

École des Ponts

ParisTech



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



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
-MathematicianOne 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, scientistInventor 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



Alumni in industry and government

École des Ponts



Elisabeth Borne
Ponts 86
Première Ministre



Ponts 93CEO 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



MostafaTerrab
Pont 79
CEO OCP Group



Christelle Heydemann
Ponts 97
CEO Orange



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



Remarkable works, designed by Ecole des Ponts ParisTech Alumni



Viaduc Millau - Michel Virlogeux



© Atelier one – passage project





Cristo Redentor Albert Caquot



Rankings and certification

ParisTech



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 PontParisTech

7 1 partner universities

35 countries

4 continents

4 7 double-degree agreements with universities

25 countries



Programme de Formation d'Ingénieurs d'Excellence - PFIEV (Vietnam)
Co-Innovation Center (Tongi, Shanghai)
Joint Education and Research Center (UW6P, Maroc)
Capacity Building Program funded by the WorldBank (INP-HB, Côte d'Noire)

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





Ecole des Ponts ParisTech and Brazil

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



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



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



The school of the Ecological transition

École des Ponts

ParisTech

- Governing Ministry's name: from Sustainable Development (2007-2017) to Ecological Transition (2017 >)
- 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

École des Ponts

ParisTech



Transportation, environment, urban services

Consulting











Construction

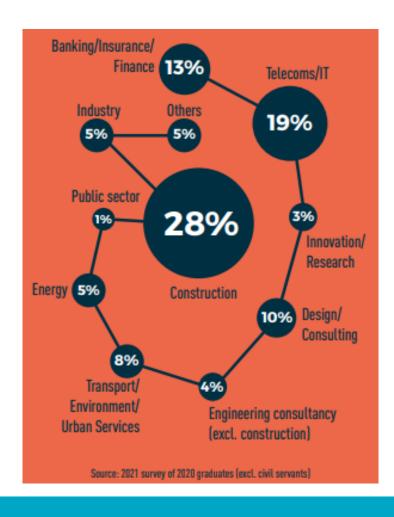
Finance



Careers and placement

AVERAGE SALARY
IN FIRST JOB

€46,900 | €52,500 with bonuses



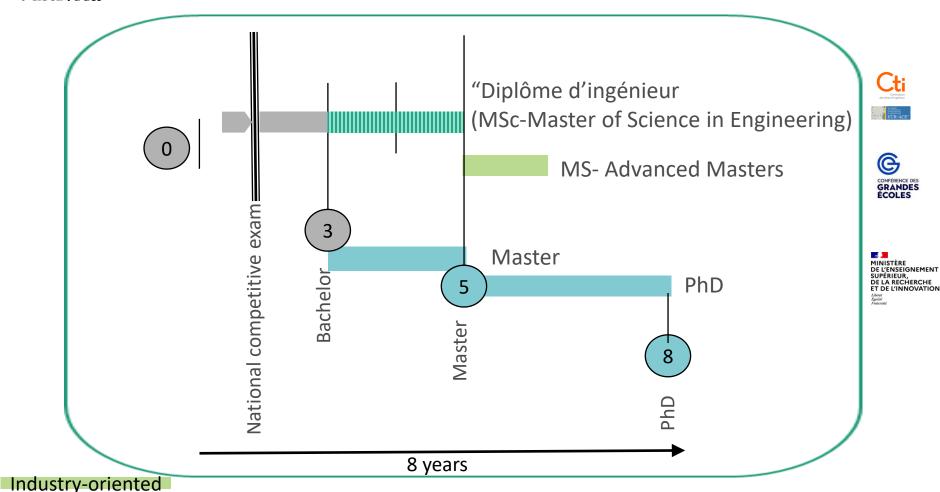
85% of engineering students are hired before graduation



Academics: graduate programs

ParisTech

Research-oriented





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

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)



Sustainable Impact Analysis (SIA)



Master's programmes

ParisTech

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**



École des Ponts

ParisTech

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

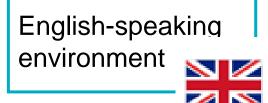


PhD Programmes

- 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





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



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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



