatial Science and Challenges concentration track**, please find further information here

This intrinsically multidisciplinary specialization offers courses from 4 different Departments: Physics, Mechanics, Applied Mathematics, Computer Science.

Courses are taught in French and in English.

Should you be interested in it, please consult us beforehand.

- the **Innovation Technology concentration track**, please consult the brochure

This track offers you to combine two high level specializations, the first one in science, and the second one in Management. You should meet the specific requirements for both specializations, especially in science.

Courses are taught in French and in English.

## You would like to add courses in Humanities and Social Sciences

In addition to their education in fundamental sciences, École Polytechnique's students follow several courses providing them with the complementary soft skills to round out their scientific background and knowledge. Through courses in humanities and social sciences, students discover artistic and literary masterpieces, learn about French and European political systems and discuss ethical questions related to sciences.

Courses in the department focused on these three main areas:

- ✓ Law, Economics and Political Science
- ✓ Literature and Humanities
- ✓ Arts and Architecture

Exchange students can ask to join one course per period if in the Bachelor program and one course and one seminar if in the *Ingénieur polytechnicien* Program **with no required approval and no added fees**.

Exchange student must take these courses in their chosen level of enrollment. Students enrolled in the *Ingénieur polytechnicien* Program who do not speak French can ask to follow Humanities and French Culture courses taught in English in the MScT, if their timetables allow it and if spots are available (there are numerus clausus).

Please note that in the *Ingénieur Polytechnicien Program*, almost all Humanities and Social Sciences courses and seminars are taught in French. Your French proficiency must therefore be high (B2 level) to attend classes. As courses are subject to numerus clausus, we cannot guarantee that spots will be open. [The list of courses is available here.](#)

The courses given in the Bachelor programme (taught in English) can be found [here](#).  
The courses given in the MSc&T (taught in English) can be found [here](#).

Please note that in the 3<sup>rd</sup> year of the *Ingénieur polytechnicien* Program, students cannot follow at the same time the seminar in Humanities & Social Sciences and the seminar in Innovation Management and Entrepreneurship due to timetable conflict.

## You would like to add courses in Innovation Management and Entrepreneurship

The Department of Innovation Management and Entrepreneurship offers basic and advanced courses to all students in innovation management and entrepreneurship.

Exchange students can ask to join one course if in the Bachelor program (in semester 6), one course and one seminar if in the *Ingénieur polytechnicien* Program **with no required approval and no added fees**.

Exchange student must take these courses in their chosen level of enrollment.

Bachelor students have one course in innovation management and entrepreneurship taught in English that exchange students may register for, in semester 6. To find out more, please consult [the Year 3 syllabus on the Bachelor website](#).

Ingénieur Polytechnicien students in the 3<sup>rd</sup> year take courses addressing the concepts of financial analysis, strategy and team management to build their skills in organizations' management.

Please note that some courses from the *Ingénieur polytechnicien* Program are not open to exchange students. [The list of courses can be found here](#) but the department of Innovation Management and Entrepreneurship may confirm in September of each year the list of courses open for exchange students.

Courses are subject to numerus clausus and some are taught in French. Your French proficiency must therefore be high (B2 level) to attend these classes. For more information, please consult us.

Students enrolled in the *Ingénieur polytechnicien* Program can ask to follow courses taught in English in the MScT, if their timetables allow it and if enough spots are available (there are numerus clausus and the list of courses is usually set up in late August or early September each year). [The list of course for the MSc&T can be found here](#). For more information, please consult us.

Please note that in the 3<sup>rd</sup> year of the *Ingénieur polytechnicien* Program, students cannot follow at the same time the seminar in Management and Entrepreneurship and the seminar in Humanities & Social Sciences due to timetable conflict.

## You would like to improve your language skills

The Department of Languages and Cultures offers a large choice of language courses: Chinese, English, German, Italian, Japanese, Spanish, Arabic, Russian, Hebrew and French as a foreign language.

