



BACHELOR PROGRAM

SYLLABI

2023 – 2024



IP PARIS



INTER-YEAR COURSE OFFERING

GENERAL EDUCATION

General education courses in the Bachelor program include those in humanities and social sciences, foreign languages, personal development and sports for a total of 5 ECTS per semester.

In each of the first four semesters, a student has to take: one foreign language course worth 2 ECTS, two hours of monitored sport activities per week worth 1 ECTS and either a course in Humanities and Social Sciences or a seminar on personal development both worth 2 ECTS with the constraint of taking one course in Humanities and Social Sciences and one seminar on personal development seminar each year.

For the third year of study, Humanities and Social Sciences courses or Personal Development seminars are optional in the Fall semester and are not offered in the Spring semester. The foreign language courses are to be chosen within a global catalog of classes provided by the corresponding department and include courses in French as a Foreign Language (FLE) for non French speaking students. Note that a student whose level in French is below B1 will have to follow extra sessions of French Language in semester 1 worth 1 extra ECTS. The seminars on personal development are specific to a given semester and are presented later within the semester presentation. The course offer in Humanities and Social Sciences is shared among students from all years and is described hereafter.

HUMANITIES AND SOCIAL SCIENCES FALL OFFERING

Geopolitics of Cyberspace HSS102

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/8133/HSS102-geopolitics-of-cyberspace>

Violence: An Introduction to Moral and Political Philosophy HSS103

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13464/>

HSS103-nature-current-problems-in-philosophy

Politics of the Ecological Mutation HSS211

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10513/HSS211-politics-of-the-ecological-mutation>

Introduction to Sustainable Architecture and Urbanism HSS212

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10514/HSS212-introduction-to-architecture>

Masterpieces of Western Literature: Sea and Sailors HSS301

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5579/HSS301-masterpieces-of-western-literature-sea-and-sailors>

Tech and Law HSS302

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13577/HSS302-tech-and-law>

HUMANITIES AND SOCIAL SCIENCES SPRING OFFERING

Major Issues in Today's World and the Place of France HSS101

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/26/HSS101-major-issues-in-today-s-world-and-the-place-of-france>

French Identity HSS151

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10515/HSS151-french-identity>

Philosophy: Science and Technology HSS202

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/58/HSS202-philosophy-science-and-technology>

Introduction to Film Studies HSS251

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10516/HSS251-introduction-to-film-studies>

Social Media and Society HSS252

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13465/HSS252-social-media-and-society>



YEAR 1

COURSE OFFERING

FALL SEMESTER

MATHEMATICS

Two introductory courses in Mathematics are to be taken in the first semester of Year 1.

Linear Algebra MAA101

ECTS Credits: 5 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/2/MAA101-linear-algebra>

Introduction to Analysis MAA102

ECTS Credits: 5 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/3/MAA102-introduction-to-analysis>

INTRODUCTION TO MAJORS

The courses in this category provide a first introduction to the topics to be covered in the different double majors.

Physics I: Mechanics and Heat PHY101

ECTS Credits: 5 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5/PHY101-physics-i-mechanics-and-heat>

Introduction to Economics EC0101

ECTS Credits: 5 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/9/EC0101-introduction-to-economics>

METHODOLOGY

Methodology classes in the first semester enable students to develop the basic mathematical, programming and experimental skills that will be used extensively in the program.

Introduction to Computer Programming CSE101

ECTS Credits: 5 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/8/CSE101-computer-programming>

Maths in Practice : Calculus LAB101

ECTS Credits: 1 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10720/LAB101-maths-in-practice-calculus>

Maths in Practice: How to Write Mathematics LAB102

ECTS Credits: 2 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10721/LAB102-how-to-write-mathematics>

Discovery Labs LAB103

ECTS Credits: 2 – MANDATORY

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10722/LAB103-discovery-labs>

PERSONAL DEVELOPMENT SEMINARS

The Art of Decision Making : Fall Session PDV 101

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/1367/PDV101-the-art-of-decision-making-fall>

Meeting Professionals PDV103

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/1369/PDV103-meeting-a-professional>



YEAR 1

COURSE OFFERING

SPRING SEMESTER

MATHEMATICS

Two courses in Mathematics are mandatory in the spring semester of Year 1.

