



General syllabus for third-cycle studies in Environmental and Energy Systems Studies TEFMIF00

The syllabus was approved by the Board of the Faculty of Engineering/LTH 24 September 2007 and most recently amended 12 March 2019 (reg. no U 2019/104).

1. Subject description

The subject comprises studies of the interchange between energy, the environment, natural resources, technology, economy and society. A special emphasis is placed on intervention strategies to prevent and solve environmental problems. Research methods are interdisciplinary in design and, when fit for the purpose, systems-analytical.

A key research field concerns efficient energy systems that prevent harmful impact on the environment in the long term. Inquiries are made into the efficient use and conversion of energy involving the whole energy chain from natural resource to energy service, into environmental impact of the use of different forms of energy and renewable resources, into factors promoting or preventing changes to the energy system, and into intervention strategies for managing and preventing problems of energy systems associated with the environment, safety and development. The research is concerned with advanced technology assessment including analyses of technical, economic and institutional contexts.

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, and
- 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

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. Ordinance (2010:1064).

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

- a specialised project of at least 30 second-cycle credits of relevance to the field

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

Exemptions from the admission requirements may be granted by the Board 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
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 90 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 180 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.

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

The courses are to address the most important aspects of the research subject and areas of relevance to the individual student's research. The course component can be designed in accordance with each student's prior knowledge and specialisation.

The courses are assessed on the basis of oral or written exams or reports at special seminars. The grades awarded for assessed components are Pass and Fail.

7.1 Licentiate

The course component is to comprise at least 30 credits and is normally divided into:

- an introductory course aimed at providing the student with general knowledge of the research subject (7.5-15 credits) and suitable courses on research methods
- other third-cycle courses (15-22.5 credits)

An individual study plan based on the individual student's prior knowledge and specialisation and on the framework stated above is to be drawn up in consultation with the student.

7.2 Doctor of Philosophy

The course component is to comprise at least 60 credits and is normally divided into:

- an introductory course or project aimed at providing the student with general knowledge of the research subject (7.5-15 credits) and suitable courses on research methods
- other third-cycle courses (45–52.5 credits)

An individual study plan based on the individual student's prior knowledge and specialisation and on the framework stated above is to be drawn up in consultation with the student.

8. Thesis

The programme shall include a research project documented in a licentiate or doctoral thesis. The thesis is to be designed as a unified research study (monograph) or as a summary of research papers written individually by the student or jointly with someone else (compilation thesis).

The student is to start on the research project as soon as possible after admission. It is to be pursued in parallel with course studies. The research topic is to be determined in consultation with the supervisor and examiner and the research project is to be carried out in close consultation with supervisor and examiner.

8.1 Licentiate thesis

Students aiming for a degree of licentiate are to write a thesis based on research. It is to correspond to at least 90 credits and be of a quality that satisfies the requirements for publication in academic journals or comparable publications. The thesis is to be presented at a public seminar. A reviewer is invited to the seminar specifically to review and discuss the thesis. The thesis must be available for scrutiny three weeks ahead of the assessment. The grade (Pass or Fail) is determined by the examiner. The examiner is appointed by the head of department.

8.2 PhD thesis

The grade for the PhD thesis is determined by an examining committee which is appointed specially for each thesis. The thesis is to correspond to at least 180 credits and is to be of a quality that satisfies the requirements for publication in academic journals or comparable publications.

The thesis is awarded one of the grades Pass or Fail. The grading is to take into account both the thesis content and the public defence. A thesis written jointly by two or more people may be approved as a PhD thesis if the individual contributions of the authors can be discerned. In the case of compilation theses, papers written jointly with someone else may be considered if the individual student's contribution can be discerned.

9. Other rules and regulations

Students on third-cycle programmes are entitled to supervision for a period of four years of full-time study or the equivalent for part-time study. The supervisors within the subject at the department are jointly responsible for the supervision of doctoral students in the subject.

Each student is to be supervised by one principal supervisor and at least one assistant supervisor. The supervisor is to be appointed in consultation with the student at the time of his or her admission to third-cycle studies.

In other respects, the rules and regulations for third-cycle studies approved at LTH apply.

10. Transitional provision

Already admitted PhD students may choose whether to refer to the new system to calculate credits for their doctoral dissertation. This applies to doctoral students who are admitted before the approval of the revision of the general study plan.

For doctoral students with an admission date of 1 January 2019 or later, it is compulsory to participate in and pass the course Introductory Workshop for Newly Admitted Doctoral Students at LTH (*Introduktionskurs för nyantagna doktorander vid LTH*) GEM056F or the equivalent in order to fulfil the requirements for the degree.