LUND UNIVERSITY

LTH
FACULTY OF ENGINEERING

Reg. No.
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Quality Support, LTH

General syllabus for third-cycle studies in Chemistry TEKEMF00

The syllabus was approved by the Board of the Faculty of Engineering/LTH on 15 June 2026 and applies to doctoral students admitted from 1 July 2026 (Reg. No. U 2025/857).

1. Subject description

Chemistry is the branch of science that studies matter, its synthesis, composition, behaviour, structure, and properties, as well as the changes it undergoes during chemical reactions.

The field encompasses research within both traditional chemical disciplines and newer, as well as interdisciplinary areas. Research may be based on theoretical and/or experimental methodologies, or combinations of the two. It may also involve the development of new methods for synthesis/analysis/computation/characterization — methods that are central to chemistry, but which also serve as important tools in other scientific fields such as biology, physics, materials science, and medicine. Research may be fundamental or applied in nature, or a combination of both.

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

Midway Review

As an intermediate milestone in the doctoral programme, a compulsory mid-term seminar must be held after two years of effective study. The mid-term seminar is mandatory for all doctoral students whose studies are intended to lead to a doctoral degree, but may, at the student's request, be replaced by a seminar for the licentiate degree.

In connection with this, a midway review is carried out with the purpose of assessing the student's education in relation to the learning outcomes set out in the Higher Education Ordinance. This applies to all doctoral students whose studies are to be completed with a doctoral degree.

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:

- has been awarded a second-cycle qualification
- has satisfied the requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second cycle, or

- 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).

4.2 Specific admission requirements

The specific entry requirement of 120 credits (courses, or a combination of courses and degree project) is defined by the research orientation of the project. This typically means courses in chemistry, but may also include courses with substantial content in, for example, molecular sciences, mathematics, life sciences, materials science, or physics.

The specific qualification may also have been obtained through other equivalent education, which is assessed on a case-by-case basis.

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 mere fact that an applicant may be able to have previous studies or professional experience credited towards the programme must not, in itself, give that applicant priority over others.

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:

- 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.

- 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.
- Written and oral communication skills
- Other experience relevant to the third-cycle studies, e.g. professional experience.

Applicants who appear well suited for the programme should, where possible, be invited to an interview.

In the recruitment and selection of doctoral students, diversity and gender balance must always be taken into account in accordance with Lund University's gender equality policy, equal treatment policy, and diversity plan. When qualifications are otherwise equivalent, applicants from under-represented genders shall be given priority, unless there are particular reasons to do otherwise.

There must also be a clear alignment between the applicant's research interests and the department's ability to provide appropriate supervision.

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.

As part of the doctoral education, students are expected to participate in scientific discussion, for example by actively taking part in departmental research seminars and by attending and presenting their research at academic meetings, preferably international ones.

The requirements for a licentiate are

- passed courses of 30 credits, and
- a passed thesis of a scope corresponding to studies of 90 credits

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

The requirements for a PhD are
- passed courses of 60 credits, and
- a passed thesis of a scope corresponding to studies of 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.

Specialised courses relevant to the research orientation must amount to at least 30 credits at doctoral level (or equivalent) for the doctoral degree, and at least 10 credits for the licentiate degree.

Mandatory courses and other credit-bearing components for the doctoral degree

- Introductory course at the department
- Work Environment, Environmental Considerations and Risks (2 credits)
- Introductory Workshop for Newly Admitted PhD Students at LTH (GEM056F) or equivalent
- Participation in and completion of the course Research Ethics (GEM090F) or equivalent
- Scientific Communication (1 credit)

Doctoral students who teach must undertake introductory training in teaching and learning in higher education in accordance with LTH's guidelines.

Mandatory courses and other credit-bearing components for the licentiate degree

- Introductory course at the department
- Work Environment, Environmental Considerations and Risks (2 credits)
- Introductory Workshop for Newly Admitted PhD Students at LTH (GEM056F) or equivalent
- Participation in and completion of the course Research Ethics (GEM090F) or equivalent

8. Thesis

The programme shall include a research project documented in a licentiate or doctoral thesis.

8.1 Licentiate thesis

The thesis should normally correspond to work equivalent to one or several (1–3) scientific papers of a quality meeting the standards for publication in recognised peer-reviewed scientific journals. The thesis must clearly state the author's contribution to any work with multiple

co-authors. An introductory chapter providing an overarching account of the research must precede the compilation section.

The thesis must be presented by the author at a public seminar announced at least three weeks in advance. During this period, the thesis must be available for scrutiny. A specially appointed reviewer shall be engaged to further illuminate the content of the thesis at the seminar. The grade (pass or fail) is determined by an examiner.

8.2 PhD thesis

The doctoral thesis may be submitted either as a compilation thesis or as a monograph. For compilation theses, the doctoral student's contribution to any co-authored work must be clearly stated. The thesis should also report any additional work in which the candidate has participated during their period of study. An introductory chapter providing an overarching account of the research must precede the compilation section.

The scientific papers included must be of a quality meeting the standards for publication in recognised peer-reviewed scientific journals.

The doctoral thesis must be defended at a public defence.

9. Other rules and regulations

Doctoral students admitted under the following general study plans — Biophysical Chemistry (TEKFKF05), Materials Chemistry (TEKMKF00), Organic Chemistry (TEKOKF00), Polymer Technology (TEKPOF00), and Pure and Applied Biochemistry (TEKBKF00) — may apply to transfer to TEKEMF00.

10. Transitional provisions

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.

For doctoral students admitted on or after 1 January 2021, it is compulsory to attend and earn a Pass grade on the course Research Ethics, GEM090F.

The midway review is compulsory for doctoral students admitted on or after 1 January 2019.