MASTER

Department of Mechanical and Process Engineering

Master of Science ETH in Nuclear Engineering

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Master Program
ETH / EPF in Nuclear Engineering

Clean, affordable and reliably available energy is of paramount importance for the well-being of industrialized economies and the development of emerging countries. Among the potential candidates for a long-term substitute for fossil fuels, power generation by nuclear fission is one of the options with low environmental impact, base-load compatibility and vast fuel reserves.

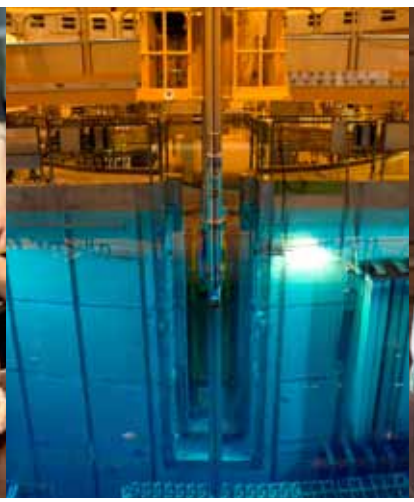
Graduates of the Master in Nuclear Engineering will be qualified to work in an interesting, multidisciplinary profession with excellent job opportunities in industry, research and the public sector. Tasks that are on the agenda – like the safe and reliable operation of existing and new nuclear reactors, the sustainable supply of nuclear fuel, the closure of the fuel cycle, the disposal of radioactive waste without harm to the environment, and many others – represent scientific and technical challenges for young engineers and researchers.

Studies are undertaken in two locations: at EPF in Lausanne for the first (autumn) semester and at ETH Zurich in the second (spring) semester. The third semester is dedicated to the industrial internship, the semester project and four compulsory core courses. The Master thesis in the fourth semester can be undertaken in a lab at the Paul Scherrer Institute (PSI) in Villigen, at EPF Lausanne or at ETH Zurich.

Program Objectives

1. Provide in-depth knowledge on the fundamentals and technology of harnessing nuclear fission for energy supply.
2. Present the basic principles and challenges of controlled nuclear fusion.
3. Provide knowledge of nuclear techniques in medicine and industry.
4. Provide a view of the complete nuclear energy conversion system and the entire fuel cycle from uranium mining to the back-end.
5. Offer the background necessary to integrate nuclear energy into energy systems as a whole.

The Master in Nuclear Engineering is a tutor-driven program. The tutor, an authorized member of the Nuclear Engineering Core Group, advises the student in the choice of optional courses, i.e. in the definition of an individualized curriculum that, while ensuring top-class specialized education, also takes into consideration the talents and expectations of the student. The teaching faculty includes leading scientists and researchers from the Nuclear Energy and Safety Research Department of the PSI, as well as senior professionals from industrial and governmental organizations.


«The Master of Science in Nuclear Engineering is a joint Master program by EPF Lausanne and ETH Zurich, two of Europe's leading science and engineering universities.»

CORE COURSES

32 credits, 8 compulsory courses:

- Neutronics (4 ECTS) - at EPFL
- Reactor Experiments (4 ECTS) - at EPFL
- Reactor Technology (4 ECTS) - at EPFL
- Nuclear Fuels (4 ECTS) - at ETHZ
- Nuclear Safety (4 ECTS) - at ETHZ
- Special Topics in Reactor Physics (4 ECTS) - at ETHZ
- Nuclear Energy Systems (4 ECTS) - at ETHZ
- Radiobiology and Radiation Protection (4 ECTS) - at PSI

30 credits, elective core courses according to track selected:

Energy Systems, Physics & Materials or Thermal-hydraulics

FREE ELECTIVE COURSES

12 credits:

Serve to deepen the scientific and technical knowledge or to complement the range of skills. The free elective is chosen in consultation with the tutor.

of wich 2 credits: course in entrepreneurship,

elective during the first semester at EPF Lausanne or at the University of Lausanne.

SEMESTER PROJECT

8 credits, 1 day per week during the third semester:

Introduction to research and development in nuclear engineering, based on scientific and technical knowledge acquired during the first semester and as preparation for the Master research project.

INDUSTRIAL INTERNSHIP

8 credits, 8 weeks during the third semester:

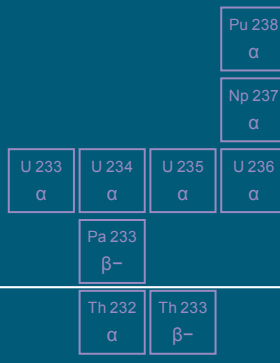
Internship in one of the nuclear utilities in Switzerland, in ZWILAG or NAGRA or in a foreign industrial company, with the aim of bringing students into contact with the professional work environment in industry.

MASTER THESIS

30 credits, fourth semester full-time:

The subject of the thesis and the project plan are proposed by the tutor, and work on the thesis is carried out in one of the research laboratories of the Nuclear Energy and Safety Department (NES) at PSI, in the Laboratory of Nuclear Energy Systems at ETH Zurich or in the Laboratory of Reactor Physics and Systems Behaviour at EPF Lausanne.





Qualification Profile

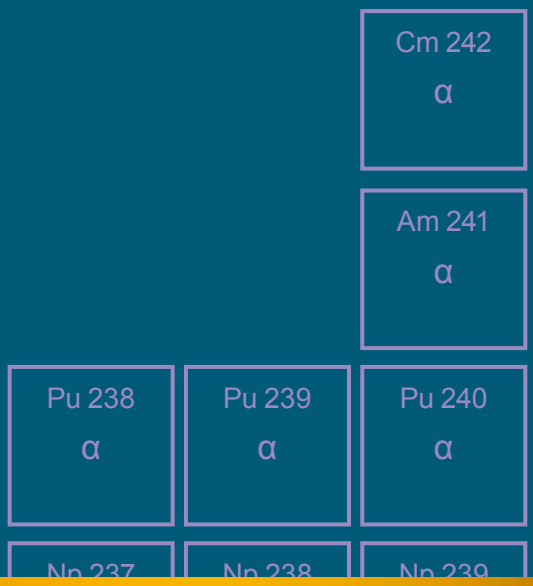
Graduates of the Master of Science in Nuclear Engineering program will have an advanced and well-respected qualification which prepares them for professional careers in industry, science and public administration.

The Department

The Department of Mechanical and Process Engineering at ETH Zurich is recognized as a center of excellence throughout the world. Research undertaken by W. C. Röntgen (Nobel Prize), H. Rohrer (Nobel Prize), A. Stodola and J. Ackert exemplifies the landmark innovations created in this department. Its partnerships with industry also involve major corporations concerned with leading edge technology. Approximately 3 spin-offs are founded each year. The majority of the professors have earned numerous international awards.

Today the Department of Mechanical and Process Engineering is one of the largest departments at ETH Zurich with more than 1700 undergraduate and graduate students, 370 Ph.D. candidates and 30 professors.

www.mavt.ethz.ch
www.lke.mavt.ethz.ch
Admission: www.rektorat.ethz.ch/students



ETH Zurich
Department of Mechanical & Process Engineering
Sonneggstrasse 3
8092 Zurich, Switzerland
- Edition: 11/2010 -

DMAVT
Departement Maschinenbau & Verfahrenstechnik
Department of Mechanical & Process Engineering