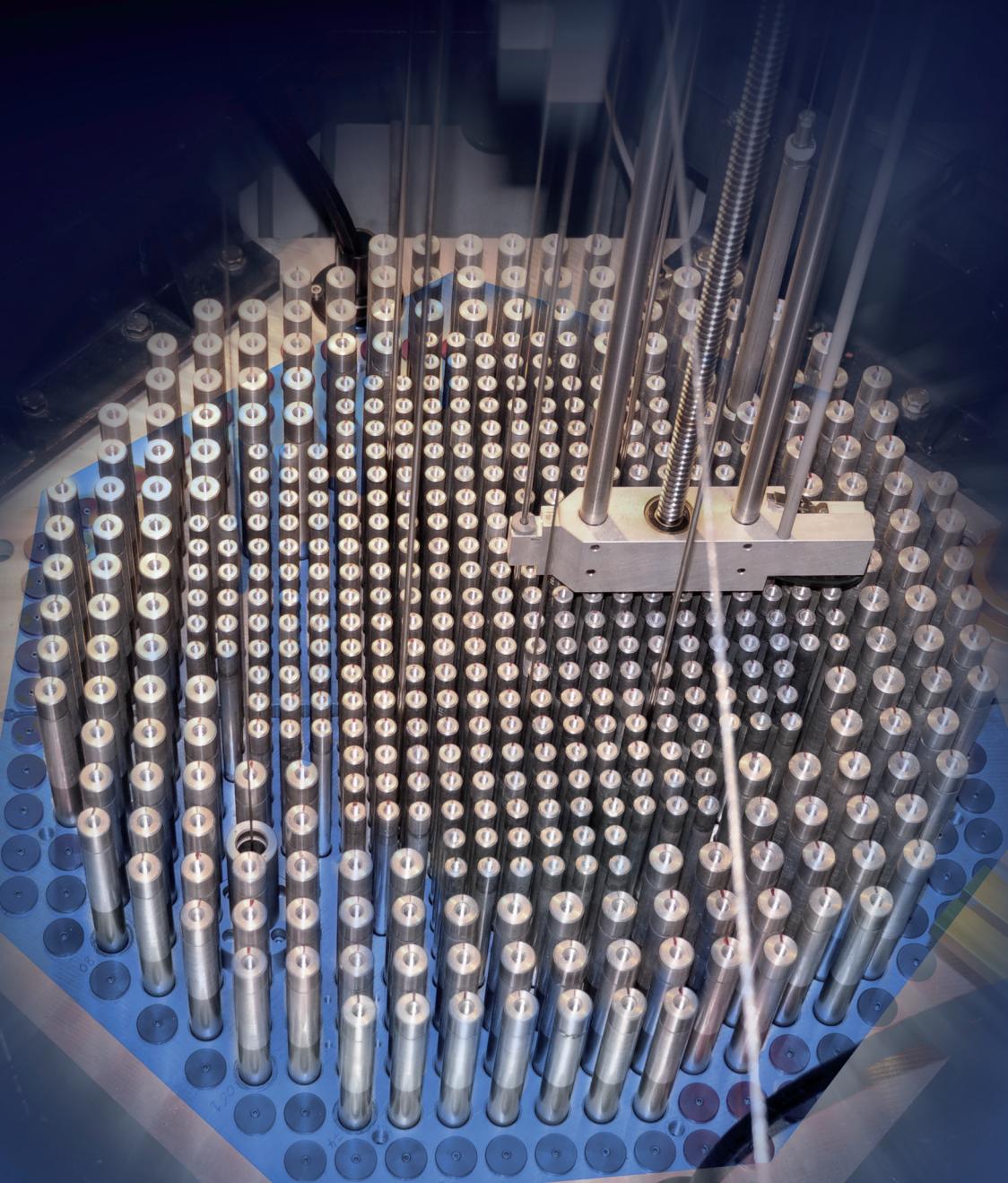


MASTER NUCLEAR ENGINEERING



ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

EPFL

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Power generation by nuclear fission has low environmental impact, vast fuel reserves and a final energy price that is competitive and nearly independent of the price of the raw energy carrier. Nuclear power constitutes one of the principal options for closing the growing energy gap in a mid-term perspective, and it can be a crucial resource in the long-term.



