



## **General syllabus for third-cycle studies in Technology and Society TETOSF00**

The syllabus was approved by the Board of the Faculty of Engineering/LTH on 16 December 2019 (reg. no. U 2019/492).

### **1. Subject description**

The third-cycle subject Technology and Society encompasses multidisciplinary and interdisciplinary studies of technology's role, interplay and importance in different sectors of society. The subject takes a broad approach to this relation: technology may mean a number of technologies, including road systems and road construction, environmental and energy systems, and property and information technology; society involves a large number of perspectives including those of economics, political science, law and sociology, which in turn can affect, or be affected by, technological development and technological needs. The fields of study may be roads and road-users, energy systems, renewable energy sources, environment and sustainability, social planning, property and housing, digitalisation and artificial intelligence, as well as markets, organisational designs, policy and the individual's role and place in relation to these fields. The research entails both qualitative and quantitative studies, and is often characterised by diverse methods and theories from the technological perspective, social science and science.

### **2. Objective of third-cycle studies at LTH**

The Board of LTH established the following objective for third-cycle studies on 15 February 2007.

The overall objective of third-cycle studies at LTH is to contribute to social development and prosperity by meeting the needs of business and industry, academia and wider society for staff with third-cycle qualifications. LTH shall primarily provide education leading to a PhD or licentiate in the fields of LTH's professional degrees. The programmes are first and foremost intended for the further training of engineers and architects. The programmes are designed to encourage personal development and the individual's unique qualities.

Third-cycle graduates from LTH shall demonstrate:

- proficiency in research theories and methods and in a critical, scientific approach
- both breadth and depth of knowledge within the subject of his or her third-cycle studies

The programmes aim to develop:

- creativity and independence with the ability to formulate advanced research issues, solve problems and plan, carry out and evaluate projects within a set time frame
- openness to change
- personal networks, both national and international
- social skills and communication skills
- teaching ability
- innovation skills, leadership and entrepreneurship

In order to enable students to achieve these skills and abilities, LTH provides:

- high-quality supervision and good conditions for study in a creative environment
- a good balance between basic and applied research, with openness to wider society
- a range of advanced third-cycle courses at both departmental and faculty level
- a good balance between courses and thesis work
- opportunities to present research findings at national and international conferences and in internationally recognised journals, or by another equivalent method which leads to wide exposure and circulation
- opportunities to spend time in international research environments for short or extended periods

### 3. Learning outcomes for third-cycle studies

The learning outcomes for third-cycle studies are given in the Higher Education Ordinance.

#### 3.1 Licentiate

##### *Knowledge and understanding*

For a Licentiate the third-cycle student shall:

- demonstrate knowledge and understanding in the field of research including current specialist knowledge in a limited area of this field as well as specialised knowledge of research methodology in general and the methods of the specific field of research in particular

##### *Competence and skills*

For a Licentiate the third-cycle student shall:

- demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge as well as to evaluate this work

- demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and society in general
- demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity

*Judgement and approach*

For a Licentiate the third-cycle student shall:

- demonstrate the ability to make assessments of ethical aspects of his or her own research
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

### **3.2 Doctor of Philosophy**

*Knowledge and understanding*

For the degree of Doctor of Philosophy the third-cycle student shall:

- demonstrate broad knowledge and systematic understanding of the research field as well as advanced and up-to-date specialised knowledge in a limited area of this field
- demonstrate familiarity with research methodology in general and the methods of the specific field of research in particular

*Competence and skills*

For the degree of Doctor of Philosophy the third-cycle student shall:

- demonstrate the capacity for scholarly analysis and synthesis as well to review and assess new and complex phenomena, issues and situations autonomously and critically
- demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work
- demonstrate through a thesis the ability to make a significant contribution to the formation of knowledge through his or her own research
- demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general
- demonstrate the ability to identify the need for further knowledge
- demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity

*Judgement and approach*

For the degree of Doctor of Philosophy the third-cycle student shall:

- demonstrate intellectual autonomy and disciplinary rectitude as well as the ability to make assessments of research ethics

- demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used

## 4. General and specific admission requirements

### 4.1 General admission requirements

A person meets the general admission requirements for third-cycle courses and study programmes if he or she:

1. has been awarded a second-cycle qualification, or
2. has satisfied the requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second cycle, or
3. has acquired substantially equivalent knowledge in some other way in Sweden or abroad.

The higher education institution may permit an exemption from the general entry requirements for an individual applicant, if there are special grounds.

### 4.2 Specific admission requirements

The specific admission requirements include a specification of the 240 credits that fulfil the general admission requirements.

A person meets the specific admission requirements if he or she has:

- at least 30 credits awarded in the second cycle relevant to the subject area.

Finally, the student must be judged to have the potential to complete the programme.

Exemptions from the admission requirements may be granted by the dean of LTH.

## 5. Selection

Selection for third-cycle studies is based on the student's potential to profit from such studies.

The assessment of potential in accordance with the first paragraph is made primarily on the basis of academic results from the first and second cycle. Special attention is paid to the following:

1. Knowledge and skills relevant to the thesis project and the subject of study. These may be demonstrated through documents appended to the application and at a possible interview.
2. An assessment of ability to work independently and to formulate and tackle research problems. The assessment could be made on the basis of the student's degree project and a discussion of this at a possible interview.
3. Written and oral communication skills, not least in making research-based knowledge available to a wider audience, public debate, legislators or in industrial collaborations.
4. Other experience relevant to the third-cycle studies, e.g. professional experience

## 6. Degree requirements

Third-cycle studies lead to a PhD or, if the student wishes or if it has been specified in the decision on admission, to a licentiate. The student also has the right to complete a licentiate as a stage in his or her third-cycle studies, but is not obliged to do so.

