

Post Master
professional Certificate

École des ponts
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ParisTech
INSTITUT DES SCIENCES ET TECHNOLOGIES
PARIS INSTITUTE OF TECHNOLOGY

UNIVERSITÉ
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ENSIAME



Rail and Transport Systems



Site of the programme

Courses are delivered at École des ponts (Marne-la-Vallée, in the Île-de-France region), for the first part of the common core and for the Management option.

Cité Descartes
6-8 avenue Blaise Pascal
F-77455 Marne-la-Vallée cedex 2

Suburban Metro station: Noisy-Champs
(line RER A)

The Engineering option and the second part of the common core take place at ENSIAME, in Valenciennes (59, North department).

Université de Valenciennes et du Hainaut-Cambrésis
Le Mont Houy
F-59313 Valenciennes

Admission

Recruitment criteria are those which are agreed by the Conférence des Grandes Écoles: candidates should hold a Master degree, or to four years plus three years of professional experience. Special dispensations are possible for other kinds of professional experience. Students are admitted on the basis of their application files and after having been interviewed by a board of examiners.

Applications are to be made, at the latest, at the beginning of June (*cf.* the website www.enpc.fr).

The number of students is limited to 30 per session.

Candidates should preferably possess a good command of English.

Foreign candidates, not coming from French speaking countries, must have a thorough command of French (level 4 of the TEF Test).

Application files can be loaded on the website of the École des ponts (www.enpc.fr).

Fees

Fees will be around 15,000 € (13,000 € for candidates who are not sponsored by a company).

Inquiries

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This programme is meant to address growing needs for expert knowledge in the booming field of railway transport systems. It will contribute bringing out the advantages of this transport mode, and facing the issues of the sustainable development of territories.

Railway industries and major French operators have requested the best engineering schools and universities to develop a new training programme for engineers and executives working, or called to work, in the area of rail and guided systems.

The programme is clearly focussed on international issues, regarding both contents and participants. Training is evenly divided between theoretical courses and courses given by leading professional experts. The programme delivers a professional degree, and recognized by the Conférence des Grandes Écoles.

Considering the various kinds of professional opportunities, two options are proposed, focusing respectively on engineering and on management of rail and guided transport systems.

The programme lasts one year and is made up of courses, over a period of 11 months, a 4 months professional internship and a professional thesis.

Key-words

Rail and guided systems

Sustainable territory development

Rail transport management

Transport engineering

Transport management

Safety

Urban and regional transport systems

Railway equipment

Transport infrastructures

Railway stations and transport hubs

Freight

Programme goals

- giving both a general overview and specialized knowledge, in the area of railway systems, to engineers entering into this area, recently recruited or as a new career development,
- helping specialized engineers to a better understanding of the development of their professional environment,
- helping civil servants to acquire the knowledge enabling them to manage infrastructure projects in rail transports, to organize and manage services.

Training targets

Students are to become capable of:

- designing, and controlling or managing, rail and guided transport system
- implementing or managing a transport system proposal, taking into account social, economical, and organizational parameters, as well as regulatory and safety issue
- understanding the issues raised by the changes taking place in this area, both in the case of institutions and of local, regional, or international actor system
- combining technical skills and sound knowledge in the field of economics and of project management
- presenting the advantages of rail transport, regarding sustainable development issues.

The actors

The programme is managed by about twenty institutional entities:

- Alstom Transport
- Ansaldo-STS
- Bombardier Transport
- Siemens Transportation Systems
- Fédération des Industries ferroviaires
- Groupe SNCF
- RATP
- Réseau ferré de France (RFF)
- French industry Cluster I-Trans
- French industry Cluster AdvanCity *Ville et mobilité durables*
- Établissement Public de Sécurité Ferroviaire (EPSF)
- Association des Régions de France (ARF).

École des ponts and ENSIAME (belonging to the Université de Valenciennes) are the leaders of the programme, cooperating with four other schools co-delivering the degree:

- École Centrale Paris
- École Centrale Lille
- ENTPE
- Université Technologique de Compiègne.

Two associate schools (ICAM and ESTACA) will take part in the teaching.



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The programme is meant for:

- system design and development engineers
- young undergraduates Master's degree (Bac +5 or equivalent)
- engineers in charge of implementing a sub-system or a railway project
- project managers, leading teams working on railway projects
- people in charge of management, planning, and regulation tasks
- technical managers, working for organizing authorities and in charge of transport services or projects
- engineers working on engineering or management projects
- operation managers, in charge of supporting tasks
- commercial and business engineers
- foreign candidates working, or expected to work in this area.

The programme is organized according to an out-of-school training pattern, making it compatible with the student holding his professional post.

Professional opportunities

The programme opens to candidates a fast developing field. More than 300 000 people are working in this area in France. The rail supply industries export over one third of their turnover overseas. Construction industries are involved in transport and large infrastructure projects.

Operators have difficulty in finding experienced staff for some core tasks. Organizing Authorities are recruiting engineers or executives to control transport projects or the management of existing networks.

For candidates already working in the railway field, the programme is a good opportunity to expand their skills and their responsibilities.

For very experienced technical staff, not holding an engineering degree, the programme can be the instrument of improving their professional status.

International scope

The programme responds to two needs: giving high level professional training to foreign engineers; training French engineers and executives to be able to develop their expertise and to help export French know-how. The programme is supported by the French Foreign Affairs Ministry and its diplomatic network. Part of the tuitions in the engineering option will be given in English; case studies will be mostly chosen among international projects.

A training staff is issued from universities and from the rail industry

One half of the training staff are transport specialists coming from universities, while the other half are professionals (working for operators, suppliers, contractors, institutional agencies).

The programme combines a core curriculum and one of two options, Engineering and Management

The core curriculum begins in September and lasts 4 weeks.

Each option comprises 10 one week modules and lasts 10 months, from October to July.

A professional internship of at least 4 months (in a private firm or in a public institution: authorities, research laboratories, design engineering firms, etc.) enables students to write a professional thesis. Students will be helped by professional and academic tutors.

Students having no previous railway experience may go through a short-length internship, enabling them to acquire a general view of the field and to prepare their long internship.

Detailed presentation of the programme

Common core

History, institutions and territories of rail and guided transport systems	18h
Economics of transports and their application to railways	18h
System analysis and project management	18h
General principles of engineering and management of railway systems	24h
Parameters influencing the institutional, industrial, and technological development of railway transport	18h
Railway safety	18h
Total amount	114 h

Rail transport management option

Transport economics	30 h
Economics of rail and guided transports and the issue of sustainable development	30 h
Sustainable development of territories and railway transport	30 h
Structural development of passenger demand	30 h
Development of demand and specific technology for freight transport	30 h
Urban and regional transports	30 h
Management of railway companies	30 h
Preparing and implementing transport plans	30 h
Traffic management and allocation of resources	30 h
Facing real life cases: adapting system management to unexpected circumstances or demands, to critical situations	30 h
Total amount	300 h

Engineering option

Main architectural choices for guided transport systems	30 h
Performances of Transport Systems	30 h
Management of Transport Systems	30 h
Main choices and constraints for civil engineering and Infrastructures	30 h
Electro-mechanic components - Maintenance of infrastructures	30 h
Controls and signalling: concepts holding for all applications	30 h
Controls and signalling: specific issues for railway and urban systems	30 h
General architectural and design criteria for rail vehicles	30 h
Energy, propulsion and braking systems	30h
Bodywork and fitting out, passenger comfort	30 h
Total amount	300 h

Professional thesis

Professional thesis	4 months
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