Discrete Mathematics MAA103

ECTS Credits: 5 – MANDATORY

Prerequisites – LAB102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/4/MAA103-discrete-mathematics>

Integral and Differential Calculus MAA105

ECTS Credits: 5 – MANDATORY

Prerequisites – MAA102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/14/MAA105-integral-and-differential-calculus>

PERSONAL DEVELOPMENT SEMINARS

A Healthy Mind in a Healthy Body PDV 102

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10511/PDV102-s1-a-healthy-mind-in-a-healthy-body>

The Art of Decision Making: Spring Semester PDV104

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10782/PDV104-s2-the-art-of-decision-making>

First Aid PDV105

ECTS Credits 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16365/PDV105-first-aid>

INTRODUCTION TO MAJORS

The courses in this category are prerequisites for the corresponding majors.

Advanced Programming CSE102

ECTS Credits: 5 – MANDATORY

Prerequisites – CSE101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/19/CSE102-computer-programming>

Introduction to Algorithms CSE103

ECTS Credits: 2 – MANDATORY for a student wishing to major or to minor in Computer Science, optional otherwise

Prerequisites – CSE101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/20/CSE103-introduction-to-algorithms>

Topics in Economics EC0102

ECTS Credits: 5 – MANDATORY for a student wishing to major in Economics, optional otherwise

Prerequisites – EC0101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/25/EC0102-topics-in-economics>

Physics II: Electromagnetism and Light PHY104

ECTS Credits: 5 – MANDATORY for a student wishing to major in Physics, optional otherwise

Prerequisites – PHY101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16/PHY104-physics-ii-electromagnetism-and-light>

METHODOLOGY

Methodology classes in the second semester enable students to develop more advanced practical mathematical, programming and experimental skills that will be used extensively in the program.

Maths in Practice 3: Vector and Fourier Analysis LAB151

ECTS Credits: 2 – MANDATORY if PHY104 is taken. Optional otherwise

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10844/LAB151-maths-in-practice-vector-and-fourier-analysis>

Maths in Practice 3: Mathematical Tools for Economics LAB152

ECTS Credits: 2

RECOMMENDED if ECO102 is taken. Optional otherwise. Incompatible with LAB151.

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16366/LAB152-maths-in-practice-mathematical-tools-for-economics>

Introduction to Numerical Analysis MAA106

ECTS Credits: 3 – MANDATORY for a student wishing to major in Computer Science, optional otherwise

Prerequisites – MAA102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/15/MAA106-introduction-to-numerical-analysis>

Beginner's Physics Lab II PHY106

ECTS Credits: 2 – MANDATORY for a student wishing to major in Physics

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/18/PHY106-beginner-s-physics-lab-ii>

ELECTIVES

Biology **BIO101**

ECTS Credits: 3 – **OPTIONAL**. Required for Biology minor

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/21/BIO101-biology>

General Chemistry **CHE101**

ECTS Credits: 3 – **OPTIONAL**. Required for Chemistry minor

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10/CHE101-general-chemistry>

Mathematical Modeling **MAA107**

ECTS Credits: 3 – **OPTIONAL**

Prerequisites – **MAA101, MAA102, incompatible with BIO101, CHE101 and CSE104**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/22/MAA107-mathematical-modeling>

Web Programming **CSE104**

ECTS Credits: 3 – **OPTIONAL**

Prerequisites – **CSE101, incompatible with BIO101, CHE101 and MAA107**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/24/CSE104-web-programming>

Applied Physics **PHY107**

ECTS Credits: 3 – **OPTIONAL**

Prerequisites – **PHY101, LAB101, incompatible with ECO102**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/23/PHY107-applied-physics>



A decorative graphic on the right side of the page, consisting of several overlapping, curved, blue and white shapes that create a sense of motion and depth.

YEAR 2 **COURSE OFFERING** **FALL SEMESTER**

MATHEMATICS

These Mathematics courses concern all second year students in the program.