Nuclear excellence: The frontiers of research and industrial Development

The master program in Nuclear Engineering has been offered collaboratively by EPFL, ETH Zürich, and the Paul-Scherrer Institute (PSI) since 2008. The combination of these three major players in Swiss research provides the students with the diversity and interdisciplinarity found at the frontiers of research and industrial development in the field of nuclear technology.

The courses are aimed to equip the next generation of Nuclear Engineers with the skills and understanding to satisfy the demands of the nuclear sector. The renewed interest in nuclear technology, as well as significant new programs growth is registered worldwide.

Studying at EPFL-ETHZ provides you with the opportunity to be at the heart of this development and build upon our expertise in teaching and research in this field.

The Laboratory for Reactor Physics and System Behavior (LRS) at EPFL provides the framework for Master and Doctoral research in the nuclear field addressing topics in nuclear safety phenomenology, physics of fuel cycle closure, safety and fuel cycle related experiments, as well as radiation applications in medicine and industry. LRS also hosts the unique facility CROCUS, EPFL's zero-power teaching and research reactor.

Watch the video:



Anne-Laure Panadero:

"I think that this program is really complete. We have a lot of different lectures, each of them opening a door to one kind of career that is possible for you."



Watch the video:



Mike MacMillan:

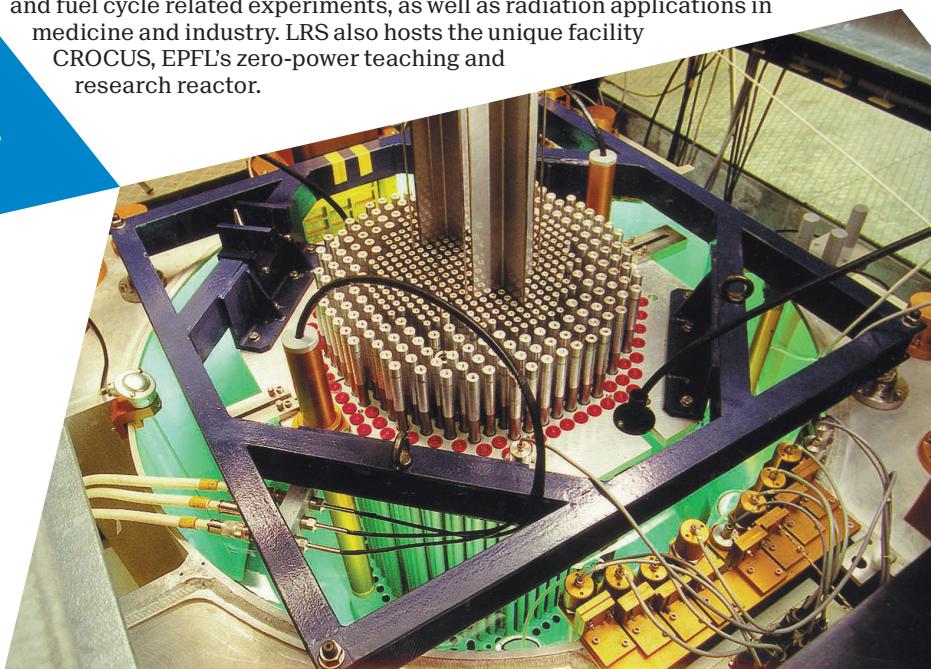
"I like to look at how we can provide the energy that the world needs right now, but without necessarily increasing our carbon footprint."

The footprints of nuclear technology

The coursework covers all major aspects of the nuclear industry from the design and construction of nuclear power stations, their operation, up to decommissioning, dismantling, and final disposal. It is also a multi-disciplinary course with emphasis on other aspects of radiation applications, well suited to train graduates with physics or engineering degrees.

