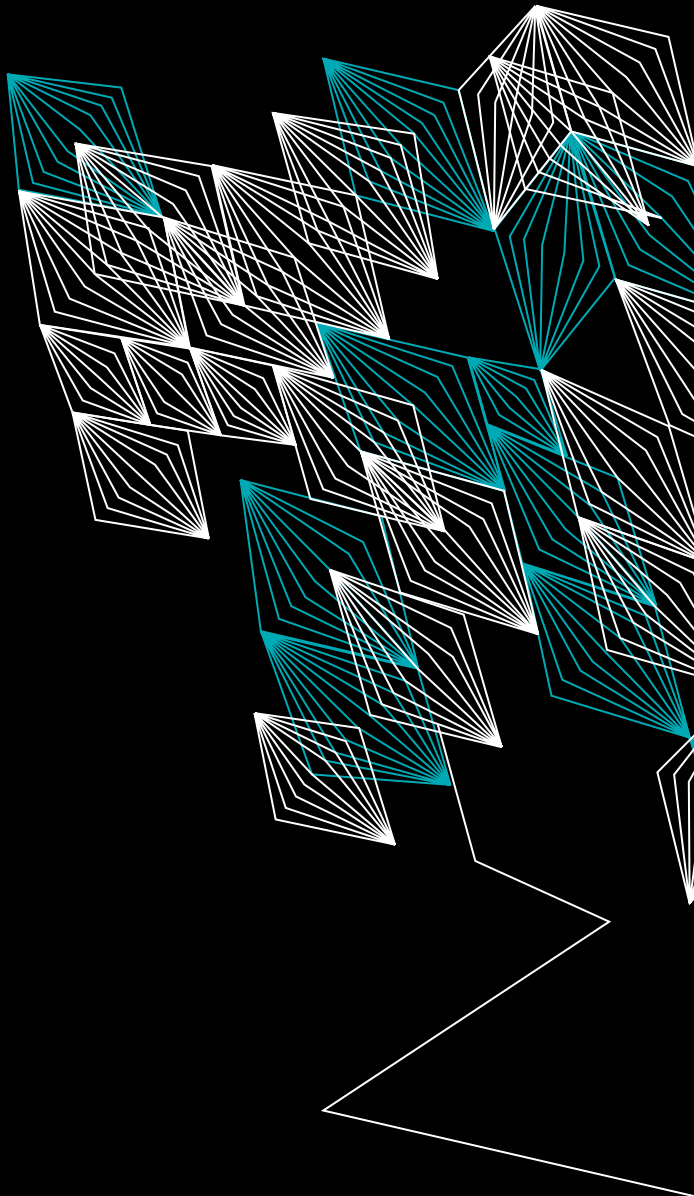


NANO- TECHNOLOGY (MSC)



NAME OF EDUCATION	NANOTECHNOLOGY (MSC)
ECTS CREDITS	120
PROGRAMME DURATION	2 YEARS
START DATE	SEPTEMBER
ADMISSION REQUIREMENTS	RELEVANT BACHELOR AND SUFFICIENT MASTERY OF ENGLISH. SEE FOR MORE INFORMATION: WWW.GRADUATE.UTWENTE.NL
MODE OF STUDY	FULL-TIME
LANGUAGE OF INSTRUCTION	ENGLISH
TUITION FEES 2011/2012	€1,713 /YEAR (EU/EEA) €12,500 /YEAR (NON-EU)
ACCREDITATION	NVAO ACCREDITED
CROHO-CODE	60028
MINIMAL IELTS / TOEFL-IBT SCORE	6.5 / 90
SPECIAL SCHOLARSHIPS INFORMATION	WWW.GRADUATE.UTWENTE.NL/FINANCE WWW.GRADUATE.UTWENTE.NL/NT

THE MASTER'S PROGRAMME

Researchers and professors active in the fields of Applied Physics, Chemical Engineering and Electrical Engineering joined together to close the gap between scientific and technological progress and conventional disciplinary educational programs by setting up an interdisciplinary master's programme in Nanotechnology. Differences in background that you and the other applicants might have are not considered a problem, but an asset. Introductory modules and personal coaching (by tutors) are offered to ensure a smooth connection between your background and the master's programme.

Within this interdisciplinary programme you develop more competence and problem solving skills compared to the monodisciplinary, traditional expertise you would develop in any other master's programme. This master's programme has a strong research component and is set up to prepare you to continue your research at a PhD level. You learn to work in a research environment: setting up, managing and completing research projects, including reporting and communicating the results. The master's programme provides you with an in-depth overview of the enabling technologies and key aspects relevant to the field of nanotechnology.

PROGRAMME STRUCTURE

This two-year master's programme consists of 120 ECTS and is divided into four semesters. In the first year, semester 1 and 2, you complete seven core modules in Nanotechnology (35 ECTS). One module of 5 ECTS is reserved for self-study/homologation and the subject depends on your previous study. In the second semester, you are offered two practical trainings in different laboratory settings. One is a clean room course and makes you familiar with research work in a clean room environment and the second one is a lab course, in which you will be trained to work in one or the research laboratories (physics, chemistry or engineering) of the participating groups.

