July 2022

ÉCOLE DES PONTS PARISTECH
Building the worlds of tomorrow
A world-class Higher Education and Research Institution

• A public engineering school recognised for the excellence of its graduate studies

• Founded in 1747

• International outlook

• A unique combination of fundamental and applied sciences, to transform business and society.

• Flexible and interdisciplinary engineering curriculum

• Leading to executive careers

• Striving for the ecological and digital transition
A long and prestigious history

The oldest School of engineering in Europe

- **1747**: École nationale des ponts et chaussées founded by King Louis XV
- **1851**: First research laboratory
- **1988**: 1st Double Degree agreement with international universities
- **1997**: Relocation in Marne-la-Vallée, Green City Campus
- **2021**: Founding member of EELISA European University

Henri Becquerel 1852-1908
- Physicist
- Nobel prize 1903

Augustin Cauchy 1789-1857
- Mathematician
- One of the founders of modern analysis

Eugène Freyssinet 1879-1962
- Engineer, entrepreneur
- The father of prestressed concrete

Louis Ménard 1931-1978
- Engineer
- Developer of the pressiometer

Claude-Louis-Marie-Henri Navier 1785-1836
- Engineer, scientist
- Inventor of general theory of elasticity

Jean Résal 1854-1919
- Engineer
- Builder of the pont Mirabeau and pont Alexandre III in Paris

Jean Tirole 1953-...
- Economist
- Nobel prize 2014

Louis Joseph Vicat 1786-1861
- Engineer
- Inventor of concrete
Remarkable works, designed by Ecole des Ponts ParisTech Alumni

Viaduc Millau - Michel Virlogeux

Gardens by the Bay (Singapore) © Atelier one – passage project

Cristo Redentor Albert Caquot
International QS Rankings 2023: + 71 spots in one year.
#174 worldwide
#180-190 Graduate Employability Ranking
#6 France

2022 THE (Times Higher Education) international ranking: +8 spots in one year.
#251-300 worldwide
#1 France < 5000 students

National Etudiant ranking 2022:
#4 France

Choose France certification
Highest level of certification of welcome procedures and programmes for international students

AFAQ ISO 9001 certification
Quality management
International partnerships

71 partner universities
35 countries
4 continents
47 double-degree agreements with universities
25 countries

1 European University

16 partner universities
13 double-degree
3 exchange agreements

16 partner universities
19 double degrees
20 Erasmus exchange agreements

9 partner universities
6 double degrees
1 exchange agreement

Global initiatives

Programme de Formation d'Ingénieurs d'Excellence - PFIEX (Vietnam)
Co-Innovation Center (Tongji, Shanghai)
Joint Education and Research Center (UMEP, Morocco)
Capacity Building Program funded by the World Bank (INP-HB, Côte d'Ivoire)

Africa/Middle-East:
9 partner universities
6 double-degrees
2 exchange agreements
Academic partnerships, and Research cooperation

- Long standing relations with top Universities

- Brazilian students are #1 international students: 30 / year

- Aproximadamente 250 antigos alunos residindo e trabalhando no Brasil

Encontro Ponts-Brasil - 2014

“Brasil na Ponts” - 2014/2015
• **State-owned institution**
  • Reports to the Ministry for the Ecological Transition and to the Ministry of Higher Education, Research and Innovation

• **Governing bodies:**
  • Board of Directors, 24 seats, 8 for industry representatives
  • Graduate School Council
  • Scientific Council

• **Funding:**
  • Annual budget: 47 M€
  • 50% by the Ministry for the Ecological Transition
  • 50% by industry
Students:
- 870 students in the MSc in engineering / Diplôme d’ingénieur
- 130 in Master’s programmes
- 300 in Advanced Master’s programmes
- 500 PhD candidates and postdocs
- 200 in Business Administration programmes

i.e. a total of: **2 000** students, **33%** female
45% international students, 45 nationalities

1 200 instructors (academics, researchers, business practitioners)