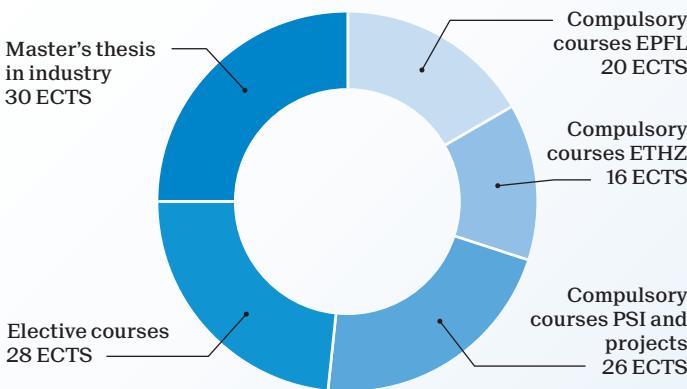
A mandatory 3-month internship in nuclear industry, and a master thesis at Paul-Scherrer-Institute complete the educational program.

The small class size of approximately 15 to 20 students allows students to put hands on the individual experiments and discuss the problems in details with the faculty and among students. The core and compulsory modules are taught by laboratory directors and leading researchers from PSI and selected personalities from industry.



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

2-year program - 120 ECTS



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

Teaching language: English

	Credits
Compulsory courses EPFL	20
Neutronics	4
Reactor experiments	4
Reactor technology	4
Radiation protection & radiation applications	4
Course of entrepreneurship	4
Compulsory courses ETHZ	16
Nuclear energy systems	4
Nuclear fuels and materials	4
Safety of nuclear power plants	4
Special topics in reactor physics	4
Compulsory courses PSI	26
Beyond-design-basis safety (block course)	3
Nuclear Computations Lab	3
Decommissioning of nuclear power plants (block course)	4
Semester project for Nuclear engineering	8
Engineering Internship for Nuclear Engineering	8
Elective courses	28
Advanced fossil and renewable energy systems	4
Computational multi-phase thermal fluid dynamics	4
Hydraulic turbomachines	4
Introduction to particle accelerators	4
Medical radiation physics	4
Multi-phase flow	4
Nuclear fusion and plasma physics	4
Renewable energy technologies II, energy storage and conversion	4
Single- and Two-Phase Particulate Flows	4
Uncertainty Quantification for Engineering & Life Sciences	4
Wind Energy	4
"Free" elective courses	max 8
Master courses from the catalogue of courses EPFL or ETHZ (provided the tutor supports this choice)	

Career prospects

Master of Nuclear Engineering graduates will have the perfect profile to start a career in industry, research institutes and national authorities. They will be able to apply their knowledge and practical know-how gained at the Federal Schools and PSI, and during the mandatory internships in nuclear industry, research and development organizations in Switzerland and abroad to become the experts in the nuclear engineering fields. Their internationally recognized degree and experience from the cultural life in two attractive and diverse cities of Switzerland will suit them to become well recognized members of the international community of nuclear engineers. For students 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. Research challenges can be as wide and complex as follow: Development of Generation IV reactors / Accelerator driven systems for transmutation / Spallation neutron sources / Safety of light water reactors / Containment thermal hydraulics / Aerosol behavior in containment flows / Fuel optimization / Reprocessing and partitioning / Safety analyses by means of computer simulations / Computational fluid dynamics / Neutron transport modeling / Life cycle analysis of energy systems / Development of two-phase flow instrumentation / New nuclear fuel materials and many others.

Admission Guideline

You are: A Bachelor of Science in Mechanical Engineering, Physics, Chemistry, Electrical Systems or similar / interested in power engineering, nuclear physics, thermal fluid dynamics, material sciences and energetic aspects / ready to work interdisciplinary / concerned about sustainability of the world's energy supply.

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 January 15 and from January 16 to April 15**.

If you need 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.

School of Basic Sciences
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