MNE, what are the skill outcomes?

- Improve safety, nuclear reactor design, nuclear reactor operation (normal, accidental and post-accidental situations);
- Build and optimize the 3rd generation advanced nuclear reactors;
- Design innovative reactors: Small Modular Reactors (SMR), Molten Salt Reactors (MSR), Generation IV…;
- Build and optimize new storage capacities, new waste disposal repositories and casks for transport;
- Reduce the radioactivity of waste;
- Operate a reactor fleet by taking into account the new energy mix context;
- Dismantle the old nuclear plants.

MNE, for which careers?

- Design and engineering;
- Operation of nuclear facilities and dismantling works;
- Research & Development;
- Education (after a PhD).

Employment needs and area

- 4,000 engineers to be recruited/year;
- 3,000 French nuclear sector firms everywhere in France. Different sizes, from 5 to 150,000 employees;
- 53% of the French nuclear sector firms currently engaged in international projects.

STARTING SALARIES €35,000/YEAR ON AVERAGE

Apply to the MNE

MNE PREREQUISITES

M2 entrance

- Justify a Bachelor degree (180 ECTS) or equivalent.

Students coming from other M1 than MNE may be eligible (providing that the scientific background is adequate).

APPLICATION

ONLINE EXCLUSIVELY, FROM JANUARY TO THE END OF JUNE. TWO ADDRESSES POSSIBLE TO APPLY:

- https://inception.universite-paris-saclay.fr/en/
- https://www.ip-paris.fr/education/masters/mention-ingenierie-nucleaire

FURTHER INFORMATION, CONTACT:

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French Baccalaureate equivalent to:
- A-levels (UK)
- High School Diploma (US)

ECTS = European Credit and Accumulative System

Bachelor degree

(180 ECTS)

Master degree

(+120 ECTS)

+ 3 years for a PhD

An International Master Programme
- Taught in English;
- Accredited by top-ranked French Universities and Engineering Schools;
- Supported by the French nuclear industry and research sector;
- Certified by the International Nuclear Energy Institute and the European Institute of Innovation & Technology;
- Sponsored by the Programme science et enseignement EDF-Institut de France-Académie des Sciences.
MNE, what are the skill outcomes?

- Improve safety, nuclear reactor design, nuclear reactor operation (normal, accidental, accidental and post-accidental situations);
- Build and optimise the 3rd generation advanced nuclear reactors;
- Improve understanding of new technologies, especially new breeds of nuclear reactors such as Small Modular Reactors (SMR), Molten Salt Reactors (MSR), Generation IV…;
- Build and optimise new storage capacities, new waste disposal repositories and casks for transport;
- Reduce the radiotoxicity of waste;
- Operate a reactor fleet by taking into account the new energy mix context;
- Dismantle the old nuclear plants.

MNE, for which careers?

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- Justify a bachelor degree associated with 180 ECTS credits or equivalent.

**M2 entrance**
- Justify a Bachelor degree (180 ECTS) + 60 ECTS associated with a 1st master year or equivalent.

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BACHELOR DEGREE (180 ECTS)

Masters Degree (+120 ECTS)

+ 3 years for a PhD
The Master of Science Nuclear Energy (MNE) has been created to train young engineers and researchers for the strong needs of Nuclear Engineering. The MNE is a two-year master programme (referred to as M1 for the 1st year and M2 for the 2nd year). Each year accounts for 60 ECTS (European Credit Transfer and Accumulation System). The MNE is awarded at the end of M2 for students who have obtained the 120 ECTS required for a master degree.

The MNE is a French diploma which is issued by the University Paris-Saclay, the Institut Polytechnique de Paris, the Université Paris Sciences et Lettres and the Ecole des Ponts ParisTech. The MNE is supported by:
- French industrial partners: ANDRA, CEA, EDF, Framatome, Orano
- French National Based Organizations (CSF, CNRS, IRSN).

The MNE programme designed by 7 well-known establishments:

- CentraleSupélec (CS) (plateau de Saclay)
- École Nationale Supérieure de Chimie de Paris (called Chimie ParisTech, Sciences et Lettres)
- École Nationale Supérieure des Techniques Avancées (ENSTA ParisTech)
- Institut Polytechnique de Paris
- École Polytechnique (IHP Polytechnique de Paris)
- École de Paris Tech (ENPC Université Paris Est)
- École de Spécialisation des Énergies et des Techniques de Santé (ESETSE)
- Faculté des Sciences d'Orsay (Univ. des Sciences d’Orsay Université Paris-Saclay)

The MNE is very close to the facilities:
- Some courses and practical work on site: Learning Expeditions to well-known nuclear sites (EDF-NUP, CEA Marcoule, Orano Marcoule, Framatome/Chalon production site, CSA/Saclay and Marcoule (NDF, dismantling works))
- Courses which implement the industrial and research tools and equipment
- Nuclear calculation codes. Simulations of reactor reactivity, Transient. Enhanced Virtual Open-Source Reactor Simulation Environment: IR automatic fusion detection, real-time and simulation platform, NEUNUS multi-ion beam irradiation platform.
- Nuclear Decommissioning and Waste Management (NDFN) R&D, CES-CEA, Framatome, CentraleSupélec.