12 research laboratories
7 labs of excellence

450 permanent scientists
14 education and research chairs

1000 rank A publications, including 45% with a foreign partner

Key facts and figures
The school of the Ecological transition

- A history of combining engineering and social sciences for effective, relevant and appropriate technologies
- 12 Research centers covering 11/17 **Sustainable Development Goals** (United Nations)
- One « European Research Institute » **Energy for Climate**
- **Develop’Ponts**: the student union committed to sustainable development, solidarity actions, **inclusion for the society and the environment**
- **10 /14 industrial chairs**, addressing the ecological transition: 3 in sustainable development, 2 in environment, 5 in sustainable transport and mobility
Close links with industry

Transportation, environment, urban services

Energy

Industry

Consulting

Construction

Finance
Careers and placement

85% of engineering students are hired before graduation

Average salary in first job:
- €46,900
- €52,500 with bonuses

Source: 2021 survey of 2020 graduates (excl. civil servants)
Academics: graduate programs

- Bachelor
- Master
- PhD

"Diplôme d’ingénieur (MSc-Master of Science in Engineering)

MS- Advanced Masters

National competitive exam

0

3

Bachelor

5

Master

8

PhD

8 years

Industry-oriented

Research-oriented
• **Civil and Structural Engineering**
  Complex projects, site work organisation, innovation of new materials and construction technologies

• **City, Environment, Transportation**
  Planification of complex urban systems and operation of urban services (transportation, water,...)

• **Mechanical Engineering and Material Science:**
  Research and design of new products and materials in the fields of energy or transportation

• **Industrial Engineering:**
  Innovation and supply chain. Robotics.

• **Economics, Management, Finance:**
  Financial engineers (financial engineering, project finance, public/private partnerships) and economist engineers (urban, environment, transportation, construction and economic regulation)

• **Applied Mathematics and Computer Science:**
  Modelisation of complex systems; analysis of financial, industrial or natural risks; challenges within big data
International Master’s programmes

**International masters**
- Masters in Transport and Sustainable Development (TRADD)
- Master in Water, Soil and Waste Management and Treatment (GTESD)

- Master Internacional en Empresa y Políticas Públicas (MIEPP) – institutional degree (Madrid)

**MSc**
- Sustainable Impact Analysis (SIA)
Master’s programmes

Applied Mathematics
• Probabilities and random models (PMA)
• Mathematics of finance and data (MFD)
• Mathematics, Vision, Learning (MVA)
• Modelling, Analysis, Simulation (MAS)
• Operational Research (RO)

Energy option
• Decommissioning and Waste Management (DWM)
• Energy Transition and Territories (TET)

Civil Engineering
• Mechanics of Soils, Rocks, and Structures in their Environment (MSROE)

Materials Science and Engineering
• Materials science for sustainable construction (SMCD)

Transportation, Mobility, Networks
• Transportation, Mobility (TM)

Environmental, Energy, and Transportation Economics
• Environmental Economics
• Energy Economics
• Forward Modelling

Mechanical Engineering
• Multiscale Analysis for Materials and Structures (AMMS)
• Durability of materials and structures (DMS)

Quantitative Economics
• Analysis and Political Economy (APE)
• Public Policies and Development (PPD)
Advanced Master’s programmes

Executive Education

FULL-TIME
- Planning and Urban Commissioning
- Urban Engineering and Information Technology (Urban ICT)
- European civil engineering
- Engineering of Large Energy Structures
- Public Policy for Sustainable Development

PART-TIME
- Design by Data, Computational Design, Digital Manufacturing and Building Technologies
- Sustainable Real Estate and Building, energy transitions and digital technology
- BIM, Integrated Design and Life Cycles of Buildings and Infrastructures
- Smart Cities Engineering and Management
- Decision Support and Geolocated Information Systems
- Rail and urban transit systems
- Smart Mobility - Digital transformation of mobility systems
- Supply Chain Design & Management
- Infrastructure Project Finance
- Advanced Public Action Morocco
- Management of Energy Projects
PhD Programmes

