



École des Ponts
ParisTech



July 2022

ÉCOLE DES PONTS PARISTECH
Building the worlds of tomorrow



École des Ponts

ParisTech

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



École des Ponts

ParisTech

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



École des Ponts

Alumni in industry and government



Elisabeth Borne
Ponts 86
Première Ministre



Benoit de Ruffray
Ponts 93
CEO Eiffage



Diane D'Arras
Ponts 77
Directrice déléguée Eau
Europe, Présidente IWA



Thibault Duchemin
Ponts 2013
Founder AVA



Antoine Frérot
Ponts 82
P-D.G. Véolia
Environnement



Mostafa Terrab
Pont 79
CEO OCP Group



Christelle Heydemann
Ponts 97
CEO Orange



François Bertière
Ponts 74
ex P-D.G. de Bouygues
Immobilier



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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



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Rankings and certification



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



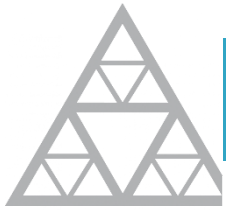
Choose France certification

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



AFAQ ISO 9001 certification

Quality management



International partnerships

École des Ponts
ParisTech

71 partner universities

IN 35 countries

ON 4 continents

47 double-degree agreements with universities

IN 25 countries

1 European University



Europe:
39 partner universities
19 double-degrees
20 Erasmus exchange agreement

ETH zürich

Imperial College London



TU Delft



Asia:
9 partner universities
8 double-degree
1 exchange agreement

MIT
MANAGEMENT
SLOAN SCHOOL



Americas
16 partner universities
13 double-degree
3 exchange agreements



GEORGIA TECH



Tufts

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)



Africa / Middle-East:
9 partner universities
6 double-degrees
2 exchange agreements



東京大学
The University of Tokyo





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Ecole des Ponts ParisTech and Brazil

Academic partnerships, and Research cooperation

- Long standing relations with top Universities



ESCOLA
POLITÉCNICA
DA USP



Universidade Federal
do Rio de Janeiro
Escola Politécnica



- 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



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Governance and funding

- **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



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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, **33%** female

45% international students, **45** nationalities

1 200 instructors (academics, researchers, business practitioners)

12 research laboratories

450 permanent scientists

7 labs of excellence

14 education and research chairs

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



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Close links with industry



Transportation,
environment,
urban services



Consulting



Energy



Construction



Industry



Finance



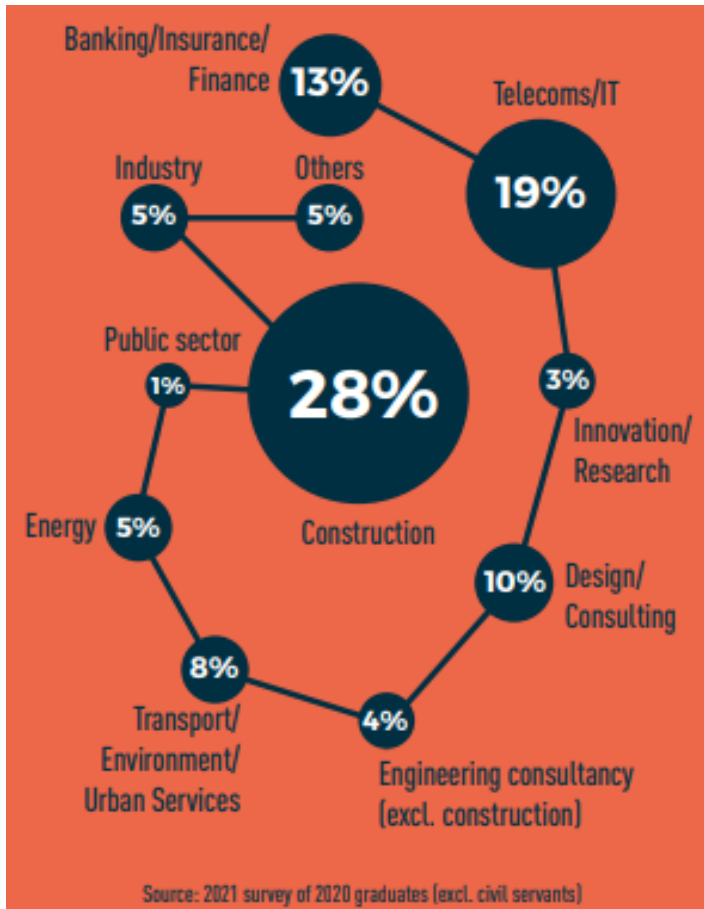
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Careers and placement