Linear Algebra 2 MAA201

ECTS Credits: 5 – MANDATORY

Prerequisites – MAA101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/27/MAA201-reduction-of-endomorphisms>

Topology and Multivariate Calculus MAA202

ECTS Credits: 5 – MANDATORY

Prerequisites – MAA102 MAA105

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/28/MAA202-topology-and-multivariable-calculus>

Probability and Statistics MAA210

ECTS Credits: 5 – MANDATORY for Economics Majors, recommended for Computer Science Majors, optional otherwise

Prerequisites – MAA102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16289/MAA210-probability-and-statistics>

COMPUTER SCIENCE

These courses are intended only for students in the Computer Science Major.

Object Oriented Programming CSE201

ECTS Credits: 5 – MANDATORY for students majoring or minoring in Computer Science, optional otherwise

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/32/CSE201-object-oriented-programming-in-c>

Design and Analysis of Algorithms CSE202

ECTS Credits: 5 – MANDATORY for Computer Science Major

Prerequisites – CSE103

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/33/CSE202-design-and-analysis-of-algorithms>

Logic and Proofs CSE203

ECTS Credits: 3 – Recommended for Computer Science Major

Prerequisites – CSE102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/34/CSE203-logic-and-proofs>

ECONOMICS

These courses are intended only for students in the Economics Major.

Microeconomics EC0201

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0101, EC0102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/38/EC0201-intermediate-microeconomics>

Macroeconomics EC0202

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0101, EC0102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/39/EC0202-intermediate-macroeconomics>

PHYSICS

These courses are intended only for students in the Physics Major.

Classical Mechanics PHY201

ECTS Credits: 5 – MANDATORY for Physics Major

Prerequisites – PHY101

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/35/PHY201-classical-mechanics>

Wave Optics and Radiation PHY202

ECTS Credits: 5 – MANDATORY for Physics Major

Prerequisites – PHY104

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/36/PHY202-wave-optics-and-radiation>

Advanced Labs 1 PHY203

ECTS Credits: 3 – MANDATORY for Physics Major

Prerequisites – PHY106

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/37/PHY203-advanced-lab-i>

ELECTIVES

Cell Biology BIO201

ECTS Credits: 3 – **OPTIONAL**. Required for Biology minor

Prerequisites – **BIO101**, incompatible with CHE201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/41/BIO201-cell-and-developmental-biology>

Reactivity Chemistry CHE201

ECTS Credits: 3 – **OPTIONAL**. Required for Chemistry minor

Prerequisites – **CHE101**, incompatible with BIO201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/42/CHE201-introduction-to-reactivity>

Algorithms for Discrete Mathematics MAA205

ECTS Credits: 3 – **OPTIONAL**

Prerequisites – **MAA101**, **MAA103**, **CSE101**, not open to Physics Major

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/31/MAA205-algorithms-for-discrete-mathematics>

PERSONAL DEVELOPMENT SEMINARS

A Healthy Mind in a Healthy Body II PDV201

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/1374/PDV201-a-healthy-mind-in-a-healthy-body-ii>

Speech Contest PDV203

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/10512/PDV203-speech-contest>

Speech Contest Organization PDV204

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13466/PDV204-speech-contest-organisation>



YEAR 2

COURSE OFFERING

SPRING SEMESTER

MATHEMATICS

These Mathematics courses are intended for all second year students in the program.

Euclidean and Hermitian spaces MAA206

ECTS Credits: 5 – MANDATORY

Prerequisites – MAA201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/43/MAA206-quadratic-forms-and-applications>

Series of Functions, Differential Equations MAA207

ECTS Credits: 5 – MANDATORY

Prerequisites – MAA202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/44/MAA207-series-of-functions-differential-equations>

Numerical Analysis 2: Linear Algebra and Optimization MAA251

ECTS Credits: 5 – MANDATORY for Computer Science Majors if MAA210 is not taken. Optional otherwise

Prerequisites – MAA106, MAA201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16291/MAA251-numerical-analysis-2-linear-algebra-and-optimization>

COMPUTER SCIENCE

3 Mandatory courses to be taken in the following list for Computer Science Major.

Machine Learning CSE204

ECTS Credits: 5 – Required for Computer Science Minor, 3 courses among CSE204, CSE205, CSE206 and CSE207 for Computer Science Major

Prerequisites – CSE101, CSE102, CSE201, not open to Maths Physics Major

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/47/CSE204-machine-learning>

