

Name of the Programme



UNIVERSITÀ DI PISA
Laurea Magistrale in Ingegneria Nucleare
Master of Science in Nuclear Engineering



Brief presentation

The Master of Science programme in Nuclear Engineering is based on the long tradition in teaching Nuclear Engineering at the University of Pisa, started in 1960. The study matters cover all the important areas necessary for acquiring high-level competences in the field, including Reactor Physics, Nuclear Reactor Thermal-Hydraulics, Structural Mechanics, Radiation Measurement and Health Effects, Nuclear Reactor Power Plant Technology, Nuclear Materials, Nuclear Reactor Control and Operation, Nuclear Reactor Safety and Reliability. Containing the basic matters required for a sound education in Nuclear Engineering, the MSc programme already granted to many of its past-students the possibility to obtain the certification of European Master of Science in Nuclear Engineering (EMSNE). This is the certification released by the European Nuclear Education Network (ENEN) to Nuclear Engineers with a good background, who also fulfilled minimum requirements of mobility for courses or thesis work at European organisations belonging to the Association (www.enen-assoc.org).

Programme Overview

The study programme is structured into two years of 60 ECTS credits each, including the final thesis work.

FIRST YEAR		ECTS
1st Semester		
Nuclear Plants I		6
Reactor physics and numerical models for nuclear reactors, 1st module: Reactor physics		6
Structural mechanics and nuclear constructions, 1st part		6
Nuclear materials		6
Thermal-hydraulics and core engineering, 1st part: Core engineering		6
		30

	<table border="1"> <thead> <tr> <th colspan="2">2nd Semester</th> </tr> </thead> <tbody> <tr> <td>Reactor physics and numerical models for nuclear reactors, 2nd part: Numerical models</td> <td>6</td> </tr> <tr> <td>Structural mechanics and nuclear constructions, 2nd part</td> <td>6</td> </tr> <tr> <td>Thermal-hydraulics and Core Engineering, 2nd part: Thermal-hydraulics</td> <td>6</td> </tr> <tr> <td>Nuclear Measurements</td> <td>6</td> </tr> <tr> <td>Elective Course</td> <td>6</td> </tr> <tr> <td></td> <td>30</td> </tr> <tr> <th colspan="2">SECOND YEAR</th> </tr> <tr> <th colspan="2">ECTS</th> </tr> <tr> <th colspan="2">3rd Semester</th> </tr> <tr> <td>Nuclear Plants II</td> <td>6</td> </tr> <tr> <td>Control and operation of nuclear plants, 1st part: Control of complex plants</td> <td>6</td> </tr> <tr> <td>Nuclear safety, 1st part: Nuclear power plant safety</td> <td>6</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <th colspan="2">4th Semester</th> </tr> <tr> <td>Control and operation of nuclear plants, 2nd part: Dynamics and control of electro-nuclear plants</td> <td>6</td> </tr> <tr> <td>Nuclear Safety 2nd part: Nuclear reactor accident analysis</td> <td>6</td> </tr> <tr> <td>Elective Course</td> <td>6</td> </tr> <tr> <td>Thesis work</td> <td>24</td> </tr> <tr> <td></td> <td>60</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <th colspan="2">Group 1 Elective</th> </tr> <tr> <th colspan="2">ECTS</th> </tr> <tr> <td>Medical applications of nuclear technologies</td> <td>6</td> </tr> <tr> <td>Physical Principles for Nuclear Plants</td> <td>6</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <th colspan="2">Group 2 Free choice</th> </tr> <tr> <th colspan="2">ECTS</th> </tr> <tr> <td>Radiation Protection</td> <td>6</td> </tr> <tr> <td>Fusion reactor engineering</td> <td>6</td> </tr> <tr> <td>Design of complex plants</td> <td>6</td> </tr> <tr> <td>Computing abilities</td> <td>6</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	2nd Semester		Reactor physics and numerical models for nuclear reactors, 2nd part: Numerical models	6	Structural mechanics and nuclear constructions, 2nd part	6	Thermal-hydraulics and Core Engineering, 2nd part: Thermal-hydraulics	6	Nuclear Measurements	6	Elective Course	6		30	SECOND YEAR		ECTS		3rd Semester		Nuclear Plants II	6	Control and operation of nuclear plants, 1st part: Control of complex plants	6	Nuclear safety, 1st part: Nuclear power plant safety	6			4th Semester		Control and operation of nuclear plants, 2nd part: Dynamics and control of electro-nuclear plants	6	Nuclear Safety 2nd part: Nuclear reactor accident analysis	6	Elective Course	6	Thesis work	24		60			Group 1 Elective		ECTS		Medical applications of nuclear technologies	6	Physical Principles for Nuclear Plants	6			Group 2 Free choice		ECTS		Radiation Protection	6	Fusion reactor engineering	6	Design of complex plants	6	Computing abilities	6		
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	<p><i>The Course is fully offered in English language. The tight network of international contacts of the teachers in the course allows performing part of the thesis work in cooperation with or at renowned institutions in Italy and abroad.</i></p>																																																																		
Academic Calendar	<p>The academic calendar defines the periods of lectures, examinations and vacations for all of the Engineering courses offered at the University of Pisa. All Engineering courses are taught over two semesters. Yearly courses are mostly taught in two parts or modules, with possible intermediate exams, held during the period between lectures.</p> <p>Lecture Periods:</p> <ul style="list-style-type: none"> • Fall Semester: End of September → Mid December; • Spring Semester: End of February → End of May. <p>Examinations:</p> <ul style="list-style-type: none"> • sessions in January and February; 																																																																		

