

Recommendations for Admission to the « diplôme d'ingénieur » City, Environment, Transportation Department International double-degree partners

The engineering programme at École des Ponts ParisTech prepares each student to become a real player in sustainable development and planning in all its dimensions. Engineers graduating from École des Ponts ParisTech are recognized by companies for their strong scientific skills combined with a capacity for practical implementation of knowledge and projects.

Engineering education at École des Ponts ParisTech leads to the development of skills in four dimensions:

- Advanced scientific and technical education: understanding and implementing conceptual, mathematical or numerical modelling approaches while knowing how to critically evaluate the results of a model is one of the foundations of the engineering profession that the School's training enables students to master.
- Project-based and on-the-job training: from the very first year, numerous collective or individual projects are developed, increasingly close to real engineering projects. For students entering the first year, four internships in laboratories and companies will punctuate the curriculum.
- Managerial, human and social skills: integrated from the first year, the human and social sciences give students an understanding of the world and the ability to take into account the problems of society. A solid knowledge of the business world is developed through courses, internships and projects.
- The ability to work in a team and to work internationally: 20% of teaching time is devoted to languages. International stays and contact with many foreign students enable engineering students to learn to work in a multicultural context.

In the context of admissions of international students from partner institutions, it should be specified that:

- The engineering degree from Ecole des Ponts ParisTech is a general engineering degree with prerequisites common to all teaching departments in the School's core disciplines: **Mathematics (Optimization, Probability, Analysis and Scientific Computing), Continuous and Solid Mechanics, Quantum Physics and Statistics, Programming, Human and Social Sciences.**
- The vast majority of courses in engineering training are in French. A **B1 level in French** is therefore required to be proven by a certificate (TEF, TCF, DELF, DALF).
- A TOEIC score of at least 785 points (or an equivalent international test, such as TOEFL, IELTS or Cambridge Proficiency, CAE or FCE) is required in order to obtain an engineering degree from Ecole des Ponts ParisTech at the end of the course. For this reason, a **B1 level in English** is required for admission, to be proven by a certificate (IELTS, TOEFL, TOEIC, CAMBRIDGE).

In addition, each department of engineering education has specific prerequisites:

City, Environment, Transportation Department

The courses given in the City-Environment-Transportation (VET) department are organized into three majors ("parcours"): Urban Planning, Water/Environment, and Transportation. Students must position themselves on one of these majors, which will be their area of specialization when they will leave the Ecole des Ponts ParisTech; they also follow courses in the VET core curriculum, which give them a more general vision of the major issues of the sustainable city. Thus, following the example of the Ecole des Ponts engineering programme, the VET department has prerequisites for all students admitted, as well as others that are specific to each course.

Prerequisites common to all three majors

Space and territorial issues

- Transport, mobility,
- Different scales of development,
- Urban infrastructures and networks (water, sanitation, roads, energy...),
- Basics of techniques to describe and characterize spatial variability.

Global environmental and sustainable development issues

- Key current energy and environmental transition issues and challenges facing the world today

- Ability to take a cross-cutting and systemic view of these issues (description and modeling of interrelationships and feedback loops)

Economy

- Fundamental tools of macroeconomic analysis and current key issues in contemporary macroeconomics (causes and consequences of inflation and unemployment, impact of cyclical stabilization policies, structural wealth gaps between countries, growth, development and energy transition, determinants and effects of globalization)
- Conditions for optimal allocation of scarce resources
- Conditions for the microeconomic efficiency of the market as a means of coordinating agents, but also the causes of its malfunctioning that justify public intervention by the regulator
- Tools for analyzing market functioning and evaluating public policies
- Return on investment.

Probabilities and statistics

- Fundamental notions (probability space, random variable, law, expectation ...)
- Usual laws with real and integer values
- Concepts of convergence, strong law of large numbers, and central limit theorem
- Main algorithms for simulating random variables
- Monte-Carlo method
- Basics of descriptive statistics
- Estimation, confidence intervals, hypothesis testing
- Simple and multiple linear regression

Water/Environment major

Fluid mechanics

- Fluid Statics
- Eulerian Kinematics
- Euler equations, Navier-Stokes equations
- Reynolds number, irrotational flat flows of incompressible perfect fluid
- Actual and complex potential

Transport major

Basics in Operations Research

Urban Planning major

Level B2 in French recommended