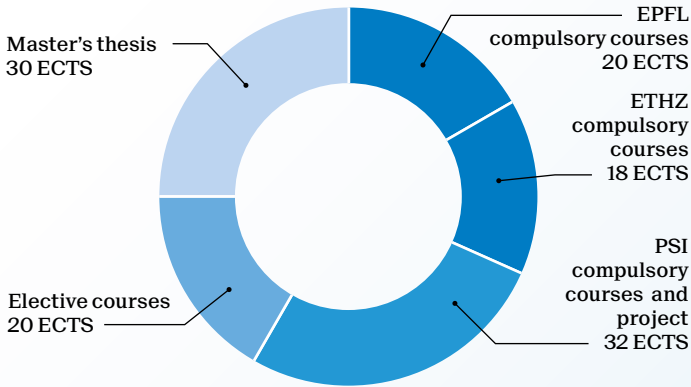


# Joint Master of Science in NUCLEAR ENGINEERING EPF Lausanne - ETH Zürich

2-year program - 120 ECTS



- 1<sup>st</sup> semester at EPFL
- 2<sup>nd</sup> semester at ETHZ
- 3<sup>rd</sup> semester at PSI (Paul Scherrer Institute)

## Career prospects

After graduation, the Master of Nuclear Engineering's students will have the perfect profile to start a career in industry, research institutes and national authorities, in Switzerland and abroad. Your internationally recognized degree, and experience from the cultural life in two attractive and diverse cities of Switzerland, allows you to become a well-recognized member of the international community of nuclear engineers. If you are interested in an academic career, the Master of Nuclear Engineering is also an ideal stepping stone to join a PhD program in nuclear engineering implemented as an EPFL-ETHZ-PSI collaboration.

Career options are as wide as follow: Development of Generation IV reactors / Medical imaging / Instrumentation for fusion technologies / Accelerator driven systems for transmutation / Spallation neutron sources / Safety of light water reactors / Environmental monitoring / Radiation protection / Reprocessing and partitioning / Computational fluid dynamics / Neutron transport modeling / Development of two-phase flow instrumentation / New nuclear fuel materials, and many others.

## Admission Guidelines

**You are:** A Bachelor student of Science in Mechanical Engineering, Physics, Chemistry, Electrical Systems or similar / ready to work interdisciplinary / concerned about sustainability / interested in power engineering, biomedical applications, nuclear physics, thermal fluid dynamics, material sciences, radiation detection, and energetic aspects. The following required admission profile is expected to be met by the largely common elements of the first years of university education in science and engineering:

- Minimum required credits in "Mathematics": 18 ECTS or equivalent hours/week
- Minimum required contents in "Natural Sciences": 12 ECTS or equivalent hours/week
- Minimum required contents in "Engineering Sciences": 12 ECTS or equivalent hours/week

	Credits
<b>EPFL compulsory courses</b>	<b>20</b>
Course of entrepreneurship	4
Physics of nuclear reactors	6
Radiation and reactor experiments	6
Radiation biology, protection and applications	4
<b>ETHZ compulsory courses</b>	<b>18</b>
Fuel cycle and waste management	4
Nuclear fuels and materials	4
Reliability engineering and quantitative risk analysis	4
Technology and safety of nuclear power plants	6
<b>PSI compulsory courses and project</b>	<b>32</b>
Advanced topics in nuclear reactor materials	4
Beyond-design-basis safety	4
Decommissioning of nuclear power plants	4
Engineering internship	8
Nuclear computations lab	4
Semester project	8
<b>Elective courses</b>	<b>20</b>
Elective project	8
<b>EPFL elective courses</b>	
Energy conversion and renewable energy	4
Experimental methods in physics	3
Hydraulic turbomachines	4
Image processing I	3
Introduction to medical radiation physics	4
Introduction to particle accelerators	4
Modeling and optimization of energy systems	4
Neutron scattering -theory and applications	4
Nuclear fusion and plasma physics	4
Nuclear interaction: from reactors to stars	4
Numerics for fluids, structures and electromagnetics	5
Plasma I	6
Radiation detection	3
<b>ETHZ elective courses</b>	
Advanced techniques for the risk analysis of technical systems	4
Biomedical imaging	6
Computational multiphase thermal fluid dynamics	4
Computational neuroimaging clinic	3
Electrochemical energy conversion and storage technologies	4
Introduction to quantum mechanics for engineers	4
Magnetic resonance imaging in medicine	4
Materials analysis by nuclear techniques	6
Medical physics II	6
Micro and nano-tomography of biological tissues	4
Monte Carlo in medical physics	4
Multiphase flow	4
Physics against cancer: the physics of imaging and treating cancer	6
Physics of nuclear reactor II	4
Radiation imaging for industrial applications	4
Therapeutic applications of particle physics: principles and practice	6

Fluency in English is required, since all courses are being taught in English. Success in an international examination of English such as the TOEFL is a plus but not mandatory for the admission to the MNE.

Applications can be submitted online twice every year, from November 15 to December 15 and from December 16 to April 15, through EPFL or ETHZ procedures.

If you need a visa to study in Switzerland, we recommend that you apply for the December deadline in order to allow for the completion of the visa procedure, which can take up to three months.

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