In the second semester you will furthermore take three different courses (8 ECTS) focused on topics and skills that are non-technical in nature.

In the second year, semester 3 and 4, you complete an industrial training at a company (compulsory for Dutch students) or a research project in any group active in nanotechnology inside or outside the University of Twente. The last nine months are reserved for your MSc research project in one of the research groups in Nanotechnology. During this project you learn to set up, plan, manage and perform a larger research project. This project you have to finalize in a written presentation (report) and an oral presentation in which you have to defend your project.

AN OVERVIEW OF THE PROGRAMME

Fabrication of nanostructures (5 ECTS)

This module in combination with the course Characterization of Nanostructures will introduce the techniques and tools that are available for creating nanostructures, both top-down (e.g. optical lithographic techniques) as well as bottom-up (self-assembly) and the wide range of characterization tools (XPS, SIMS, TEM, SEM, AFM, etc.) that are available to study materials at the nanometer scale.

Characterization of nanostructures (5 ECTS)

This module will introduce and discuss a wide range of modern, state-of-the-art analytical techniques and tools (XPS, SIMS, TEM, SEM, AFM, neutron, X-ray and light scattering, diffraction, NMR etc.) to characterize structure and properties of nanostructures. The central goal of this module is to provide a fundamental understanding of various aspects of molecular, nanoscale and continuum (macroscopic) scale characterization that are essential for the study of nanostructures.

Nanoscience: fundamentals and applications (5 ECTS)

This module will discuss the fundamentals of physics on the nanoscale, including (amongst other) topics as free and confined electrons, band theory, tunnel junctions, single electron tunneling, electronic structure of quantum dots, quantum wires and quantum wells and their transport properties.

Nano-electronics (5 ECTS)

In this module the items semi-conductor nano-electronic devices, spin-tronics and molecular electronics will be studied. Furthermore different topics such as light detection in nano-structures, optics in nano-size structures, and optics in periodic nano-structures will be discussed.

Nano-optics (5 ECTS)

Different topics such as light detection in nano-structures, optics in nano-size structures and optics in periodic nano-structures will be discussed.

Bionanotechnology (5 ECTS)

Bionanotechnology is a field of research and applications that sits at the interface between nanotechnology on one hand and life sciences on the other. This module provides you an introduction into this field, some basics in nanobiology, the methods and techniques used and some applications in the field of bionanotechnology.

Nanofluidics (5 ECTS)

After an introduction into nano-fluidics different topics are discussed such as:

- liquid structure near solid-liquid interfaces (interactions, adsorption/desorption)
- hydrodynamics at small scales (laminar flow, slip versus no-slip, mixing)
- 3-phase systems (capillary forces, wetting, superhydrophobicity)
- electro kinetic effects (electro-osmotic pumping, electro-viscous effect)
- electrophoresis and separation techniques
- colloids

MORE INFORMATION

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UNIVERSITY OF TWENTE STUDY INFORMATION DESK

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7500 AE ENSCHEDE
THE NETHERLANDS

PHONE +31 53 489 5489
E-MAIL: MASTER@UTWENTE.NL
WWW.GRADUATE.UTWENTE.NL

ADMISSION AND ENROLMENT PROCEDURE

The organization aims at an enrolment of 10-20 students per year. This programme is open to students with a bachelor's degree in a lot of disciplines in sciences and applied sciences, including chemistry, physics, electrical and mechanical engineering, materials science and biology. Because of the anticipated diversity of the group backgrounds, emphasis in teaching is on individual coaching. The master's programme is research oriented and this requires excellent students and therefore selection is based on undergraduate study results, motivation, and (if possible) an interview.

In order to enroll you have to provide the following documents:

- An application form fully completed, which is available at the graduate site (www.graduate.utwente.nl);
- A curriculum vitae;
- If English is not your first language, a document stating you have a minimum score of 6.5 in an IELTS or 90 in a TOEFL-iBT English language test.
- A summary of bachelor's courses in English, preferably with indication of books used, etc.
- A certified copy of relevant qualifications, together with an English translation by a certified translator and a list of marks (can be delivered at a later stage).

FINANCIAL SITUATION

Students must be enrolled in the University of Twente postgraduate programme. For Dutch students and students from other European Economic Area (EEA) countries, the student fees are subsidized by the Dutch government and are €1,713 per year. Non-EEA citizens are not subsidized and the fees are €12,500. Several grants and scholarships are available for students who study at the University of Twente. Further information about this can be found on our website www.graduate.utwente.nl. For international students who intend to continue their MSc studies with a (salary paid) PhD position, the University of Twente offers a limited number of scholarships, that partially cover living expenses and tuition fees. For students from EEA countries, scholarships are available through the general Dutch scholarship system. More information, please visit www.duo.nl and click on the link for international visitors.

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MORE INFORMATION

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