- City, Transportation, and Territories
- Sciences, Engineering, and Environment
- Mathematics and ICT
- Organizations, Markets, Institutions
- Agriculture, Food, Biology, Environment and Health
- Social Science
- Environmental Sciences
- Astronomy and Astrophysics
- Mechanical, Energy, Materials Sciences and Geosciences
- Economics

Choose PhD@Ecole des Ponts ParisTech for:
- International perspective
- Close links with industry
- Impact on public policies and sustainable development

English-speaking environment
• Executive DBA (Paris – New York)

• LEADTECH Global Executive MBA (Paris – Barcelona – Singapore – Silicon Valley)

• Global Executive MBA (Casablanca)

• Executive Certificates (Africa)

• Executive MBA in aviation management with Tsinghua University (Beijing)

• DBA – Intelligent Manufacturing Management- (Shanghai)

• Certificate in Innovation and Technology Management (Paris)
# Non-Degree English-taught Programmes

<table>
<thead>
<tr>
<th>Level</th>
<th>Topic</th>
<th>Academic program</th>
<th>Specifics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor-senior</td>
<td>Applied Mathematics</td>
<td>Mathematical tools for engineer analysis and scientific computing, optimization, probability, introduction to programming, statistical physics, operational research and optimization, statistics &amp; data analytics, language (French), sport, project within lab</td>
<td>Bespoke academic supervision and small class teaching</td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
<td>Full Ecole des Ponts ParisTech student and research experience</td>
</tr>
<tr>
<td>Graduate students</td>
<td>Green Finance</td>
<td>Physics of climate change, energy economics, ESG analysis, green financing, conferences, credit risk, management of climate risks, project finance, life cycle analysis, capstone projects</td>
<td>Extension to 1 semester of research at CIRED laboratory</td>
</tr>
</tbody>
</table>
An entrepreneurial ecosystem for students

- Entrepreneurship courses
- 2 incubators (Descartes, Station F), 1 accelerator
- Annual Hackathon: « One night to launch a startup »
- Access to research equipment and mentorship
- Special awards, and seed-funds from Fondation des Ponts
Research for the ecological and digital transition

A challenge-based approach to address 4 socio-economic issues of sustainable development

- Industry of the future
- City and mobility systems
- Economy, practices and society
- Management of risks, resources and milieus
Research for the ecological and digital transition

- Ecomaterials
- Digital Manufacturing
- Innovative Structures
- Geomechanics

- Sustainable mobility
- Territorial dynamics

- Modelisation of uncertainty
- Digital simulation
- Systems optimisation

- Data processing
- 3D vision
- Big data

- Cities of the future
- Infrastructures
- Practices

- Public policies
- Environmental economy
- Markets and governance

- Physics of atmosphere
- Climate

- Hydro-meteorological risks
- Resilient cities

- Urban waters
- Alternative resources

- Atmospheric environment
- Air quality
- Renewable energy

- Urban waters
- Alternative resources

- Sustainable development
- Climate change

- Renewable energy
- Natural risks
The Co-Innovation Lab
Collaborative platforms improving transfer to industry

**Fresnel**: multi-scale observation and modelling platform for resilient cities
*X-band dual polarisation weather radar, lidars, disdrometer...*

**Build’In**: building systems and artificial intelligence, materials and structures optimisation, industrial processes
*Robotic hall, large-scale additive manufacturing unit, concrete and composite materials modelling...*

**Mµ**: urban mobility modelling, new behaviors, infrastructures and urban planning, impact of public policies
*Softwares, traffic simulators...*
Maker space | d.school

Makerspace
• 3D Printing,
• Laser cut
• 4 poles (ceramic, wood, steel, water, electronics)

d.School Paris
Design Thinking as an approach to innovation and its management

56 CORPORATE PARTNERS
74 PROFESSIONAL PROJECTS
100 ALUMNI EXPERTS

- innovate – collaborate – share -
La Source, Learning Center
- 250 seats
- 200,000 documents
- Open 71 hours/week

Scientific information services for researchers
- 25,000 scientific publications
- HAL ENPC Open Science Plan (65% publications in open access)

Archives
- Exceptional heritage
- Ancient manuscripts and maps since the 18th century.