	<ul style="list-style-type: none"> • sessions in June and July; • sessions in September.
Professional perspectives	<p>Nuclear Engineers graduated at the University of Pisa have found employment in Italy and abroad in the nuclear field and in conventional industry. The broad education in engineering matters and the specific skills in the nuclear field provide a flexible and targeted background that can be used for nuclear energy applications as well as for other major industrial endeavours. The research and development fields also absorb a considerable share of our graduates.</p> <p>Nuclear Studies can be also continued at the University of Pisa in the Research Doctorate Programme in Nuclear Engineering and Industrial Safety, obtaining higher qualifications to be spent in the research field.</p> <p>A short gallery of our “testimonials”, i.e. past students now working in Italy and abroad, can be found at the website: http://youcnuclear.ing.unipi.it/Testimonials.html</p>
Admission	<p>The section for foreign students of the portal “Matricolandosi”, to be found at the web site http://matricolandosi.unipi.it/index.php?page=default&id=35&lang=it , reports detailed information to enrol in the University of Pisa courses for both EU and non-EU citizens. More specific information can be obtained by sending e-mail messages at the address youcnuclear@ing.unipi.it .</p>
Requirements for Admission	<p>In order to be enrolled in the Corso di Laurea Magistrale in Ingegneria Nucleare, it is necessary to be in possession of a first level university degree obtained after three years of study in Italy or of another equivalent first level title obtained in other Countries that can be recognized as adequate. The Candidate must present the application attaching at least the former degree certification (or an equivalent document) and the programs of the successfully passed examinations. Both curricular (i.e., past study career) and personal preparation requirements will be checked by the degree course organisms, through an Evaluation Committee (CIV) having the tasks to examine the admission applications, to evaluate the curricula of candidates, to check the possession of the curricular and personal requirements, then making proposals for the admission or for compensation of possible educational lacks.</p> <p>In short, the candidate should have passed sufficient university level prior examinations in mathematics, physics, chemistry, thermodynamics, thermal machines, mechanical drawing, continuum mechanics and machine design. A reasonable knowledge of the English language is also requested (level B1 or equivalent).</p> <p>The Evaluation Committee can decide to directly enroll the student on the basis of the presented documentation or to ask for an admission interview, indicating the program on which the student will be interviewed. The objective of this possible phase of the enrolment procedure is to ascertain that the student has enough background to be safely enrolled in the MSc studies.</p>

	<p>Students having a Laurea in Mechanical Engineering from the University of Pisa who followed the specific “nuclear path” will be particularly well accepted in the MSc course. Therefore, the path through Mechanical Engineering in Pisa constitutes one of the possible ways to achieve from the very beginning the good background necessary to enrol in the MSc courses in Nuclear Engineering.</p>
<p>Deadlines for application</p>	<p>For application deadlines, please follow the information reported for each academic year at the website: http://matricoladosi.unipi.it/index.php?page=default&id=35&lang=it</p>
<p>Websites and contacts</p>	<p>For receiving information, send e-mail messages to:</p> <ul style="list-style-type: none"> • Prof. Walter Ambrosini: walter.ambrosini@ing.unipi.it • the contact of the <i>YouNuclear</i> webpage: younuclear@ing.unipi.it • the Department Coordination Point: f.nannelli@ing.unipi.it <p>Visit the webpages:</p> <ul style="list-style-type: none"> • http://younuclear.ing.unipi.it/ • Facebook page: Studiare Ingegneria Nucleare a Pisa – Nuclear Engineering Studies in Pisa • European Nuclear Education Network Association http://www.enen-assoc.org/en/about/news.html?actu_id=131
<p>A final message to summarise our spirit</p>	<p>Studying Nuclear Engineering allows undertaking a wonderful cultural experience, aiming to contribute in designing the energy mix of the future. Nuclear energy is relatively young in the history of civilization and has a great development potential. Learning how to use it in the best ways is the commitment of those who wish to give the world an additional chance to reach a fully sustainable development.</p> <p>In this commitment to progress towards a better world, we recognize that:</p> <p style="text-align: center;">“It is harder to crack a prejudice than an atom” <i>(Albert Einstein)</i></p>