LUND UNIVERSITY

LTH
FACULTY OF ENGINEERING

PROGRAMME SYLLABUS

Master's Programme in Nanoscience

- Programme code: TANAV
- Scope: 120 credits
- Cycle: Second
- Approved by: Programme Board N
- Validity: 2022/2023
- Date of approval: 21 February 2022

In addition to the syllabus, general regulations and information for the Faculty of Engineering apply to this programme.

1 Aim and outcomes

1.1 Aim

The internationally oriented master's program aims to educate students that can be active in nanoscience research and development at universities and in industry, and who also have the knowledge and insight needed to include new nanoscience knowledge in more traditional applications. The main focus of the program is nanophysics with a basis in materials science and with applications in electronics, optoelectronics and biophysics. Characteristic of the strongly research-based education is the emphasis on the interdisciplinary connections and applications of nanoscience.

1.2 Outcomes for a Degree of Master of Science (120 credits)

(Higher Education Ordinance 1993:100)

Knowledge and understanding

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information,
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work,
- demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work,
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and

- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

1.3 Specific outcomes for a Degree of Master of Science (120 credits)

After completing the program, the student shall

- demonstrate knowledge of the scientific and empirical basis of nanotechnology,
- demonstrate both broad knowledge in nanotechnology as well as substantially in-depth knowledge of any of its applications,
- demonstrate in-depth knowledge of methods for the production, characterization and physical modelling of nanostructured semiconductor materials and the possibilities and limitations of these materials in various applications,
- demonstrate the ability to model, simulate and evaluate materials and physical phenomena for technical applications.

1.4 Further studies

On completion of the second-cycle degree, students have basic eligibility for third-cycle studies.

2 Programme structure

The first semester, the students study a compulsory set of courses comprising 30 credits. The purpose of these courses is partly to provide a common platform for the following studies and partly to strengthen the coherence between the new students. These courses introduce processing and analysis techniques of special importance for nanostructures and provide a quantum mechanical basis for nanophysics. One of the courses also includes a student project in one of the research groups within NanoLund. The student projects are presented at a joint symposium and are therefore helpful in choosing a specialization. The student projects also fulfil the purpose of already the first semester provide the students with a strong connection to a research environment at LTH.

The second and third semesters, the students choose elective courses to form a specialization. The elective courses that are available are listed in the timetable. The specialization is concluded with a degree project worth 30 credits.

2.1 Courses

The courses included in the programme are indicated in the timetable. Students may also be allowed to attend PhD courses that fit into the master's programme. In addition to these courses, students are entitled to accreditation of 7.5 credits of courses in Swedish (organised by Lund University for exchange students).

3 Specific admission requirements

3.1 Admission requirements

A Bachelor’s degree in science or engineering. Completed courses of at least 40 credits/ECTS in physics and 30 credits/ECTS in mathematics, covering quantum mechanics, electromagnetism, solid-state physics, multi-dimensional calculus, linear algebra and Fourier analysis. English 6.

4 Degree

4.1 Degree requirements

For a Degree of Master of Science (120 credits) students must successfully complete courses comprising 120 credits, including a degree project worth 30 credits. 90 credits must be second-cycle credits and 60 credits of those must be in the main field of study, including the degree project.

4.1.1 Degree project

The degree projects included in the programme are listed in the timetable.

4.1.2 Transitional provisions

The transitional provisions apply when there are no more re-examination opportunities for discontinued compulsory curses and when a student has not attended one or more of the compulsory courses in his or her curriculum. In cases when replacement courses are worth less credits than the courses replaced students are to select optional courses for the remaining credits. The following transitional provisions have been established:

FFFF10 Processing and Device Technology
was offered for the last time in the Academic Year 2021/2022 and is replaced by FFFF11 Processing and Device Technology.

4.2 Degree and degree certificate

When students have completed all the degree requirements, they are entitled to apply for a certificate for a Degree of Master of Science (120 credits). Main Field of Study: Nanoscience.