**Exchange students can ask to join one course of French as a foreign language with no required approval and no added fees.** You must take these courses in your chosen program of enrollment.

In each program, French courses are open to beginners (A1, A2 levels), to intermediate levels (B1, B2 levels) and thematic courses are also available for students with an advanced level (C1, C2 levels). [To find out more, consult the list of French as a Foreign Language's courses](#).

A **placement test** is organized before the beginning of the courses to register you in the group that best suits to your level.

**Exchange students can add one more course in another foreign language.** If you would like to register to another foreign language course, please note that you should demonstrate a B1 level at least and approval will be subject to classroom availability. Please send us a proof of your level.

## You would like to do Sports on campus

Exchange students can also practice sports and benefit from the campus' great sport facilities. You can register for sport courses upon your arrival on campus.

There are 2 main options: either to do sports with regular full-time students (2 to 6 hours a week), or to do sports at École Polytechnique's sports center (called CSX) together with students and staff; the second option will require small fees.

We advise exchange students to do sports with regular full-time students of their chosen level of enrollment, as this is the best way to network with other students on campus.

## You would like to join us for the fall semester or for the whole year

At graduate level, fall term offers a large choice of courses. Should you stay the whole year, you will have the possibility to undertake a research internship in one of École Polytechnique's laboratory.

For undergraduate students willing to undertake a research project or a Bachelor thesis, please note that this opportunity is open only for students registered in the 3<sup>rd</sup> year of the Bachelor program and for students staying the whole year.

## You would like to join us for the spring semester only

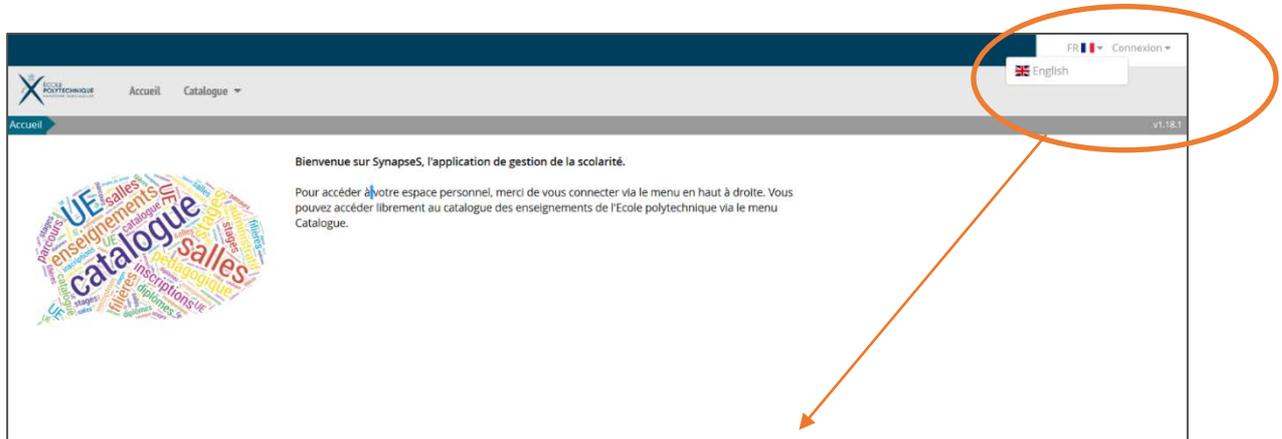
At undergraduate level, exchange students can join us in spring semester only to follow courses in semesters 2 or 4. Please note that courses in the semester 6 start in early April until end of June. Registration for the Bachelor thesis is only available to students enrolling for the whole year (see above).

Please note that at graduate level courses are only available from January to March (mostly in French in the 3<sup>rd</sup> year of the *Ingénieur polytechnicien* Program) and from January to June (in French only in the 2<sup>nd</sup> year of the *Ingénieur polytechnicien* Program). **Therefore students willing to join us at graduate level in Spring semester must demonstrate a B2/C1 level in French prior to their arrival.** Candidates are asked to do a placement test in French prior to their arrival.

