Faculty of Science
Faculty board

General programme syllabus for third-cycle studies in Environmental Science, MNMILJ02

The programme syllabus was approved by the Faculty Board on 13 June 2018 and is valid for admissions to third-cycle studies from that date onwards.

The programme syllabus is based on Chapter 6, Sections 1–11, 25–36 and Chapter 7, Sections 34–41 of the Higher Education Ordinance and Annex 2, which is the Qualifications Ordinance.

1. Possible degrees

Studies in accordance with this general programme syllabus can lead to one of the following degrees:

Doctor of Philosophy in Environmental Science / *Filosofie doktorsexamen i miljövetenskap*

Licentiate of Philosophy in Environmental Science / *Filosofie licentiatexamen i miljövetenskap*

The Faculty Board, in consultation with LTH, has decided (NA35 643/2005) that those admitted to third-cycle studies in the Faculty of Science with a Degree of Master of Science in Engineering as grounds for eligibility, can be given the title Doctor of Engineering or Licentiate of Engineering without a special examination.

2. The subject

Environmental science is the scientific study of environmental problems caused by humanity, including climate change. The subject combines the study of human impact on natural processes along with the measures and strategies that can be implemented to prevent, avert or counteract environmental problems and achieve long-term sustainable development. Environmental science research is based on a fundamental understanding of natural processes and how they are affected by human activity and therefore has a broad base in traditional subjects such as biology, chemistry, physics, geology and physical geography. It also includes studies of relevant measures and strategies to address environmental problems. This means that the research is based on an interdisciplinary approach in collaboration across traditional subject borders.

The main fields of research in environmental science are:

- the study of chemical substances' spread, changes and dispersion in air, soil and water, and the consequent effects on people, other organisms, the climate and ecosystems
- the study of humanity's impact on climate and ecosystems, and the consequences for biological diversity and opportunities to sustainably utilise ecosystems for the production of ecosystem services
- the study of environmental and climatic consequences of humanity's utilisation of energy and natural resources, and strategies for long-term sustainable production and consumption
- the study of strategies, evidence-based decision-making, nature-based and technical solutions that prevent environmental and climatic problems from arising, or can be used to address such problems.

Environmental science research concerns both a basic understanding of how environmental problems arise and how to contribute a basis of knowledge for the long-term, sustainable development of society. Research is therefore often carried out in close cooperation with organisations active in society.

Current fields of research are outlined on the Centre for Environmental and Climate Research's website: www.cec.lu.se.

3. Aims and learning outcomes for third-cycle studies

Third-cycle studies are mainly to build on knowledge students have gained from first and second-cycle studies or equivalent knowledge. Third-cycle studies shall, in addition to what is specified for first and second-cycle studies, particularly develop the knowledge and competence needed for independent research.

The environmental science programme aims to educate students to become licentiates and doctors who have the ability to conduct research of high quality and carry out other advanced tasks in higher education, business, and society in which experience of research activities is important.

The overall learning outcomes for third-cycle studies are defined in the Higher Education Ordinance's Annex 2, the Qualifications Ordinance.

3.1. Learning outcomes for the Degree of Doctor

Knowledge and understanding

For the Degree of Doctor the doctoral 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 the doctoral student shall

- demonstrate the capacity for scholarly analysis and synthesis as well as 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 dissertation 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 and
- 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 the doctoral student shall

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

3.2. Learning outcomes for a Degree of Licentiate

Knowledge and understanding

For a Degree of Licentiate the doctoral 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 Degree of Licentiate the doctoral 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, and
– 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 Degree of Licentiate the doctoral 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, and
– demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

4. Entry requirements

To be admitted to third-cycle studies, the applicant is required to fulfil the general and specific entry requirements and is otherwise deemed to have the abilities required to benefit from the study programme.

General entry requirements

To meet the general entry requirements for third-cycle studies the applicant is to have

1. gained a second-cycle (Master's) degree, or
2. completed courses for at least 240 credits, of which 60 are second-cycle credits, or
3. in some other way, either in Sweden or abroad, acquired equivalent knowledge in general.

The head of department may allow exceptions to the general entry requirements in individual cases, if there are particular reasons.

Specific entry requirements

To be eligible for admission to third-cycle studies in Environmental Science, the student is to have completed an independent project (e.g. degree project) in the relevant subject for at least 30 credits, and have good oral and written English language skills.

The specific entry requirements can also be fulfilled through an equivalent programme. This is assessed on a case-by-case basis.

Qualifications other than the applicant's subject-specific competence in environmental science may be taken into consideration in order to enable interdisciplinary initiatives and important specialisations in certain areas.

5. Selection

The selection process involving the applicants who fulfil the requirements is to take into account their ability to benefit from the study programme. However, an applicant who is deemed eligible for credit transfer from a previous study programme or professional experience shall not be given priority over other applicants in the selection process.

The following selection principles are applied:

Study results achieved in courses in the first and second cycles or equivalent level.

The breadth, depth and relevance of courses in the first and second cycles or equivalent level. The quality of a degree project and other independent projects.

Other knowledge or expertise relevant for the chosen line of research.

Applicants considered to be well suited should, if possible, be interviewed.

In the recruitment and selection of students for third-cycle studies, diversity and equal gender distribution must always be considered in accordance with Lund University's gender equality policy, equal opportunities policy and diversity plan. The under-represented gender is to be given precedence in cases where other qualifications are equal, unless there are special reasons to the contrary.