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

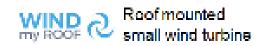






Successful start-ups



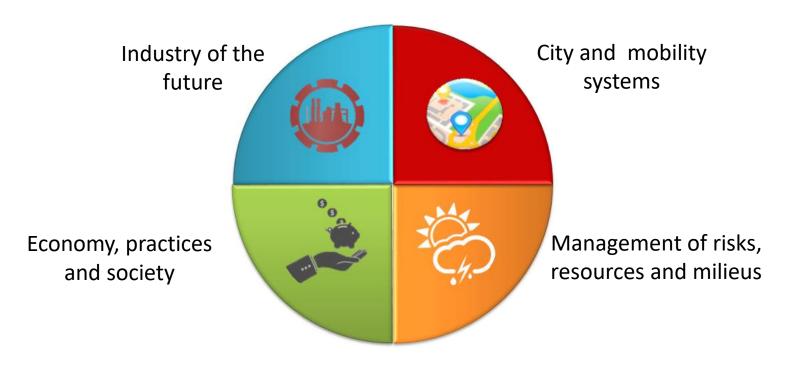






Research for the ecological and digital transition

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





Research for the ecological and digital transition

ParisTech

- Ecomaterials
- Digital Manufacturing
- Innovative Structures
- Geomechanics
- \\/IFR I\/N/

NAVIER

LVMT

- 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

CERMICS

LIGM

LATTS

LEESU

- Urban waters
- Alternative resources

CEREA

Sustainable mobility

Territorial dynamics

- Atmospheric environment
- Air quality
- Renewable energy

HM&Co

- Hydro-meteorological risks
- Resilient cities

PiSE

LMD

- Physics of atmosphere
- Climate

CIRED

- Sustainable development
- Climate change

LHSV

- 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 -



Library, Heritage and Publishing.

La Source, Learning Center

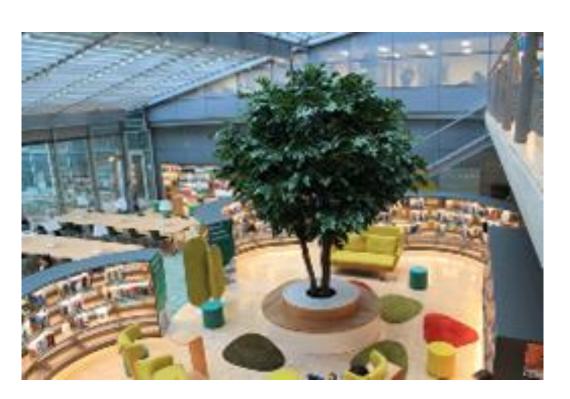
- 250 seats
- 200 000 documents
- Open 71 hours/week

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



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



Fondation des Ponts

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



« 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



Human-sized classes 30% international 25 nationalities

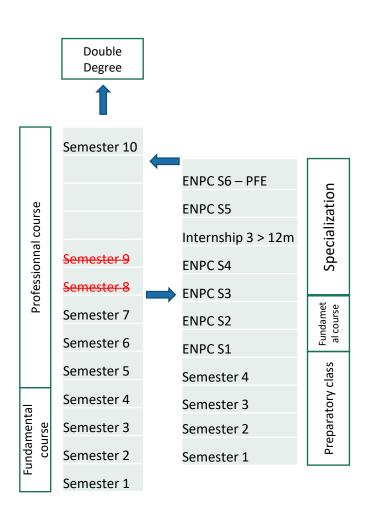
Final Project / Master thesis

• 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.

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



Double-degree curriculum for Brazilian students





Application process Double-degree UFRJ - ENPC

Phase	Nomination by EP-UFRJ	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.en pc.fr/communi ty/enpc/custo m forms/184	30mn Motivations	Academic excellence Clarity of the project Recommendation letters Interview Maximum 5 students	A2 in French (B1 for VET Urban planning track) TOEIC 785	Assessment of language level, and upgrading courses in mechanics (in September)