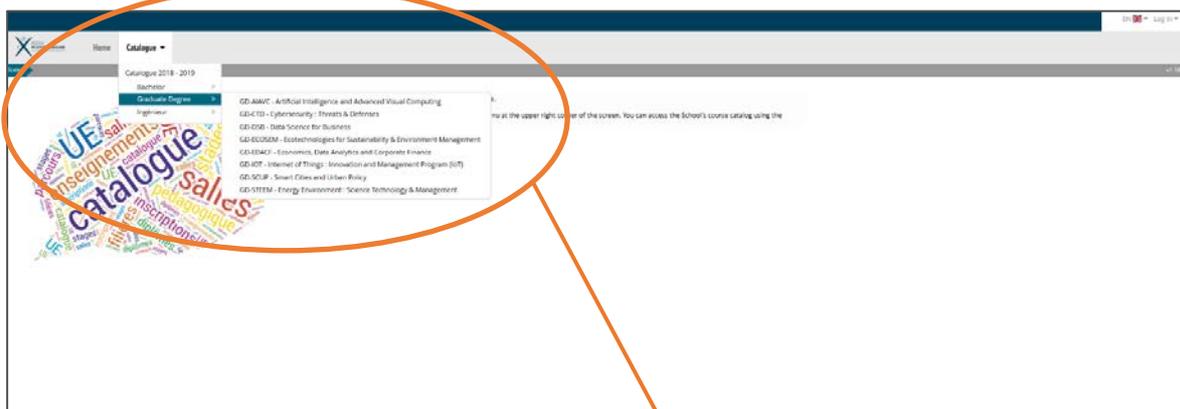
Registration for the research internship will not be open for students joining us for the spring semester. Should you want to undertake a research internship only, please apply for the Internship program for International Students (deadline: end of January for internship in spring or in the summer).

## How to find a course on Synapses (École Polytechnique's Courses catalog)

**For Bachelor Program, please consult the syllabi available online for updated version.**



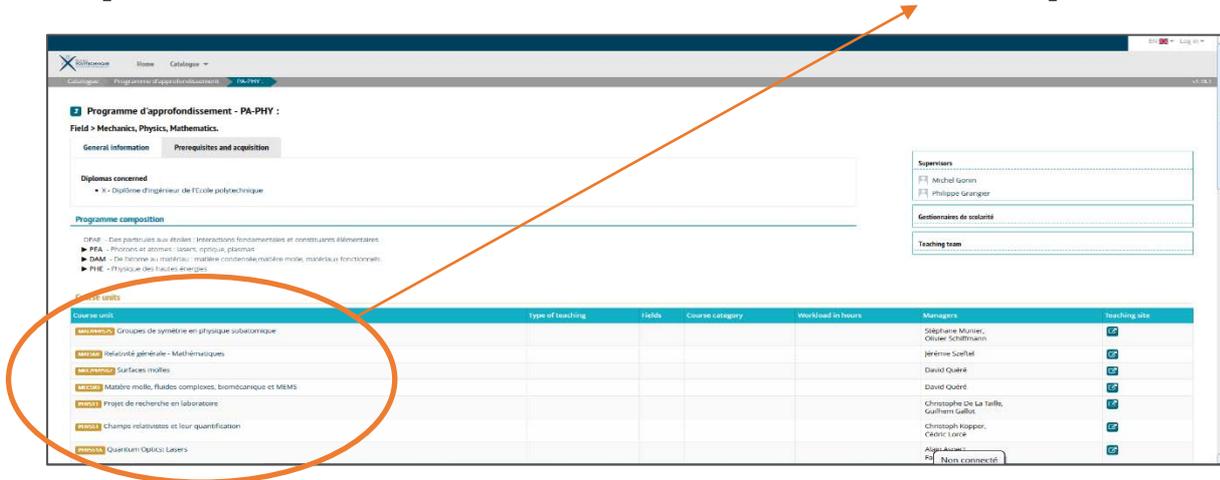
**In the top right corner, please select the flag (French or English).**