There is also to be a concordance between the student's research interests and the department's capability to provide competent supervision.

6. Degree requirements

Third-cycle studies conclude with a Degree of Doctor or, if the doctoral student so wishes or if it has been stated in the admission decision, a Degree of Licentiate. The doctoral student also has the right, but not the obligation, to take the Degree of Licentiate as a stage in education towards a Degree of Doctor.

A Degree of Doctor comprises 240 credits, whereas a Degree of Licentiate comprises 120 credits.

The award of a Degree of Doctor or Licentiate requires a pass for the academic thesis and passes in courses or other credit-generating components as stated below. The head of department (or person with delegated powers) checks that all formal requirements have been fulfilled and approves the awarding of a Degree of Doctor or Licentiate.

6.1. Doctoral/ licentiate thesis

The studies include a scholarly project documented in a doctoral thesis or a licentiate thesis. This thesis is to be defended at a public defence (Degree of Doctor) or at a public seminar (Degree of Licentiate), in both cases with an external reviewer.

Doctoral thesis

The thesis comprises 180 credits.

The doctoral thesis can be produced either as a *compilation thesis* or as a *monograph*.

A compilation thesis consists of appended copies of a number of scholarly articles or manuscripts as well as a summarising chapter. The articles may be written solely by the doctoral student or together with others, but the summarising chapter is to be written independently by the doctoral student. The scholarly articles are to be of a quality corresponding to that required for publication in recognised research journals (with review procedures) and it must be possible to discern the various authors' contributions to the work involved. The summarising section is to consist of an introduction to the subject area of the thesis, as well as a presentation and discussion of the findings reached in the articles. This presentation and discussion is to be presented in an independent form that is different compared to the articles. Using this approach, the findings that have been reached can be placed in an overall context.

A monograph consists of a coherent report with accounts of the research task, research issues, working methods, analysis, results and discussion.

Licentiate thesis

The thesis comprises of 75–90 credits.

The licentiate thesis can be produced either as a summary of at least one scholarly article (or manuscript) that the doctoral student has written alone or with others, or as a uniform coherent scholarly work (monograph). The scholarly thesis is to be of a quality corresponding to that required for publication in recognised research journals (with review procedures) and it must be possible to discern the various authors' contributions to the work involved. For details about compilation theses and monographs, see the respective sections above.

6.2. Courses and other credit-generating components

In Environmental Science, courses or other credit-generating components for 60 credits are included in a Degree of Doctor and for 30–45 credits in a Degree of Licentiate.

Courses or other credit-generating components included in the studies can be earned within and outside Lund University. For courses or other credit-generating components earned outside the Faculty of Science, the number of transferred credits is decided by the head of department (delegated to the director of studies in Environmental Science). The courses to be included in third-cycle studies shall be specified in the individual study plan.

The following applies for a Degree of Doctor in Environmental Science:

Compulsory courses and other credit-generating components, at least 25.5 credits (22.5 credits excl. basic course in teaching and learning)

- Introductory paper and seminar, 8 credits:
    - Introductory paper (equivalent to 7.5 credits; to be completed within 12 months of admission)
    - CEC seminar at which the introductory paper is presented
- Introductory course for at least 1.5 credits, of which 0.5 credits is comprised of the faculty-wide introductory course for doctoral students
- Basic course in teaching and learning , 3 credits (compulsory for doctoral students who teach)
- Course in research ethics, at least 2 credits
- Interdisciplinarity in environmental research, 3 credits
- Science communication and role in society, 3 credits
- Environmental challenges and the role of environmental science: past and present, 3 credits
- Midway assessment and seminar, 2 credits

Elective courses and other credit-generating components, maximum 34.5 credits

- Broad, specialised and methodology courses in Environmental Science or the subject area of the thesis or other subjects of relevance for the learning outcomes of the programme.
- Active participation in conferences, i.e. participation in which the doctoral student presents their work using posters or oral presentations, can earn 1 credit per conference. The transfer of credits requires active feedback, in the form of a presentation or written summary on the exchanges from the conference. A maximum of 5 credits can be earned from such conference participation during the programme.

The following applies for a Degree of Licentiate in Environmental Science:

Compulsory courses and other credit-generating components, at least 23.5 credits *(20.5* credits *excl. basic course in teaching and learning)*

- Introductory paper and seminar, 8 credits:

    - Introductory paper (equivalent to 7.5 credits; to be completed within 12 months of admission)
    - CEC seminar at which the introductory paper is presented
- Introductory course for at least 1.5 credits, of which 0.5 credits is comprised of the faculty-wide introductory course for third-cycle students
- Basic course in teaching and learning, 3 credits (compulsory for third-cycle students who teach)
- Course in research ethics, at least 2 credits
- Interdisciplinarity in environmental research, 3 credits
- Science communication and role in society, 3 credits
- Environmental science and the role of environmental science: past and present, 3 credits

Elective courses and other credit-generating components, maximum 21.5 credits

- Broad, specialised and methodology courses in Environmental Science or the subject area the thesis project addresses or other subjects of relevance for the learning outcomes of the programme.
- Active participation in conferences, i.e. participation in which the third-cycle student presents their work using posters or oral presentations, can earn 1 credit per conference. The transfer of credits requires active feedback, in the form of a presentation or written summary on the exchanges from the conference. A maximum of 3 credits can be earned from such conference participation during the programme.