Presse des Ponts
- 220 books and scientific and technical software applications primarily in the fields of civil and structural engineering, and spatial planning
• Housing (on campus or in Paris center)
• Sport facilities
• Vibrant campus life
• 15 student societies
• 20’ from Paris center (direct urban train)
• International students welcome desk with « Feel Français »
Alumni endowment and support

- 22,000 alumni worldwide, holding leadership positions in 100 countries
- 14 international groups
- Bespoke mentoring for international students over their stay in France
- Support for careers and internships

- Special scholarships program for international students
- Corporate Scholarship (Meridiam)
- Excellence awards
- A powerful network of donors
**Bachelor cycle**
At home institution

**Master cycle**
At Ecole des Ponts ParisTech
> Choice of a Department of studies
  - Civil and structural engineering
  - City, environment, transportation
  - Mechanical engineering and materials science
  - Industrial engineering
  - Economics, Management, Finance
  - Applied mathematics and computer science

**Industrial internship**
- 3 months or 1 year
- France or abroad

**Final Project / Master thesis**
- For at least 4 months, students apply the skills acquired in their programme to a scientific or technical problem, in a company or research laboratory.

<table>
<thead>
<tr>
<th>7 Semesters</th>
<th>Master courses</th>
<th>Master courses</th>
<th>Internship</th>
<th>Master courses</th>
<th>Final project / Master thesis</th>
<th>Semester 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Home university in Brazil</td>
<td>&gt; Ecole des Ponts ParisTech</td>
<td></td>
<td>FR, BR or WW</td>
<td>&gt; FR / BR or WW</td>
<td>&gt; Home university in Brazil</td>
<td></td>
</tr>
</tbody>
</table>
## Double-degree curriculum for Brazilian students

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>ENPC S6 – PFE</td>
</tr>
<tr>
<td>9</td>
<td>ENPC S5</td>
</tr>
<tr>
<td>8</td>
<td>Internship 3 &gt; 12m</td>
</tr>
<tr>
<td>7</td>
<td>ENPC S4</td>
</tr>
<tr>
<td>6</td>
<td>ENPC S3</td>
</tr>
<tr>
<td>5</td>
<td>ENPC S2</td>
</tr>
<tr>
<td>4</td>
<td>ENPC S1</td>
</tr>
<tr>
<td>3</td>
<td>Semester 4</td>
</tr>
<tr>
<td>2</td>
<td>Semester 3</td>
</tr>
<tr>
<td>1</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

### Fundamentals

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Professional course

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>ENPC S6 – PFE</td>
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<td>ENPC S5</td>
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<tr>
<td>8</td>
<td>Internship 3 &gt; 12m</td>
</tr>
<tr>
<td>7</td>
<td>ENPC S4</td>
</tr>
<tr>
<td>6</td>
<td>ENPC S3</td>
</tr>
<tr>
<td>5</td>
<td>ENPC S2</td>
</tr>
<tr>
<td>4</td>
<td>ENPC S1</td>
</tr>
<tr>
<td>3</td>
<td>Semester 4</td>
</tr>
<tr>
<td>2</td>
<td>Semester 3</td>
</tr>
<tr>
<td>1</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

### Specialization

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Semester 1</td>
</tr>
</tbody>
</table>
### Application process
#### Double-degree UFRJ - ENPC

