ÉCOLE DES PONTS PARISTECH
Building the worlds of tomorrow

May 2020
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
- **2017**: National HEI Program “Inventing the City of Tomorrow”

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
Ecole des Ponts ParisTech Alumni in industry and in government

Elisabeth Borne
Ponts 86
Minister of the Ecological Transition

François Bertière
Ponts 74
CEO Bouygues Immobilier

Diane D’Arras
Ponts 77
President of IWA, former VP SUEZ Environnement

Fabrice Fourcade
Ponts 89
CEO EDF China

Antoine Frérot
Ponts 82
CEO Veolia

Mostafa Terrab
Ponts 79
CEO OCP Group

Benoit de Ruffray
Ponts 1993
CEO Eiffage

Thibault Duchemin
Ponts 2013
Founder AVA
Remarkable works, designed by École des Ponts ParisTech Alumni

Viaduc Millau - Michel Virlogieux

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

Beijing Opera © Paul Andreu

Cristo Redentor Albert Caquot
International QS Rankings 2020: +13 spots over last year.
#250 worldwide
#8 France

2019 THE (Times Higher Education) international ranking: +50 spots over last year.
#201-250 worldwide
#5 France / #2nd “Grande Ecole” France

National Etudiant ranking 2019:
#3 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 partners universities
35 countries
4 continents
45 double-degree agreements with universities
25 countries

Europe:
39 partner institutions
19 double-degree agreements
20 Erasmus+ exchange agreements

Asia:
9 partner institutions
8 double-degree agreements
1 bilateral exchange agreement

Africa and the Middle East:
9 partner institutions
6 double-degree agreements
2 bilateral exchange agreements

Americas:
15 partner institutions
12 double-degree agreements
3 bilateral exchange agreements

4 Global Initiatives

Programme de Formation d'Ingénieurs d'Excellence - PFIEV (Vietnam)
Co-Innovation Center (Tongji, Shanghai)
Joint Education and Research Center (UM6P, Maroc)
Capacity Building Program funded by the WorldBank (INP-HB, Côte d'Ivoire)
• **State-owned institution**
  • Reports to the Ministry for the Ecological and Inclusive 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 and Inclusive Transition
  • 50% by industry
Key facts and figures

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, **25%** female
**45%** international students, **45** nationalities

**1 200** instructors (academics, researchers, business practitioners)

- **12** research laboratories
- **7** labs of excellence
- **6 EUR, 3 ERC**
- **1000** rank A publications, including **45%** with a foreign partner

- **300** permanent scientists
- **50** PhD defense / year
- **14** education and research chairs
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

**JOB OPPORTUNITIES**

- Public Sector: 3%
- Innovation/Research: 3%
- Commerce/Media/Tourism: 3%
- Construction: 25%
- Telecoms/IT: 15%
- Banking/Insurance/Finance: 13%
- Industry: 9%
- Design and Consultancy: 7%
- Energy: 4%
- Transportation/Environment/Urban Services: 4%

Source: 2019 survey of 2018 graduates (excluding civil servants)
Our fields of excellence

- Civil engineering / Environment / Transportation / Urbanism
- Applied mathematics / Computer science / Data sciences
- Mechanics / Materials Science
- Industrial engineering / Robotics / Supply Chain
- Economics / Finance / Sustainable development
• **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
Specific Engineering Areas

Energy
Energy Transition At Local Scale, Management of energy projects, Nuclear Energy, Energy efficient buildings, Transport and Sustainable Development...

Robotics
Mechanical engineering, Advanced Robotics, Design by Data, Industrial Systems Design & Robotics

Data Sciences
Applied mathematics, Mathematics for Finance and Data, Mathematics, Vision, Learning, Design by Data

Departments of Humanities

Languages and Cultures
French as a Foreign Language Certified Center
Pre-arrival seminars, intensive French courses.
17% of study time dedicated to foreign languages, 10 taught languages, study trips, debates, tandem language learning.