AVERAGE SALARY
IN FIRST JOB

€46,900 | €52,500 with bonuses



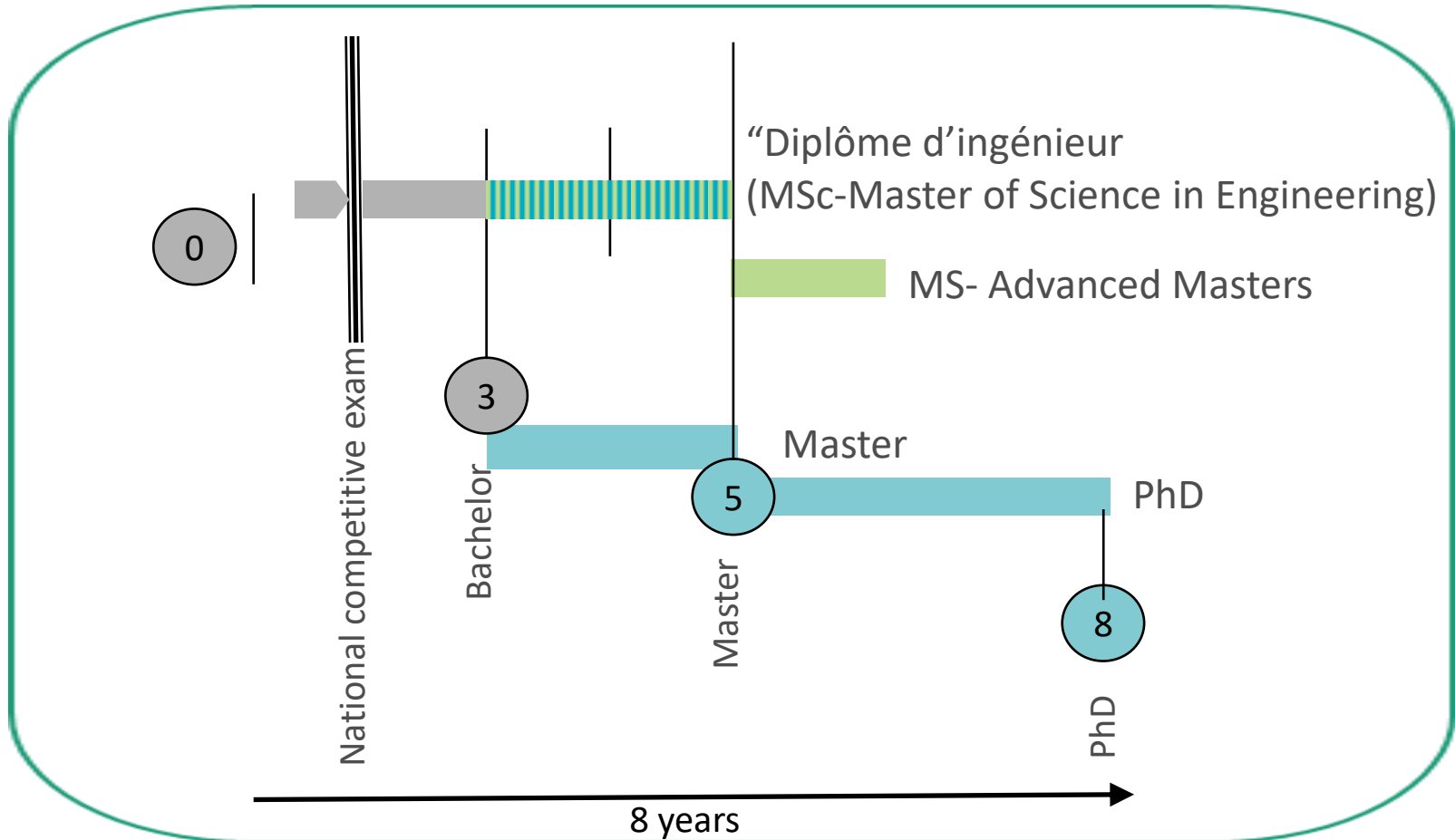
85% of engineering students are hired before graduation