<table>
<thead>
<tr>
<th>Phase</th>
<th>Nomination by EP-UFRJ</th>
<th>Application online</th>
<th>Remote Interview</th>
<th>ENPC Admission Jury</th>
<th>Deadline for sending certificates</th>
<th>Beginning of the academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deadline</strong></td>
<td>Early September</td>
<td>September 30th</td>
<td>Mid-October</td>
<td>Mid-November</td>
<td>Early June</td>
<td>Last week of August</td>
</tr>
<tr>
<td><strong>Criteria</strong></td>
<td>GPA</td>
<td><a href="https://crm.enpc.fr/community/enpc/custom_forms/184">https://crm.enpc.fr/community/enpc/custom_forms/184</a></td>
<td>30mn Motivations</td>
<td>Academic excellence</td>
<td>A2 in French (B1 for VET Urban planning track)</td>
<td>Assessment of language level, and upgrading courses in mechanics (in September)</td>
</tr>
<tr>
<td></td>
<td>Ranking by class</td>
<td></td>
<td></td>
<td>Clarity of the project</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional project</td>
<td></td>
<td></td>
<td>Recommendation letters</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Letters of recommendation</td>
<td></td>
<td></td>
<td>Interview</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Maximum 5 students</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Motivations:**
  - Academic excellence
  - Clarity of the project
  - Recommendation letters
  - Interview
  - **Maximum 5 students**
### Organization of courses in Departments of Studies

#### Year 2 (S1&S2) M 1 Level

<table>
<thead>
<tr>
<th>Civil and Structural Engineering</th>
<th>City, Environment, Transportation</th>
<th>Mechanical Eng. &amp; Material Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses focusing on:</td>
<td>Courses focusing on:</td>
<td>Courses focusing on:</td>
</tr>
<tr>
<td>- Mechanics and dynamics</td>
<td>- Transportation (Continued)</td>
<td>- Transportation:</td>
</tr>
<tr>
<td>applied to soils, fluids &amp;</td>
<td>territorial analysis,</td>
<td>Hydrology, water</td>
</tr>
<tr>
<td>structures</td>
<td>transport economics</td>
<td>treatment, air</td>
</tr>
<tr>
<td>- Thermics</td>
<td>- Environment:</td>
<td>pollution, energy</td>
</tr>
<tr>
<td>- Structural design</td>
<td>- Engineering of design</td>
<td>- Eng. of operations and</td>
</tr>
<tr>
<td>- Drawing</td>
<td>and innovation</td>
<td>optimization</td>
</tr>
<tr>
<td>- Modelling</td>
<td>- Modelling:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphasis on solving</td>
<td></td>
</tr>
<tr>
<td></td>
<td>equations</td>
<td></td>
</tr>
</tbody>
</table>

#### Year 3 (M2) M 2 Level

<table>
<thead>
<tr>
<th>City, Environment, Transportation</th>
<th>Mechanical Eng. &amp; Material Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 tracks for Y3:</td>
<td>2 tracks for Y3:</td>
</tr>
<tr>
<td>- Civil Engineer</td>
<td>- Classic</td>
</tr>
<tr>
<td>- Researcher Engineer: Master (M2): AMMS, MSROE or SMCD (1)</td>
<td>- Classic + Master (M2): SMCD (1) or AMMS (1), or Durability of materials &amp; structures or Energy: Decommissioning and Waste Management</td>
</tr>
</tbody>
</table>

#### Internship between Y2 & Y3 - 2 options: 12 weeks minimum or 43 weeks minimum

- Transportation: traffic engineering,
- Urban planning: economics, legal, territorial analysis & environmental aspects of urban development operations
- Data science for industry
- Innovation & design
- Master (M2): Operational research or Energy transition at Local Scale or Transport and Sustainable Development
- Supply chain, operational research, modelling, project, ...
- Design of industrial systems: project oriented, robotics and prototyping
- Modelling: emphasis on solving equations
- Vision & learning
- Design of industrial systems: project oriented, robotics and prototyping
- Modelling: emphasis on solving equations
- Operational Research
- Infrastructure Project finance
- Economics: urban economics, sustainable dvt, transportation eco. & dvt eco. ...
- Finance: corporate, project and sustainable finance

#### Sem 1:
- Supply chain, operational research, modelling, project, ...
- Design of industrial systems: project oriented, robotics and prototyping
- Modelling: emphasis on solving equations
- Vision & learning
- Design of industrial systems: project oriented, robotics and prototyping
- Modelling: emphasis on solving equations
- Operational Research
- Infrastructure Project finance
- Economics: urban economics, sustainable dvt, transportation eco. & dvt eco. ...
- Finance: corporate, project and sustainable finance

#### Detailed curriculum and pre-requisites: https://ecoledesponts.fr/en/academic-departments
## Civil and Structural Engineering

### Year 2 (M1)

You must validate at least 48.5 ECTS in scientific courses to validate your Year 2 (M1).

