



POLITECNICO
MILANO 1863

POLY²NUC



POLITECNICO
DI TORINO

Joint MSc Program in Nuclear Engineering

Politecnico di Milano - Politecnico di Torino

Politecnico di Milano (PoliMi) and Politecnico di Torino (PoliTo) are the premier technical universities in Italy and have 50-years-long tradition and well-recognised quality in nuclear engineering education and research.

The **Joint Master of Science Program in Nuclear Engineering (POLY²NUC)** is a *NEW* initiative, launched in the academic year 2015-2016, and a unique opportunity:

- To take advantage of the complementary know-how present in the two Universities.
- To get access to state-of-the-art **laboratories**, including the research reactor TRIGA @ LENA-Pavia and several other experimental and computational labs and facilities (nuclear electronics, nuclear instrumentations and measurements, radiation protection, radiochemistry, thermal-hydraulics).
- To become part of a lively and stimulating international academic community, and to enjoy the Italian cultural environment.

The program in a nutshell

- Two-year MSc program focused on the various aspects of nuclear engineering (fission reactor physics and engineering, fusion reactor physics and engineering, laboratory of nuclear reactor kinetics, radiation protection and radiochemistry, biomedical and industrial applications of radiation, safety of nuclear installations, etc.)
- The students will take courses in both Universities (one year @ PoliMi, one year @ PoliTo), and will earn a Master's Degree in either:
 - Nuclear Engineering at PoliMi, or
 - Energy and Nuclear Engineering at PoliTo:depending on where they choose to enrol and attend their first year.
- The call is launched every year for both Italian and International students, with different deadlines.

How to apply and deadlines

To apply to the POLY²NUC program you need to enroll in the university first. Hereinafter, you can find the main reference to the university websites. Please, be careful about the deadlines, especially for International students.

Italian students

Students coming from any Italian university can apply to the POLY²NUC program by:

1. Enrolling in the corresponding master's program:

- Nuclear Engineering at PoliMi

<http://www.poliorientami.polimi.it/ammissione-magistrali/>

- Energy and Nuclear Engineering at PoliTo

https://didattica.polito.it/lauree_magistrali/

2. Participating in the call for the POLY²NUC program that is launched after the opening of the general Politecnico enrollment.

The chosen Politecnico will be the place where the first year courses are taken and the institution granting the final degree. Enrollment is possible only starting at the beginning of the academic year (i.e. it is not possible to enroll in the spring semester).

International students

Students with a degree from universities outside Italy can apply to the POLY²NUC program by:

1. Enrolling in the corresponding master's program:

- Nuclear Engineering at PoliMi

<http://www.polinternational.polimi.it/how-to-apply/laurea-magistrale/>

<http://www.polinternational.polimi.it/how-to-apply/laurea-magistrale/how-to-apply/>

- Energy and Nuclear Engineering at PoliTo

http://apply.polito.it/info_en.html

http://international.polito.it/admission/prospective_undergraduates_and_graduates/admission_to_master_of_science_programs

2. Participating in the call for the POLY²NUC program that is launched after the opening of the general Politecnico enrollment.

The chosen Politecnico will be the place where the first year courses are taken and the institution granting the final degree. Enrollment is possible only starting at the beginning of the academic year (i.e. it is not possible to enroll in the spring semester).

NOTICE: since the enrollment rules depend on the single institution, it is advisable to apply to both Universities, if you want to maximize the chances of being selected.

Logistics

The POLY²NUC program requires spending one year at PoliMi and one year at PoliTo. In both locations, Milano and Torino, it is possible to apply for accommodation in a student dormitory:

In Milano:

<http://www.residenze.polimi.it/index.php?id=31&L=1>

In Torino:

<http://international.polito.it/>

http://international.polito.it/financial_aid/edisu_piemonte_scholarships

Contacts

Please write an e-mail to the contacts below in case you need additional information.

Prof. Francesco Di Maio (francesco.dimaio@polimi.it);

Prof. Piero Ravetto (piero.ravetto@polito.it)



POLY²NUC

STUDY PLAN



Curriculum A: enrolment @ PoliTo

1st year (@ PoliTo)

Semester	Course	ECTS
I	Nuclear reactor physics and transport theory	10
I	Monte Carlo methods, safety and risk analysis	5+5
I	Nuclear fusion reactor physics and engineering	5+5
II	Thermal design and optimization	8
II	Biomedical and industrial applications of radiation	6
II	Fission nuclear plants	8
II	Radiation protection	6
II	Computational thermal fluid dynamics	6

2nd year (@ PoliMi)

Semester	Course	ECTS
I	Nuclear design and technology	10
I	Experimental nuclear reactor kinetics (TRIGA reactor)	5
II	Dynamics and control of nuclear plants	10
	<i>Courses to be chosen in Table A (I-II semester)</i>	15
	Master thesis	16

Semester	Table A - Course	ECTS
I	Plasma physics II	5
I	Physics of nuclear materials	5
I	Integrated deterministic and probabilistic safety analysis of nuclear power plants	5
I	Corrosion engineering	5
II	Applied radiochemistry A	5
II	Applied radiochemistry B	5
II	Radiation detection and measurement	10
I	Industrial and nuclear electronics A	5
I	Industrial and nuclear electronics A+B	10
II	Safety assessment of radioactive waste repositories	5
I	Computational methods for reliability, availability and maintenance	5
II	Transport of radioactive contaminants	5



1st year (@ PoliMi)

Semester	Course	ECTS
I	Fission reactor physics	10
I	<i>Courses to be chosen in Table B</i>	10
I	<i>Courses to be chosen in Table C</i>	10
II	Dynamics and control of nuclear plants	10
II	<i>Courses to be chosen in Table D</i>	10
II	<i>Courses to be chosen in Table E</i>	10

Sem.	Table B - Course	ECTS
I	Introd. to nuclear eng. A+B	10
I	Introduction to quantum physics	5
I	Plasma physics I	5
I	Mathematical methods for materials engineering	5

Sem.	Table C - Course	ECTS
I	Plasma physics I	5
I	Plasma physics II	5
I	Physics of nuclear materials	5
I	Heat and mass transfer I	5
I	Heat and mass transfer II	5

Sem.	Table D - Course	ECTS
II	Applied radiochemistry A + B	10
II	Radiation detection and meas.nt	10

Sem.	Table E - Course	ECTS
II	Reliab., safety and risk analysis A	5
II	Reliab., safety and risk analysis A+B	10
II	Solid state physics	10
I	Industrial and nuclear electronics A	5
I	Industrial and nuclear electr. A+B	10

2nd year (@ PoliTo)

Semester	Course	ECTS
I	Nuclear fusion reactor physics and engineering	10
I	Introduction to computational heat transfer	8
I	Experimental nuclear reactor kinetics (TRIGA reactor)	5
II	Safety of nuclear plants	6
II	Biomedical and industrial applications of radiation	6
I-II	<i>Courses to be chosen in Table F</i>	>=10
II	<i>Master thesis</i>	15

Semester	Table F - Course	ECTS
I	Finite element modelling	6
I	Modern design of control systems	6
I	Stochastic processes	6
I	Introduction to numerical methods and simulation techniques	8
I	Materials for MEMS and characterizations of technological processes	8
I	Micro and nanotechnologies applied to biomedicine, environment and energy	6+6
II	Machine design	8