The requirements for a licentiate are

- passed courses of *at least 30 credits*, and
- a passed thesis of a scope corresponding to studies of *at least 75 credits*

The thesis and courses shall comprise at least 120 credits in total.

The requirements for a PhD are

- passed courses of *at least 60 credits*, and
- a passed thesis of a scope corresponding to studies of *at least 150 credits*

The thesis and courses shall comprise at least 240 credits in total.

### 6.1 Degrees awarded

The programme can lead to the following degrees:

*Teknologie licentiatexamen*/Licentiate in Engineering

*Teknologie doktorsexamen*/Doctor of Philosophy in Engineering

or:

*Filosofie licentiatexamen*/Licentiate of Philosophy

*Filosofie doktorsexamen*/Doctor of Philosophy

## 7. Course component

The programme is to include courses. For each course, an examiner shall be appointed at the department that delivers the course. The examiner shall draw up a written syllabus which states the course title in Swedish and English, the learning outcomes of the course, the course content and the number of credits.

The individual study plan is to include details of which courses the individual student shall or may include in his or her studies and how many credits for each

course may be included in the degree. Courses taken at other faculties or higher education institutions may also be included in the study plan.

A considerable proportion of the courses (at least 30 credits for the PhD and at least 15 credits for the licentiate) should provide broad research methodology, a theoretical overview as well as a good foundation for the whole subject area. The courses thus cover the most important sub-areas within the third-cycle subject, as well as relevant areas for the individual's research and prior knowledge. As far as possible, these courses should be taken at the beginning of third-cycle studies.

The mix of courses may, and should, also include those given by other departments at Lund University or other higher education institutions. Given the subject's multidisciplinary nature, cooperation over discipline boundaries is particularly encouraged.

It is compulsory to participate in and pass the course Introductory Workshop for Newly Admitted PhD Students at LTH (*Introduktionskurs för nyantagna doktorander vid LTH*) GEM056F or the equivalent.

### **7.1 Licentiate**

For a degree of licentiate, 15 credits of the course component should be basic courses in areas such as research methodology, theory of science, project management and presentation techniques. An individual study plan, with an appropriate balance between basic courses and subject-specific and thesis-specific courses, is to be drawn up in consultation with the student, taking into consideration their prior knowledge and the focus of their research.

### **7.2 Doctor of Philosophy**

For a degree of Doctor of Philosophy, 30 credits of the course component should be basic courses in areas such as research methodology, theory of science, project management and presentation techniques. An individual study plan, with an appropriate balance between basic courses and subject-specific and thesis-specific courses, is to be drawn up in consultation with the student, taking into consideration their prior knowledge and the focus of their research.

## **8. Thesis**

The programme shall include a research project documented in a licentiate or doctoral thesis. The thesis is to be presented either as a unified, coherent scientific treatise (monograph) or as a summary (kappa) of scientific papers that have been written by the student alone or with one or more co-authors (compilation thesis). The structure and content of the summary should follow the tradition that applies within the field that the thesis primarily addresses. The choice of thesis subject is made in consultation with the supervisor or supervisors and the research work is also carried out in consultation with the supervisor or supervisors.

An individual study plan shall be drawn up for each doctoral student. This plan shall contain the undertakings made by the doctoral student and the higher education institution and a timetable for the doctoral student's study programme.

Through discussions with the supervisor or supervisors, the doctoral student is offered regular opportunities to have his or her thesis project discussed at seminars or the equivalent, which, for example, may include start up, midway and final seminars. Conducting a midway seminar is particularly recommended if the doctoral student is not presenting a licentiate thesis. The seminars should, if the supervisor or supervisors and doctoral student consider it appropriate, be open seminars.

### **8.1 Licentiate thesis**

The licentiate thesis is presented orally at a public seminar. The head of department decides on the date for, and announcement of, the licentiate seminar. The announcement is to be published at least three weeks in advance and is to contain information on the doctoral student's name, the third-cycle subject, thesis title and number of credits, examiner, critical reviewer, and the time and place of the seminar. The thesis is to be made available prior to the announcement.

There is to be a critical reviewer at the seminar. The critical reviewer is to hold a PhD and not be employed at the faculty department in question, unless there are special grounds.

The licentiate thesis is graded by a member of the teaching staff (examiner) assigned by the head of department. A supervisor is not to be appointed as an examiner.

### **8.2 PhD thesis**

The thesis shall be defended in a public defence and the grade determined by an examining committee, which is appointed specifically for each thesis. Normally, the examining committee should have three members. In cases where it will make an all-round assessment of the thesis easier, there is an option to appoint five members, but this should only be used in special cases. The multidisciplinary and interdisciplinary nature of the third-cycle subject Technology and Society is to be taken into consideration when selecting the examining committee, with special consideration taken for the specific focus of the thesis.

A supervisor is not to be a member of the examining committee. The Higher Education Ordinance states that at least one of those participating in the grading of a doctoral thesis shall be someone who does not have a post at the higher education institution awarding the degree. At least one substitute is to be appointed for those occasions when a member of the examining committee is unexpectedly unable to attend.

In this connection, it is to be ensured that the composition of the examining committee is to fulfil the stated requirements even when a regular member is substituted. It should be an aim that the examining committee is composed of both men and women.

It is recommended that at least two members have the qualifications of an associate professor or the equivalent.

## 9. Other provisions

Given the subject's multidisciplinary and interdisciplinary nature as well as social relevance, collaboration is encouraged across departmental, faculty and university boundaries. This applies not least to the choice of supervisors. Even though the principal supervisor should be affiliated to, and based mainly at, the department, one or more assistant supervisors may be based at another department, adapted to the specific needs of the thesis subject.