Organization of courses in Departments of Studies

Applied Maths Civil and Industrial City, Mechanical Eng. Economics, & Computer Structural Environment, **Engineering** & Material Management, Science Engineering Transportation Sciences Finance Y3 - Semester 2 : End-of-study project (17 weeks minimum) 3 tracks covering Y2 & Y3: 3 tracks for Y3: 2 tracks for Y3: 3 tracks for Y3: 4 tracks covering Y2 & Y3 3 tracks for Y3: Year 3 Data science for industry Urban planning: Classic Probability & Finance - Civil Engineer Sustainable and Green economics, legal, - Innovation & design => Y3: at school or Master Classic + Master (M2): Finance Researcher Engineer: territorial analysis &, Level Master (M2): SMCD (1) Maths for Finance & Data Master (M2): AMMS, environmental aspects of Operational research or AMMS (1). or Master Probability & **Economics (at Paris School** MSROE or SMCD (1) urban development Random Models or Durability of of Economics) or Energy transition at operations materials & structures Local Scale - Optimization Infrastructure Project or Energy: - Transportation : ⇒ Y3 : at school or Master or Transport and finance Decommissioning and Sustainable traffic engineering, Operational Research Waste Management Developpement Internship between Y2 & Y3 - 2 options: 12 weeks minimum or 43 weeks minimum Courses focusing on: Transportation Sem 1: Supply chain, 2 tracks differing by the - Vision & learning 2 tracks for Y2: Mechanics and dynamics operational research, => Y3 : at school or Master (Continued): Year 2 nature of pedagogy: Economics: urban modelling, project, ... applied to soils, fluids & territorial analysis, Maths, Vision, Learning (S1&S2) Design of industrial economics, sustainable dvt, structures transport economics Sem 2: 2 tracks - Modelling systems: project transportation eco. & dvt M 1 - Thermics - Engineering of design oriented, robotics and => Y3: at school or Master Environment: and innovation Level Structural design Modelling, Analysis, prototyping Hydrology, water Finance: corporate, project Eng. of operations and Simulation Drawing Modelling: emphasis on treatment, air and sustainable finance optimization Modelling solving equations pollution, energy

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



ParisTech

Civil and structural engineering Year 2 (M1)

https://ecoledesponts.fr /en/civil-and-structuralengineering

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

(CIVIL AND STRUCTURAL ENGINEERING (GCC) 2022 2023				
Y	EAR 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 - 02GE1	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			
DE	PARTMENT MANDATORY COURSES TO BE CHOSEN	6			
	uple 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			
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 aeraulics 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			



Paris**Tech**

Civil and structural engineering

Year 3 (M2)

https://ecoledesponts.fr /en/civil-and-structuralengineering

	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	Future construction technologies : Techniques and Building Information Modeling (BIM) - CHBIM	1		
	Week of the department OR ATHENS - SEP	1		
	CORE CURRICULUM (mandatory)	7,5		
CT.	Teamwork : Dams - GCPBR OR Bridges - GCPPO OR Highway - GCPRO OR Coastal and port engineering - EXPHY	7,5		
S5	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 I	east 3 courses (9 ects as a minimum) distributed over the 2 groups : materials and advanced Materials			
	Reinforced and prestressed concrete - BAEP 1 & 2	3		
	Wooden structures - CASBO	3		
	Steel construction - CASME	3		
	Advanced courses			
S5	Advanced construction dynamics - DYNAV	3		
	Advanced structural design - COAST			
	Finite elements for civil engineering - CALEF			
	Geomechanics and advanced geotechnics - GEOME	3		
	Advanced concrete - BETAV	3		
Please choose courses among	ELECTIVE COURSES the courses proposed by the department (see below) or among the whole school catalogue, taking into account their compatibility with department mandatory courses	6		
	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		
S 5	Buildings energy and comfort performance - APAM1	3		
	Design of underground structures - COTU1	3		
	Bridge design and construction - COPO1	3		
	Structures, energy and risks - CORI1	3		
S5	LANGUAGES (mandatory)	4,5		
S6	END-OF-STUDY PROJECT (17 weeks at least)	30		
	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

https://ecoledesponts.fr/en/civiland-structural-engineering

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



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€
- o Food: 300€
- Entertainment: 200€
- Incidentals: 100€



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- marie-christine.bert@enpc.fr

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- 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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