Computer Architecture CSE205

ECTS Credits: 5 – 3 courses among CSE204, CSE205, CSE206 and CSE207 for Computer Science Major

Prerequisites – CSE201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/48/CSE205-computer-architecture>

Formal Languages CSE206

ECTS Credits: 3 – 3 courses among CSE204, CSE205, CSE206 and CSE207 for Computer Science Major

Prerequisites – CSE203

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/49/CSE206-introduction-to-formal-languages>

Networks CSE207

ECTS Credits: 3 – 3 courses among CSE204, CSE205, CSE206 and CSE207 for Computer Science Major

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/50/CSE207-introduction-to-networks>

ECONOMICS

These courses are only for students in the Economics Major.

Econometrics EC0203

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0101, EC0102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/55/EC0203-introduction-to-econometrics>

Finance EC0204

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0101, EC0102, EC0201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/56/EC0204-introduction-to-finance>

History of Economics EC0205

ECTS Credits: 3 – MANDATORY for Economics Major

Prerequisites – EC0101, EC0102

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/57/EC0205-topics-in-history-of-economic-thought-since-1945>

PHYSICS

These courses are only for students in the Physics Major.

Classical Electrodynamics PHY204

ECTS Credits: 5 – MANDATORY for Physics Major

Prerequisites – PHY104

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/51/PHY204-classical-electrodynamics>

Quantum Physics PHY205

ECTS Credits: 5 – MANDATORY for Physics Major

Prerequisites – PHY101, PHY104

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/52/PHY205-introduction-to-quantum-physics>

Geophysics PHY206

ECTS Credits: 3 – At least one course among PHY206 and PHY208 for Physics Major

Prerequisites – PHY101, PHY201, PHY202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/53/PHY206-waves-in-fluids-with-illustrations-from-geophysics>

Atoms and Lasers PHY208

ECTS Credits: 3 – At least one course among PHY206 and PHY208 for Physics Major

Prerequisites – PHY104

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/3276/PHY208-atoms-and-lasers>

Advanced Labs II PHY207

ECTS Credits: 3 – MANDATORY for Physics Major

Prerequisites – PHY203

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/54/PHY207-advanced-lab-ii>

ELECTIVES

Molecular Genetics **BIO202**

ECTS Credits: 3 – **OPTIONAL**. Required for Biology minor

Prerequisites – **BIO201**, incompatible with **CHE202**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/59/BIO202-molecular-genetics>

Environment and Energy **CHE202**

ECTS Credits: 3 – **OPTIONAL**. Required for Chemistry minor

Prerequisites – **CHE101**, incompatible with **BIO202**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/60/CHE202-environment-and-energy>

Lab Research Project **LAB251**

ECTS Credits: 3 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13624/LAB251-lab251-prl>

PERSONAL DEVELOPMENT SEMINARS

Group Volunteering PDV202

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/3278/PDV202-volunteering>

Sustainable Development PDV206

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13468/PDV206-sustainable-development>

How to prepare for Graduate Studies PDV207

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13469/PDV207-prepare-for-graduate-studies>



YEAR 3

COURSE OFFERING

FALL SEMESTER

MATHEMATICS

A third year student majoring in either Computer Science or in Physics has to take at least 2 courses among MAA302-MAA303-MAA304-MAA307-MAA313. A third year student majoring in Economics has to take MAA307 and at least one course among MAA302-MAA304-MAA313.

Topology and Differential Calculus MAA302

ECTS Credits: 5 – **OPTIONAL**

Prerequisites – **MAA207**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/62/MAA302-topology-and-differential-calculus>

Algebra and Galois Theory MAA303

ECTS Credits: 5 – **OPTIONAL. Not offered to Economics Major**

Prerequisites – **MAA206, incompatible with MAA307**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/80/MAA303-algebra-and-galois-theory>

Mathematical Statistics MAA304

ECTS Credits: 5 – **Recommended for Computer Science and Economics Major. Optional otherwise**

Prerequisites – **MAA210**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/63/MAA304-mathematical-statistics>

Convex Optimization and Optimal Control MAA307

ECTS Credits: 5 – **MANDATORY for Economics Major**

Prerequisites – **MAA202, incompatible with MAA303**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/82/MAA307-convex-optimization-and-optimal-control>

Complex Analysis MAA313

ECTS Credits: 5 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/16292/MAA313-complex-analysis>

COMPUTER SCIENCE

These courses are intended only for the Third year students in the Computer Science Major.