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Industrial and research support (teaching, internships, learning expeditions)

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MNE programme for acquiring a strong scientific background as well as operational skills

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- Ecole de Spécialisation des Énergies et du Environnement et des Technologies de Santé (ESCC/ENSCI (ParisTech))
- Faculté des Sciences d’Orsay (UF1 Sciences d’Orsay Université Paris-Saclay)
- Inria, French National Research Organizations (CEA, CNRS) and specialized institutes (such as the IRSN).

The MNE is supported by:
- French industrial partners: ANDRA, CEA, EDF, Framatome, Orano
- French National Research Organizations (CEA, CNRS) and specialized institutes (such as the IRSN).

MNE general frame

**M1 CONSISTS OF 2 TRACKS**

**M2 CONSISTS OF 6 TRACKS**

**SHARING COMMON COURSES**

**WASTE MANAGEMENT** (NDWM)

**Nuclear Reactor Physics and Core Reactor (NRPE)**

**Chemistry track**

20 ECTS

Located at ENPC-Saclay and ENSCP

**Physics track**

20 ECTS

Located at ENPC-Saclay and ENSCP

**Internship** (10 weeks min.) 18 ECTS

Courses very close to the facilities

Courses which implement the industrial and research tools and equipment

Nuclear reactor operation codes: Simulations of reactor beseiling (normal, incidental). Enhanced Virtual Open Access to (EVA) (train on-line: operation planninng normal, incidental, core monitoring, basic fault detection, dismantling works, FRM and SIM).

Courses which implement hands-on experience

Practical weeks. Learning according to a Project Management approach. Some learning outcomes evalu- ated through reports and defenses.

Immersion into professional life and current challenges of the nuclear energy field thanks to the internship

In research laboratory, on design and engineering department or on production site: EDF Framatome, Orano, CDA, BSN, ANDRA, Senior positions: UEP, PM2, PSU, PSILab, Internship abroad possible.

**Internship (20 weeks min.) 40 ECTS**

**M2 NUCLEAR ENERGY 60 ECTS**

1 track = Common + Specific courses + Internship

**Common courses**

18 ECTS (NRPE)

20 ECTS

25 ECTS

25 ECTS

22 ECTS

**Specific courses**

Nuclear Decommissioning and Waste Management (NDWM)

Located at ENPC-Saclay and ENSCP

of CentraleSupélec and

of Chimie ParisTech

EPCR

EPCR

EPCR

EPCR

**Internship** (20 weeks min.) 40 ECTS

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**M2 CONSISTS OF 5 TRACKS**

**M1 CONSISTS OF 2 TRACKS**

**Core Nuclear Plant Operation (NPO)**

**Chemistry track**

Avignon

**Physics track**

Avignon

**Internship (10 weeks min.) 18 ECTS**

**Common courses**

18 ECTS (NRPE)

20 ECTS

25 ECTS

22 ECTS

20 ECTS

**Specific courses**

Nuclear Decommissioning and Waste Management (NDWM)

Located at ENPC-Saclay and ENSCP

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of Chimie ParisTech

EPCR

EPCR

EPCR

EPCR

**Internship** (20 weeks min.) 40 ECTS

**MNE timeline**

1st week of Sept.

Beginning of April

End of the academic year

Thesis defense

(mid-Sept.)

(Around 450 hours / 51 ECTS)

(Around 420 hours / 48 ECTS)

(Around 20 weeks / 18 ECTS)

30 Sept.

Defence (in July)

Internship

4 weeks

Free period

10 weeks

Internship

The establishments: INSTN (with the CEA, ENSTA, CentraleSupélec are located on the Plateau de Saclay, south-east of Paris, around 30 km away. The Moulinex has its seat in Saclay, which gathers research labs, well-known firms (EDF, CEA,…), universities (ENSTA, IPParis, PSL laboratories. Internship abroad possible.

The ENSCP is located in Paris. The ENPC is located at Paris 5e, 2 km away.

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FUTURE INFORMATION, CONTACT:

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