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Academics: graduate programs



Industry-oriented
Research-oriented



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Academics: Departments of studies

- **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:**

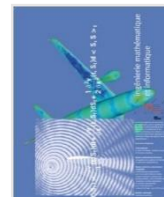
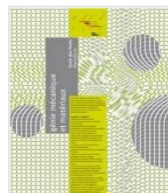
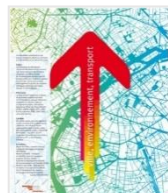
Innovation and supply chain. Robotics.

- **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

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International masters

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

UIMP
Universidad Internacional
Menéndez Pelayo



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



MSc

- Sustainable Impact Analysis (SIA)



Master's programmes


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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



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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



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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

English-speaking
environment



Choose PhD@Ecole des Ponts ParisTech for:

- International perspective
- Close links with industry
- Impact on public policies and sustainable development



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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)  清华大学
Tsinghua University
-  • DBA –Intelligent Manufacturing Management- (Shanghai)
-  • Certificate in Innovation and Technology Management (Paris)

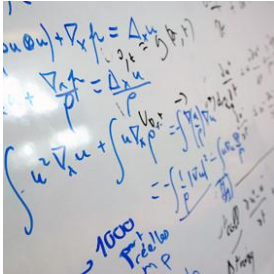



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Non-Degree English-taught Programmes



Level	Topic	Academic program	Specifics
Bachelor-senior students	Applied Mathematics 	Mathematical tools for engineer Analysis and scientific computing Optimization Probability Introduction to programming Statistical physics Operational research and optimization Statistics & data analytics Language (French) Sport Project within lab	Bespoke academic supervision and small class teaching Full Ecole des Ponts ParisTech student and research experience
Graduate students	Green Finance 	Physics of climate change Energy economics ESG analysis Green financing Conferences Credit Risk Management of Climate Risks Project Finance Life Cycle Analysis Capstone Projects	Extension to 1 semester of research at CIRED laboratory



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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