Compilers CSE302

ECTS Credits: 5 – MANDATORY for Computer Science Major

Prerequisites – CSE201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/66/CSE302-compilers>

Functional Programming CSE301

ECTS Credits: 3 – At least one course among CSE 301, CSE303 and CSE307 for Computer Science Major

Prerequisites – CSE201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/65/CSE301-functional-programming>

Constraint Logic Programming CSE307

ECTS Credits: 3 – At least one course among CSE 301, CSE303 and CSE307 for Computer Science Major

Prerequisites – CSE201, CSE203

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5468/CSE307-relational-programming>

Computer Science Project CSE303

ECTS Credits: 3 – At least one course among CSE 301, CSE303 and CSE307 for Computer Science Major. Mandatory for Computer Science minor

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/67/CSE303-computer-science-project>

ECONOMICS

These courses are intended only for the third year students in the Economics Major.

Advanced Microeconomics EC0301

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/72/EC0301-advanced-microeconomics>

Advanced Macroeconomics EC0302

ECTS Credits: 5 – MANDATORY for Economics Major

Prerequisites – EC0202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/73/EC0302-advanced-macroeconomics>

PHYSICS

These courses are intended only for the third year students in the Physics Major.

Quantum Physics 2 PHY301

ECTS Credits: 5 – **MANDATORY** for Physics Major

Prerequisites – **PHY205**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/68/PHY301-advanced-quantum-physics>

Condensed Matter Physics PHY302

ECTS Credits: 5 – **At least one course among PHY302 and PHY304 for Physics Major**

Prerequisites – **PHY201, PHY204**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/69/PHY302-introduction-to-condensed-matter-physics>

Solid Mechanics PHY304

ECTS Credits: 5 – **At least one course among PHY302 and PHY304 for Physics Major**

Prerequisites – **PHY101, PHY201**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/71/PHY304-solid-mechanics>

Advanced Labs III PHY303

ECTS Credits: 3 – **MANDATORY** for Physics Major

Prerequisites – **PHY203**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/70/PHY303-advanced-lab-iii>

ELECTIVES

Biology Practicals **BIO301**

ECTS Credits: 3 – **OPTIONAL**. Required for Biology minor

Prerequisites – **BIO201, BIO202, incompatible with CHE301**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5007/BIO301-biology-practicals>

Technological Tools for Chemistry **CHE301**

ECTS Credits: 3 – **OPTIONAL**. Required for Chemistry minor

Prerequisites – **CHE101, incompatible with BIO301**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/79/CHE301-technological-tools-for-chemistry>

Lab Research Project **LAB301**

ECTS Credits: 3 – **OPTIONAL**

Incompatible with CSE303, CHE301 and BIO301

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13623/LAB301-lab301-prl>

PERSONAL DEVELOPMENT SEMINARS

Diversity Report PDV301

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5259/PDV301-diversity-report>

Active Volunteering PDV302

ECTS Credits: 2 – **OPTIONAL**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5260/PDV302-active-volunteering>



YEAR 3

COURSE OFFERING

SPRING SEMESTER

The semester starts with a mandatory Bachelor Thesis prepared during a research internship of 8 weeks minimum.

The subsequent classes have a shorter duration.

MATHEMATICS

These Mathematics courses are intended for all third year students in the program.

Measure and Integration MAA301

ECTS Credits: 4 – MANDATORY IN S6, except for students having taken a similar class during their exchange semester

Prerequisites – MAA207

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/61/MAA301-measure-and-integration>

Probability: Stochastic Processes MAA305

ECTS Credits: 4 – OPTIONAL. At least one course among MAA305-MAA306-MAA308-MAA312 for Computer Science and Physics Majors

Prerequisites – MAA210

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/64/MAA305-probability-stochastic-processes>

Differential Geometry MAA306

ECTS Credits: 4 – OPTIONAL. At least one course among MAA305-MAA306-MAA308-MAA312 for Computer Science and Physics Majors.