Visit [https://ecoledesponts.fr](https://ecoledesponts.fr) for more information.

### Core Curriculum (Mandatory)
- **Introductions and Computer Graphics (Rhino, Photoshop) 1 - O2DMO (2.5 ECTS)**
- **Introduction to Construction Materials - O2IMC (1 ECTS)**
- **Corporate Social Responsibility (RSE) Week (1 ECTS)**
- **Week Engineering Geology: Principles and Practice - O2GEO (1 ECTS)**

### Core Curriculum (Mandatory) Details

<table>
<thead>
<tr>
<th>Period</th>
<th>Course Description</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2022</td>
<td>Introduction to drawings and computer graphics (Rhino, Photoshop) 1 - O2DMO</td>
<td>1</td>
</tr>
<tr>
<td>September 2022</td>
<td>Introduction to construction materials - O2IMC</td>
<td>1</td>
</tr>
<tr>
<td>February 2023</td>
<td>Corporate Social Responsibility (RSE) Week</td>
<td>1</td>
</tr>
<tr>
<td>February 2023</td>
<td>Week Engineering Geology: Principles and Practice - O2GEO</td>
<td>1</td>
</tr>
</tbody>
</table>

### Department Mandatory Courses

#### S3
- **Rock Mechanics - MECSR**
- **Structural Mechanics (Elastic Structures) - MECST**
- **Fluid Mechanics for Incompressible Flows - MECA 1 & 2**
- **Introduction to Drawings and Computer Graphics (Rhino, Photoshop) 2 - IDSMO**
- **Technology and Architecture of Buildings and Structures - OUVGC**

#### S4
- **Mechanics of Elastic Structures 2 - MECS2**
- **Thermics - TERGC**
- **Accessibility Day (23/02/2023) - JPACC**
- **Plasticity, Limit Analysis and Yield Design - PLAST**
- **Dynamics of Structures and Constructions - DYSTR**

### Department Mandatory Courses to Be Chosen

Please choose 1 couple of theoretical/application courses among the 2 couples below:

- **Structural Design (Theoretical part + application) - APST1 & EXPST**
- **Design of Geotechnical Structures (Theoretical part + application) - APGE & EXPGE**

### Elective Courses

Please choose a course among the whole school catalogue, including those proposed by GCC department.

You can choose the theoretical part of "Structural Design" or "Design of Geotechnical Structures" if not chosen as department mandatory couple.

<table>
<thead>
<tr>
<th>Course Description</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustics - ACOUS</td>
<td>1.5</td>
</tr>
<tr>
<td>Statistics: Practice of Learning Methods - PRAMA</td>
<td>2</td>
</tr>
<tr>
<td>Non Linear Mechanics of Curvilinear Structures - MECNL</td>
<td>1.5</td>
</tr>
<tr>
<td>Numerical Simulation of Aerealics and Air Quality in Urban Areas - SATUR</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### S3 and S4 Courses

- **Sport (Mandatory)**
- **Languages (Mandatory)**

### Total Year 2 (M1)

<table>
<thead>
<tr>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
</tr>
</tbody>
</table>
### Exposure Weeks (Mandatory)

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Course Description</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 6th, 7th and 9th, 2022</td>
<td>FEEDBACK ON ENGINEER INTERNSHIP - REX* (only for long internships) - 03STA</td>
<td>1.5</td>
</tr>
<tr>
<td>September 2022 : 12th to 16th</td>
<td>Week dedicated to Innovative materials in concrete construction - 03ATB OR Building freeforms - 03ATC OR Design of an arch - 03ATT OR Masonry wall : conception, construction and deconstruction - 03ADL</td>
<td>3</td>
</tr>
<tr>
<td>September 2021 : 13th to 19th</td>
<td>Future construction technologies : Techniques and Building Information Modeling (BIM) - CHBIM</td>
<td>1</td>
</tr>
<tr>
<td>November 2021 : 14th to 18th</td>
<td>Week of the department OR ATHENS - SEP</td>
<td>1</td>
</tr>
</tbody>
</table>