Successful start-ups



Daylight system
with fiber optic



Roof mounted
small wind turbine



From 2D to 3D
BCUTE 3D
3D printing center

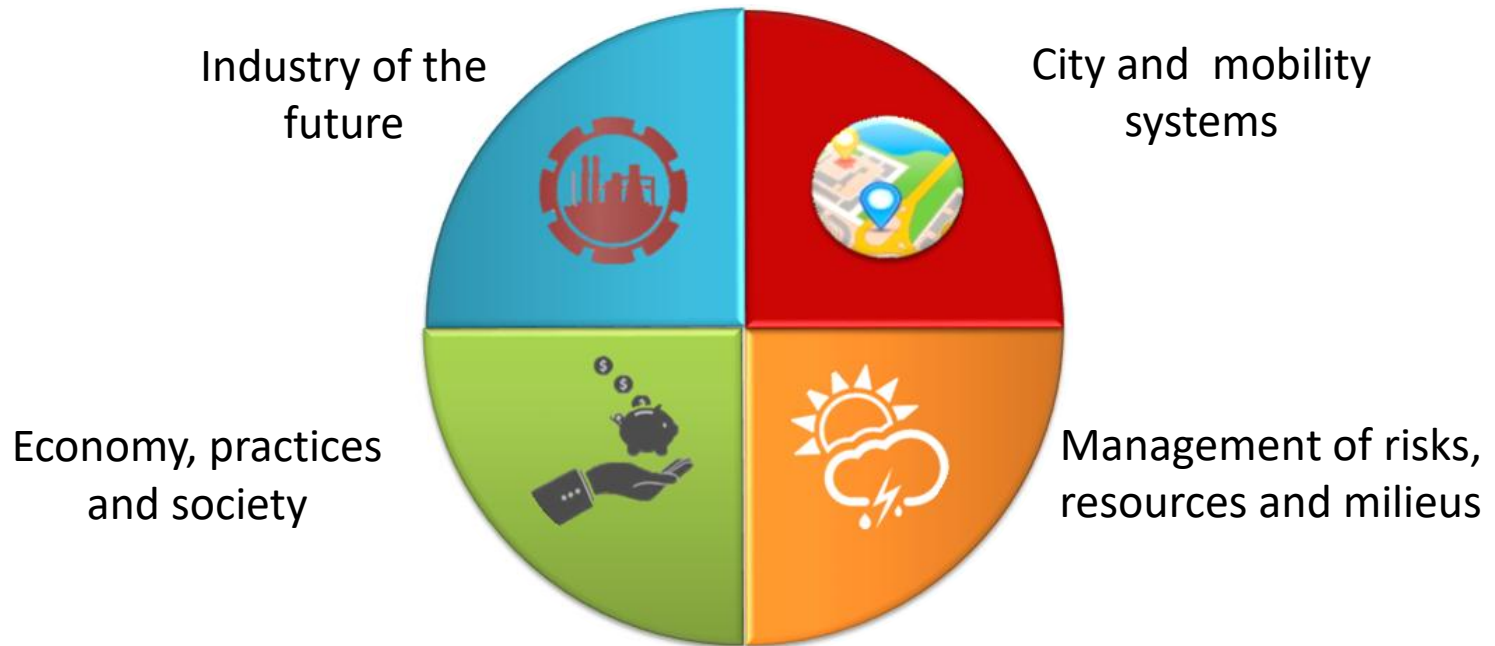


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Research for the ecological and digital transition

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





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Research for the ecological and digital transition

- Ecomaterials
- Digital Manufacturing
- Innovative Structures
- Geomechanics

NAVIER

- Sustainable mobility
- Territorial dynamics

LVMT

- Modelisation of uncertainty
- Digital simulation
- Systems optimisation

CERMICS

LEESU

- Urban waters
- Alternative resources

- Data processing
- 3D vision
- Big data

LIGM

CEREA

- Atmospheric environment
- Air quality
- Renewable energy

- Cities of the future
- Infrastructures
- Practices

LATTS

HM&Co

- Hydro-meteorological risks
- Resilient cities

- Public policies
- Environmental economy
- Markets and governance

PjSE

LMD

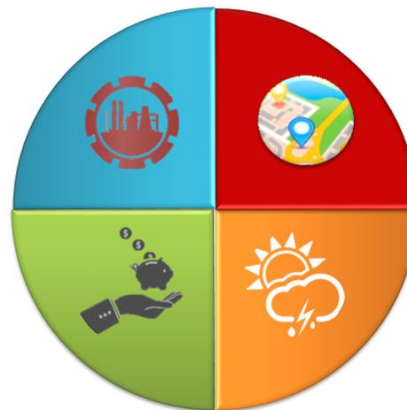
- Physics of atmosphere
- Climate

CIRED

LHSV

- Sustainable development
- Climate change

- Renewable energy
- Natural risks





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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 ...

M μ : urban mobility modelling, new behaviors, infrastructures and urban planning, impact of public policies
Softwares, traffic simulators...



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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 -



École des Ponts

ParisTech

Library, Heritage and Publishing.

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



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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 »





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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



Fondation des Ponts

- Special scholarships program for international students
- Corporate Scholarship (Meridiam)
- Excellence awards
- A powerful network of donors



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« Diplôme d'ingénieur » (MSc in engineering)_International students

Bachelor cycle

At home institution

Master cycle

At Ecole des Ponts ParisTech

> Choice of a Department of studies

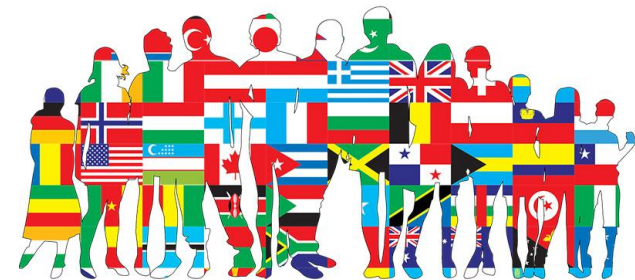
- Civil and structural engineering
- City, environment, transportation
- Mechanical engineering and materials science
- Industrial engineering
- Economics, Management, Finance
- Applied mathematics and computer science

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.