Humanities and Social Sciences
History of engineering, Corporate communications, Sociology, Movies and Workplace
Academics: graduate programs

- National competitive exam
- Bachelor
- Master
- PhD

8 years

Industry-oriented
Research-oriented

“Diplôme d’ingénieur (MSc-Master of Science in Engineering)
MSc-Master of Science
MS- Advanced Master’s
FIRST YEAR (Bachelor cycle – senior year)
• Consolidation of scientific and general knowledge,
• projects (research and academic)
• Work experience: the year ends with a 4 week hands-on internship in a company

2nd & 3rd YEAR (Master cycle)
2nd Year: 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

Year 2 internship
• Between the 2nd and 3rd Year, 80% of the class opt for a long internship (1 year), more than 30% of them abroad.
• The other students undertake a short internship in a company or research laboratory (3 months), 20% of them abroad.

Year 3 Final Year Project (PFE)
Over minimum 4 months, students apply the skills acquired in their programme to a scientific or technical problem, in a company or research laboratory either individually or in a group (Ponts Team Project).
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, either individually or in a group (Ponts Team Project).
• Can be done at home university

<table>
<thead>
<tr>
<th>Bachelor</th>
<th>Master courses (for RU)</th>
<th>Master courses</th>
<th>Master courses</th>
<th>Internship</th>
<th>Master courses</th>
<th>Final project / Master thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Home university</td>
<td>&gt; Ecole des Ponts ParisTech</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; Ecole des Ponts or home university</td>
</tr>
</tbody>
</table>

Human-sized classes
35% international
25 nationalities
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**
- Economic Decision and Cost Benefit Analysis (EDCBA)
## 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)

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

### 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

### 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
Business Administration programmes

- 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

Full Ecole des Ponts ParisTech student experience / 1 semester / 500€/semester

<table>
<thead>
<tr>
<th>Level</th>
<th>Topic</th>
<th>Academic program</th>
<th>Specifics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor-senior students</td>
<td><strong>Applied Mathematics</strong></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 Full Ecole des Ponts ParisTech student and research experience</td>
</tr>
<tr>
<td>Graduate students</td>
<td><strong>Green Finance</strong></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
- 3 incubators (Descartes, GreenTech and Station F)
- Annual Hackathon: « One night to launch a startup »
- Access to research equipment and mentorship
- Special awards, and seed-funds from Fondation des Ponts

Successful start-ups

Daylight system with fiber optic

Roof mounted small wind turbine

From 2D to 3D
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

- Urban waters
- Alternative resources

- Physics of atmosphere
- Resilient cities

- Sustainable development
- Climate change

- Hydro-meteorological risks
- Natural risks

- Atmospheric environment
- Air quality
- Renewable energy

- Physics of atmosphere
- Climate

- Renewable energy
- Natural risks

- Public policies
- Environmental economy
- Markets and governance

- Cities of the future
- Infrastructures
- Practices

- Data processing
- 3D vision
- Big data
Research for the ecological and digital transition

- Predictive Maintenance

- Industry 4.0: how to use data to enhance competitiveness
Research for the ecological and digital transition

- Renewable Energy
- Onshore and offshore marine energy
- Wind farms and solar energy
- Smart grids

- EDF
- ADEME
- RTE
Research for the ecological and digital transition

- Resilient Cities: mobility, water, air.

- Smart & Sustainable Mobility

- Extreme rains

- Air Quality
Research for the ecological and digital transition

- Sustainable buildings and infrastructures
- Ecodesign of buildings and infrastructures
- Materials Science for Sustainable Construction
- Green roof performance

Ecole des Ponts ParisTech

VINCI

LafargeHolcim

Soprema
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, disdrometers*...

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

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

- 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
**Campus Cité Descartes**
Greater Paris green cluster

- 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
• Scholarships from corporate donors (Meridiam, OCP Group, LafargeHolcim, Saint-Gobain, Veolia)
• Excellence awards
• A powerful network of donors