### Core Curriculum (Mandatory)

#### Materials
- Reinforced and prestressed concrete - BAEP 1 & 2
- Wooden structures - CASBO
- Steel construction - CASME

#### Advanced Courses
- Advanced construction dynamics - DYNAV
- Advanced structural design - COAST
- Finite elements for civil engineering - CALEF
- Geomechanics and advanced geotechnics - GEOME
- Advanced concrete - BETAV

### Elective Courses

Please choose courses among the courses proposed by the department (see below) or among the whole school catalogue, taking into account their compatibility with department mandatory courses.

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Course Description</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>S5</td>
<td>Civil engineering project management and economics - GEPCO</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life cycle analysis (ACV) - ANCYV 6 sessions</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>OR Life cycle analysis (ACV) - ACVGC 13 sessions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Buildings energy and comfort performance - APAM1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Design of underground structures - COTU1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Bridge design and construction - COPO1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Structures, energy and risks - CORI1</td>
<td>3</td>
</tr>
<tr>
<td>S5</td>
<td>LANGUAGES (mandatory)</td>
<td>4.5</td>
</tr>
<tr>
<td>S6</td>
<td>END-OF-STUDY PROJECT (17 weeks at least)</td>
<td>30</td>
</tr>
</tbody>
</table>

### Total Year 3 (M2)

60
Civil and structural engineering: Prerequisites

**Scientific analysis and calculation**
- Fundamental numerical methods for the engineer: finite differences for time integration of evolutionary equations, finite elements for solving variational problems.
- Linear algebra, matrix calculus, tensor calculus.
- Laplace transform, Fourier transform.
- Partial differential equations and finite elements

**Probabilities**
- Fundamental notions (probability space, random variable, law, expectation ...)
- Usual laws with real and integer values.
- Concepts of convergence
- Strong Law of Large Numbers
- Central Limit Theorem
- Main algorithms for simulating random variables
- Monte-Carlo method

**Solid mechanics**
- Kinematics and dynamics of non-deformable solids
- Geometric Transformation: Eulerian and Lagrangian Descriptions
- Internal stresses for 3D continuous medium: Cauchy stress tensor, Green-Lagrange strain tensor, linearization
- Thermodynamic approach to linear thermoelastic behavior, three-dimensional linear thermo elasticity problems
- Flat deformations
- Theorem of kinetic energy
- The Theorems of Minimum Potential Energy and Complementary Energy
- Principle of the finite element method in linear elasticity
- Linear elasticity finite element method
- Concepts of Limit Analysis and the Study of Linear Elastic Curvilinear Media

**Fluid mechanics**
- Eulerian Kinematics
- Euler's equations
- Navier-Stokes equations
- Reynolds Number Irrotational plane flows of perfect incompressible fluid
- Actual and complex potential
- Conformal transformations
- Transformation and Zhukovsky profiles

https://ecoledesponts.fr/en/civil-and-structural-engineering
Your budget

Tuition and fees
- Tuition: 64800€/year - Waived
- Fees (CMCI): 1000€/year

Scholarships
- Eiffel: 1180€/month
- Fondation des Ponts: 650€/month over 15 months
- Corporate scholarships (Meridiam)

Monthly Cost of living in Paris: ~850€
- Housing (including APL)
  - Residence Meunier: 400€ or
  - Maison des Mines et des Ponts: 250€
  - Less Gvt Housing allowance: 150/200 €
- Transport (Greater Paris): 40€
- Food: 300€
- Entertainment: 200€
- Incidentals: 100€
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- emmanuel.simantov@enpc.fr

Useful links:
- School website: https://www.ecoledesponts.fr/en
- Course catalogue: http://gede.enpc.fr/
- Student union (in French): https://bde.enpc.org/