Prerequisites – MAA202, incompatible with MAA308

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5448/MAA306-introduction-to-differential-geometry>

Image Analysis MAA308

ECTS Credits: 4 – OPTIONAL. At least one course among MAA305-MAA306-MAA308-MAA312 for Computer Science and Physics Majors.

Incompatible with MAA306

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/83/MAA308-image-analysis-registration>

Numerical Methods for ODEs MAA312

ECTS Credits: 4 – OPTIONAL. At least one course among MAA305-MAA306-MAA308-MAA312 for Computer Science and Physics Majors.

Prerequisites – MAA207

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5451/MAA312-numerical-methods-for-odes>

COMPUTER SCIENCE

A Computer Science Major must choose at least two courses among CSE304-CSE305-CSE306-CSE308. A student in the Computer Science Minor must choose only one of these courses.

Complexity CSE304

ECTS Credits: 4 – OPTIONAL

Prerequisites – CSE202, CSE203, CSE206

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/84/CSE304-complexity>

Concurrent & Distributed Computing CSE305

ECTS Credits: 4 – OPTIONAL

Prerequisites – CSE201, CSE202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/85/CSE305-concurrent-and-distributed-computing>

Computer Graphics CSE306

ECTS Credits: 4 – OPTIONAL

Prerequisites – CSE201, CSE202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/86/CSE306-computer-graphics>

Formal Methods and Model Checking CSE308

ECTS Credits: 4 – OPTIONAL

Prerequisites – CSE203

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/13645/CSE308-formal-methods-and-model-checking>

ECONOMICS

These courses are intended only for students in the Economics Major. A third year student in this major must choose: a) at least 5 courses from the list below if two or more Math courses are taken in the semester OR b) at least 6 courses from the list below if only MAA301 is taken.

Corporate Social Responsibility for Business EC0305

ECTS Credits: 2 – OPTIONAL

Prerequisites – EC0201, EC0202

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/76/EC0305-social-and-environmental-responsability-of-business>

Research Frontiers A EC0307

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/92/EC0307-introduction-to-research-frontiers-a>

Research Frontiers B EC0308

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/93/EC0308-introduction-to-research-frontiers-b>

Computational Economics EC0309

ECTS Credits: 4 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/94/EC0309-computational-economics>

Economics of Blockchain EC0351

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/74/EC0351-economics-of-block-chains>

Experimental Economics EC0352

ECTS Credits: 2 – OPTIONAL

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/91/EC0352-experiments-in-economics>

PHYSICS

These courses are only for the third year students in the Physics Major.

Thermodynamics and Statistical Physics PHY305

ECTS Credits: 4 – MANDATORY for Physics Major

Prerequisites – PHY101, PHY201, PHY205

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/89/PHY305-thermodynamics-and-statistical-physics>

Fluid Mechanics PHY306

ECTS Credits: 4 – At least one course among PHY306 and PHY307 for Physics Major

Prerequisites – PHY101, PHY201

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/90/PHY306-fluid-mechanics>

Introduction to Subatomic Physics PHY307

ECTS Credits: 4 – At least one course among PHY306 and PHY307 for Physics Major

Prerequisites – PHY204, PHY205

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5409/PHY307-introduction-to-subatomic-physics>

METHODOLOGY

Bachelor Thesis BT

ECTS Credits: 14 – MANDATORY

ELECTIVES

Biomedicine BIO302

ECTS Credits: 3 – **OPTIONAL**. Required for Biology minor

Incompatible with CHE302

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/5008/BIO302-biomedicine>

Chemistry Synthesis and Transformation CHE302

ECTS Credits: 3 – **OPTIONAL**. Required for Chemistry minor

Prerequisites – **CHE201, incompatible with BIO302**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/97/>

CHE302-mastering-the-synthesis-and-transformation-of-molecules

Management and Innovation MIE301

ECTS Credits: 3 – **Recommended**

<https://synapses.polytechnique.fr/catalogue/2023-2024/ue/87/MIE301-fundamentals-of-organization>

Maquette-impression  **oly-media**

Photos: thinkstock 2017 –
Getty Images 2020



ÉCOLE POLYTECHNIQUE
91128 PALAISEAU CEDEX
www.polytechnique.edu