**Then select your chosen program of enrollment.**

Please note that for Master of Science and Technology (formerly Graduate Degree) you can select your chosen master courses at this stage. For *Ingénieur polytechnicien* Program, please select the program first, then your year of enrollment and, if Year 3, your chosen Scientific Concentration track (called Programme d'Approfondissement or PA). **For Bachelor Program, please consult only the syllabi available online.**

For some Scientific Concentrations, you can choose **the specialization in the “Program composition” section and then have access to the courses related to this specialization.**



How do I know when the courses are taught?

- By looking to the courses' codes

### Bachelor

For example, **CSE 301: Advanced Programming in C++** taught in Year 3

The 3 first letters indicate the field of study while the 3 last digits indicate the year for that course.

CSE	Computer Science
MAA	Mathematics
PHY	Physics
ECO	Economics



100	1 <sup>st</sup> year (semester 1 and semester 2)
200	2 <sup>nd</sup> year (semester 1 and semester 2)
300	3 <sup>rd</sup> year (semester 1 and semester 2)

### Ingénieur polytechnicien Program

For example, **INF 550: Advanced Algorithmics** taught in Year 3

The 3 first letters indicate the name code of the department that taught it while the 3 last digits indicate the year and the semester for that course.

AP	Public Affairs
BIO	Biology
CHI	Chemistry
ECO	Economics
EE	Electrical Engineering
ENR	Energies for the 21st Century
HSS	Humanities and Social Sciences
INF	Computer Science
IT	Technological Innovation
LAN	Languages and Culture
MAP	Applied Mathematics
MAT	Pure Mathematics
MIE	Innovation Management and Entrepreneurship
MEC	Mechanics
PHY	Physics
SDE	Science for Environmental Challenges
SDS	Science and Challenges of Space



300	1 <sup>st</sup> year
400	2 <sup>nd</sup> year
500	3 <sup>rd</sup> year

For courses taught at graduate level, courses codes starting with **550 and 570 are generally taught in term 1 (Fall term)**, courses starting with **560 and 580 are generally taught in term 2 (Winter term)** and codes starting with **590 refers to the research internship (Spring term)**.

## Further Resources

### SynapseS

It's an online platform with free access to our course catalog.

Once registered at l'X you will receive an email with your login/password. Your timetable will be available there and you will have access to the courses materials and supports and to your grades.

### MOOCs

To prepare your stay, you have the possibility to watch our online courses and videos [here](#) (some courses in English).

For students with a B1 level in French, please have a look to this language course "[Étudier en France: French Intermediate course B1-B2](#)".

### Courses

Courses are broken down into lectures in amphitheater (approximately 100-200 students per course) and lessons in small groups (approximately 10-20 students per course).

### Courses taught in English

At undergraduate and in the MScT, all courses are taught in English.

In the *Ingénieur polytechnicien* Program, some courses in the 3<sup>rd</sup> year are taught in English: you can find them on SynapseS by looking for courses whose titles are in English.

### Adding/deleting a course

Once registered to a course, we will give you **a few days after your arrival** to finalize your choice.

Please note that you must first receive the approval of your home institution before adding or deleting a course.

#### Attendance to courses

Some courses have a limited number of participants. Due to classroom capacity, once a course is full we are unable to add more students and we do not use waiting list. If you enroll without going to the course, it means you are taking the place of another student.

Attendance in all scheduled courses is **mandatory** and **any absences must therefore be justified and documented**. According to each program's regulations, 3 unjustified absences in classes, labs, seminars, sports and language classes or tutorials will result in a maximum coursework grade of C (passing grade).

#### Having missed a lesson?

Please contact your academic coordinator or registration office.

Should you anticipate some absences for personal or medical reasons, please give us a leave for absence as soon as possible.

#### Exam schedule

Detailed exam timetables will be released approximately one month before the exam. Exam timetables will be available on your student records page.