Human-sized classes

30% international

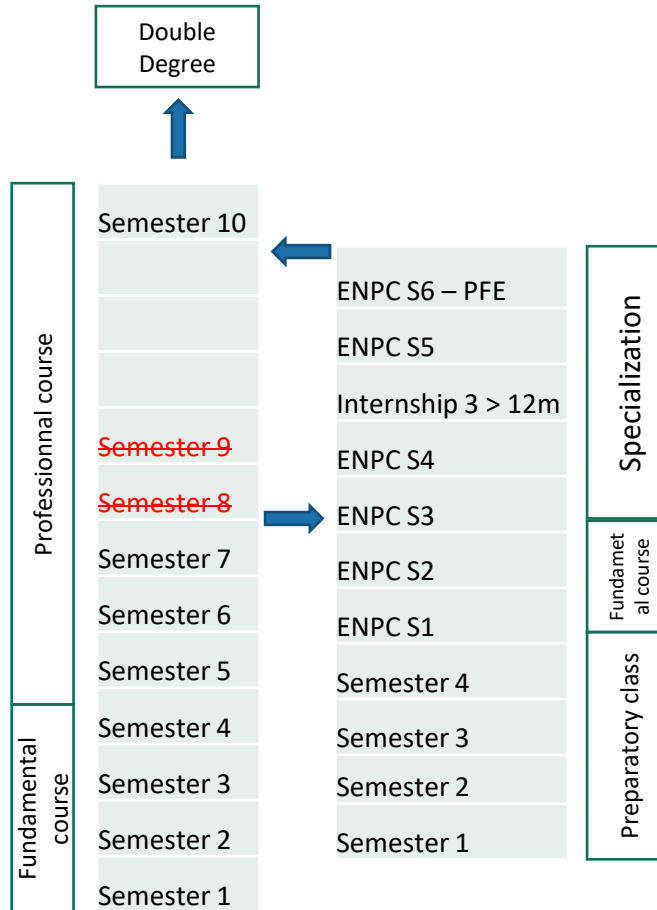
25 nationalities

7 Semesters	Master courses	Master courses	Internship	Master courses	Final project / Master thesis	Semester 10
> Home university in Brazil	> Ecole des Ponts ParisTech		FR, BR or WW		> FR / BR or WW	> Home university in Brazil



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Double-degree curriculum for Brazilian students





Application process

Double-degree and non-degree student exchange

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European Autumn session

Phase	Nomination by EP-USP	Application online	Remote Interview	ENPC Admission Jury	Deadline for sending certificates	Beginning of the academic year
Deadline	Early September	September 30th	Mid-October	Mid- November	Early June	Last week of August
Criteria	GPA Ranking by class Professional project Letters of recommendation	https://crm.enpc.fr/communitv/enpc/custom_forms/184	30mn Motivations	Academic excellence Clarity of the project Recommendation letters Interview Maximum 6 students Maximum 4/département	A2 in French (B1 for VET Urban planning track) TOEIC 785	Assessment of language level, and upgrading courses in mechanics (in September)

European Spring session : for non degree exchange students only (2 semesters of coursework)

