



TUM

Fakultät für Maschinenwesen

Study Information

NUCLEAR TECHNOLOGY (BACHELOR/MASTER)

at Technische Universität München



THE FACULTY OF MECHANICAL ENGINEERING



A central element of Garching's Campus is the Faculty of Mechanical Engineering. The new inviting and state of the art building, which was opened in 1997, is located in the immediate vicinity of the faculties of chemistry, physics, mathematics, and information technology. The modern technical equipment provides a forward-looking education for the students, as well as a fundamentals-orientated research that also goes in line with industrial needs and hence allows an industrial transfer. Therefore, a variety of big laboratory facilities, like flight and driving simulators, wind channels, and a Virtual-Reality-Laboratory are available for teaching and research. Besides the classical engineering core disciplines, the content spectrum of the more than 30 chairs includes also interdisciplinary pronounced research topics like medical engineering and mechatronics.

In addition to the technical qualification, a sound basis of soft skills and leadership is demanded from the young engineers. Therefore, for several years now, the Faculty of Mechanical Engineering offers a soft skills and Management Training System for additional qualification and development.

TUM is core in an international network of elite universities and the faculty has developed a variety of contacts to renowned universities abroad. Therefore it offers an international orientation including stays abroad at partner universities.

THE CHAIR OF NUCLEAR ENGINEERING



Nuclear energy is currently one of the main components of the energy mix in the world, and especially in the EU, for the production of reliable, safe and environmentally friendly electric power. This role is expected to be maintained or even increased in

the future, as policies promoting a sustainable energy mix that aim to minimize the effects that the burning of fossil fuels cause are continued and expanded. Moreover, nuclear technologies based on the safe use of radiation find also important fields of application in medicine, industry and research which will certainly continue to be an essential part of our technologically advanced society.

In order to address the demands for education and research required by such scenarios, TUM, with the help of an endowment by E.ON Energy, established in 2007 the Chair of Nuclear Engineering at the Faculty of Mechanical Engineering.

Its purpose is to develop and offer a modern academic curriculum, research, and training in fundamental and advanced nuclear engineering subjects, which will prepare the scientists and engineers demanded today and in future by German, European and world nuclear industry, regulatory agencies and research centres.

It is also the aim of the Chair to serve as a reference centre of knowledge and reliable information for nuclear safety topics of interest to the public in general.

MAIN RESEARCH AREAS

The safe operation and management of nuclear systems requires engineering and scientific capabilities to analyze their behaviour under normal and abnormal operating conditions. Such capabilities are based on the use of:

- Sophisticated physical and computer models,
- Experiments to study important physical phenomena,
- Experimental data to evaluate the accuracy of analytical simulations and to develop better computer modelling tools.

The main lines of research carried out at the Chair address these needs by concentrating on:

- Application and development of advanced methodologies for the modelling and simulation of nuclear systems with state of the art computer programmes:
 - Thermal-hydraulic behaviour with System Codes: ATHLET, TRACE, RELAP-5
 - Thermal-hydraulic modelling: CFX
 - Neutronic behaviour: QUABOX-QBOX, PARCS
 - Nuclear Data Analysis Programs: SCALE5.1
 - Radiation Transport: MCNP, PENELOPE
- Experimental investigations on thermal-hydraulic phenomena of relevance for nuclear safety.



BACHELOR AND MASTER DEGREES IN NUCLEAR ENGINEERING

Bachelor in Nuclear Engineering (6 semesters)

Prerequisite for admittance to the Bachelor's programme is the pass of an aptitude test and the certificate of an at least eight weeks industrial internship. In the first four semesters fundamentals are imparted whereas in the last two semesters the following is taught:

- Fundamentals of nuclear engineering and the physical behaviour of nuclear reactors,
- Computer tools used for nuclear safety analysis,
- Fundamental concepts in radioactivity needed for industrial, research or medical applications.

Master in Nuclear Engineering (4 semesters)

Based on:

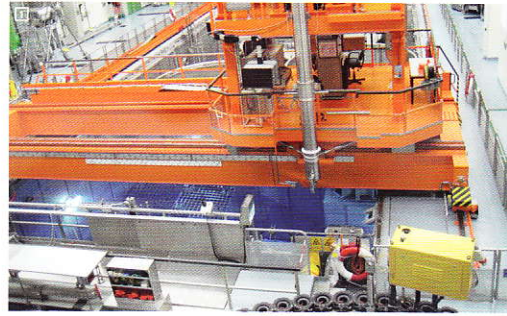
- Interdisciplinary and nuclear specific courses at the faculties of Mechanical Engineering and Physics,
- Advanced nuclear engineering courses (English) for one winter semester at the Institut National des Sciences et Techniques Nucléaires (CEA-INSTN) in Saclay, France.

The Master provides future nuclear engineers with the advanced knowledge and skills in the principles of nuclear science and technology, and their application to:

- Analysis of the operation and design of nuclear reactors,
- Safe use of radiation sources,
- Safety evaluation of nuclear systems.

Nuclear specific practical courses at university, industrial placements and a Bachelor's or Master's thesis complete the degrees.

AFTER GRADUATION. THE FUTURE



Nuclear engineers are in high demand and they will continue to be in future, as nuclear technologies are fundamental for modern technologically advanced societies.

A nuclear engineer can find intellectually challenging, well paid jobs in, amongst others:

- Electric power producing companies,
- Government energy and regulatory agencies,
- Research Laboratories,
- Companies designing and building nuclear plants,
- Private companies working in nuclear technologies,
- Health and medical related organizations.

In these jobs a nuclear engineer can tackle issues in:

- Consumer and industrial power production,
- Nuclear safety regulation,
- Nuclear research on advanced power concepts,
- Water supply, food supply safety, health and transportation.

As a nuclear engineer you could, for example:

- Develop designs for nuclear power plants,
- Apply radiation to the diagnosis and treatment of disease,
- Support the operation of nuclear energy systems or develop power systems for space exploration.

➔ *Your career options are limitless.*

GARCHING'S CAMPUS OF THE FUTURE



The Technische Universität München enjoys worldwide an excellent reputation and stands for a leading position in university rankings concerning research and teaching. Today, its location Garching has a research and science

cluster of international status. Besides the TUM's technical and natural scientific facilities, other institutes of the Ludwig-Maximilians-Universität (LMU), of the Max-Planck-Gesellschaft, of the Leibnitz-Rechenzentrum, as well as private science institutes are located on the campus, establishing and optimizing synergetic effects between science and economy. At the moment approximately 5500 scientists of different fields work in Garching and more than 9000 students are enrolled in the university's departments.

As a residence the "Universitätsstadt im Aufschwung" (Boosting University City) is very attractive. Besides the numerous sport and leisure facilities, residence halls very close to the campus are offered to students. With the metro line U6, Garching and München move closer together and the state capital's culture and leisure program can be reached within 30 minutes journey time.



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Information about the Aptitude Test:
www.mw.tum.de/aptitudetest

Information about
the Industrial Placement:
www.mw.tum.de/preparatoryinternship

Chair of Nuclear Technology:
www.ntech.mw.tum.de

Bildquellenangabe:
1: E.ON Kernkraft GmbH – 2: E.ON / FVAmuc –
3: Rolf Sturm – Sonstige: TUM