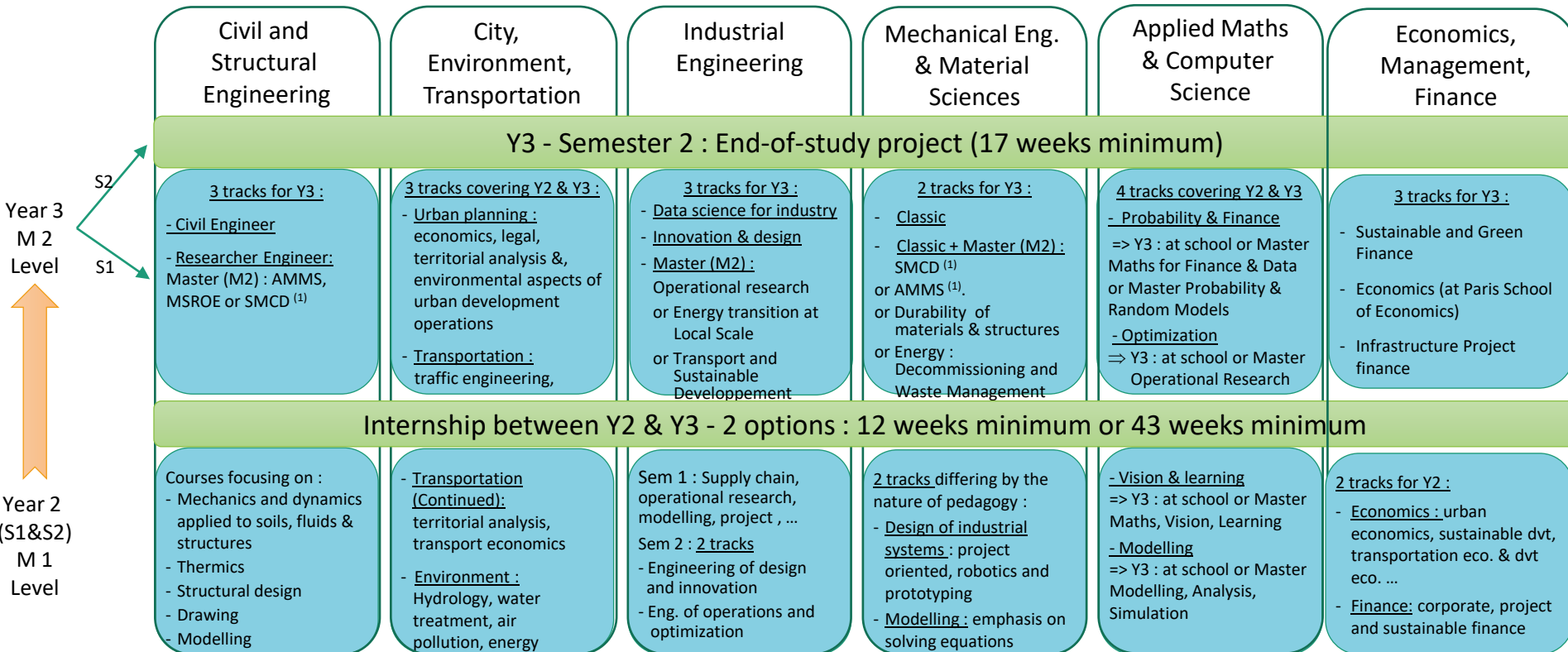
Phase	Nomination by EP-USP	Application online	Remote Interview	ENPC Admission Jury	Beginning of the academic year
Deadline	Mid March	March 31st	Mid-April	Early May	Last week of August
Criteria	GPA Ranking by class Statement of purpose Letters of recommendation	https://crm.enpc.fr/community/enpc/custom_forms/184	30mn Motivations	Academic excellence Clarity of the project Recommendation letters Interview Maximum 3 students	Assessment of language level,



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Organization of courses in Departments of Studies



(1) AMMS : Multiscale Approaches for Materials and Structures; MSROE : Mechanics of Soils, Rocks and Structures in their Environment; SMCD : Materials Science for Sustainable Construction



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Civil and structural engineering

Year 2 (M1)

<https://ecoledesponts.fr/en/civil-and-structural-engineering>

You must validate at least 48,5 ects in scientific courses to validate your Year 2 (M1)

CIVIL AND STRUCTURAL ENGINEERING (GCC) 2022 2023		
YEAR 2 (M1) OF ENPC MSc IN ENGINEERING		ECTS
ENGINEER INTERNSHIP		2,5
COACHING AND CAREER GUIDANCE (AOP2A)		0,5
EXPOSURE WEEKS (mandatory)		4
September 2022 : 5th to 9th	Introduction to drawings and computer graphics (Rhino, Photoshop) 1 - O2DMO	1
September 2022 : 19th to 23rd	Introduction to construction materials - O2IMC	1
February 2023 : 6th to 10th	Corporate Social Responsibility (RSE) Week	1
February 2023 : 13th to 17th	Week Engineering geology : principles and practice - O2GEO	1
CORE CURRICULUM (mandatory)		9,5
September 2022 : 12th to 16th	Business management - O2GE1	1,5
S3	Numerical statistics and data analysis - STNUM	2
S4	Introduction to law - DROA/DROE	3
S3 or S4	Course to be chosen in the Humanities and Social Sciences Department	3
DEPARTMENT MANDATORY COURSES		27
S3	Rock mechanics - MECSR	3
S3	Structural mechanics (elastic structures) - MECST	3
S3	Fluid mechanics for incompressible flows - MECA 1 & 2	3
S3	Building materials and engineering design - CCMAT	3
S3	Introduction to drawings and computer graphics (Rhino, Photoshop) 2 - IDSMO	3
S3	Technology and architecture of buildings and structures - OUVGC	3
S4	Mechanics of elastic structures 2 - MECS2	1,5
S4	Thermics - TERGC	1,5
S4	Accessibility Day (23/02/2023) - JPACC	0
S4	Plasticity, limit analysis and yield design - PLAST	3
S4	Dynamics of structures and constructions - DYSTR	3
DEPARTMENT MANDATORY COURSES TO BE CHOSEN		6
Please choose 1 couple of theoretical/application courses among the 2 couples below		
S4	Structural design (Theoretical part + application) - APST1 & EXPST	6
S4	Design of geotechnical structures (theoretical part + application) - APGE & EXPGE	6
ELECTIVE COURSES		2
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		
S4	Acoustics - ACOUS	1,5
S4	Statistics : practice of learning methods - PRAMA	2
S4	Non linear mechanics of curvilinear structures - MECNL	1,5
S4	Numerical simulation of aerualics and air quality in urban areas - SATUR	1,5
S3 et S4	SPORT (mandatory)	1
S3 et S4	LANGUAGES (mandatory)	7,5
TOTAL YEAR 2 (M1)		60



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Civil and structural engineering

Year 3 (M2)

<https://ecoledesponts.fr/en/civil-and-structural-engineering>

CIVIL AND STRUCTURAL ENGINEERING (GCC) 2022 2023		
YEAR 3 (M2) OF ENPC MSc IN ENGINEERING		ECTS
September 6th, 7th and 9th, 2022	FEEDBACK ON ENGINEER INTERNSHIP - REX* (only for long internships) - 03STA	1,5
EXPOSURE WEEKS (mandatory)		3
September 2022 : 12th to 16th	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	1
September 2021 : 13th to 19th	Future construction technologies : Techniques and Building Information Modeling (BIM) - CHBIM	1
November 2021 : 14th to 18th	Week of the department OR ATHENS - SEP	1
CORE CURRICULUM (mandatory)		7,5
S5	Teamwork : Dams - GCPBR OR Bridges - GCPPO OR Highway - GCPRO OR Coastal and port engineering - EXPHY	7,5
	Teamwork : Bioclimatic building design project BABIO (you need to take "Buildings energy and comfort performance - APAM1"; "Life cycle analysis" is highly recommended)	7,5
DEPARTMENT MANDATORY COURSES		9
Please choose at least 3 courses (9 ects as a minimum) distributed over the 2 groups : materials and advanced		
S5	Materials	
	Reinforced and prestressed concrete - BAEP 1 & 2	3
	Wooden structures - CASBO	3
	Steel construction - CASME	3
	Advanced courses	
	Advanced construction dynamics - DYNAV	3
	Advanced structural design - COAST	3
	Finite elements for civil engineering - CALEF	3
	Geomechanics and advanced geotechnics - GEOME	3
	Advanced concrete - BETAV	3
ELECTIVE COURSES		6
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		
S5	Civil engineering project management and economics - GEPCO	3
	Life cycle analysis (ACV) - ANCYV 6 sessions	1,5
	OR Life cycle analysis (ACV) - ACVGC 13 sessions	3
	Buildings energy and comfort performance - APAM1	3
	Design of underground structures - COTU1	3
	Bridge design and construction - COPO1	3
	Structures, energy and risks - COR11	3
S5	LANGUAGES (mandatory)	4,5
S6	END-OF-STUDY PROJECT (17 weeks at least)	30
TOTAL YEAR 3 (M2)		60



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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>



École des Ponts

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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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Contacts :

Marie-Christine BERT :

- Director of International Relations and Corporate Partnerships
- marie-christine.bert@enpc.fr

Emmanuel SIMANTOV :

- Head of international mobility
- 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/>



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www.enpc.fr/en

ÉCOLE DES PONTS PARISTECH
Building the worlds of tomorrow