

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

General syllabus for doctoral (third-cycle) studies in Quality Technology and Logistics at Luleå University of Technology

Decided by the Chair of TFN 17 August 2021.

1. Subject description

English name: Quality Technology and Logistics

Quality technology and logistics includes principles, working methods, and tools for customer and sustainability-oriented product and process improvement as well as refining, processing, and management of flows. The subject has an industrial base with applications in goods and service production.

2. Programme aim and intended learning outcome

The aim of the doctoral (third-cycle) studies in Quality Technology and Logistics at the University is to give the doctoral student specialized knowledge in Quality Technology and Logistics, in-depth knowledge of different research methods and a good understanding of the challenges related to research and its practical application. The overall objective of the programme is that the doctoral student develops into a critical and autonomous researcher in Quality Technology and Logistics, able to plan and carry out research projects. The doctoral student shall fulfil all the qualitative targets specified in the Higher Education Ordinance as well as in the locally decided qualitative targets, if any (see attached Annex A).

3. Admission requirements and selection

3.1 General entry requirements

An applicant meets the general entry requirements for doctoral (third-cycle) studies if he or she has been awarded a Master's (second-cycle) qualification, has satisfied the requirements for courses comprising at least 240 credits, of which at least 60 second-cycle credits, or has acquired substantially equivalent knowledge in another way, in Sweden or elsewhere (Higher Education Ordinance (2010:1064) Chapter 7 Section 39).

3.2 Specific entry requirements

No particular requirements.

3.3 Selection

In selecting among applicants who meet the requirements, their ability to benefit from the course or the study programme shall be taken into account. However, the fact that an applicant may be credited for previous courses and study programmes or for professional or vocational experience may not alone give the applicant priority over other applicants (Higher Education Ordinance (2010:1064) Chapter 7 Section 41). The University's local guidelines in the Admissions procedure for doctoral (third-cycle) studies must also be applied.

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

The following criteria will be used in the selection of applicants for doctoral (third-cycle) studies in Quality Technology and Logistics:

- The applicants' knowledge in the planned field of the research education,
- Tests during the employment process, and
- Personal qualities that are relevant to education at the third level.
- Good, oral and written communication skills in English.

4. The degree

The doctoral (third-cycle) studies lead to a Degree of Doctor. Within Quality Technology and Logistics, a student admitted to doctoral studies has the right to be awarded a licentiate degree after having completed at least 120 credits of the programme leading to a Degree of Doctor.

4.1 Degree requirements

For a Degree of Doctor, the doctoral student shall

- have been awarded a pass grade for courses of at least 60 credits
- have been awarded a pass grade for a research thesis (doctoral thesis) of at least 165 credits.

The thesis and the courses shall together amount to 240 credits for a Degree of Doctor.

For a Degree of Licentiate, the doctoral student shall

- have been awarded a pass grade for courses of at least 30 credits.
- have been awarded a pass grade for a licentiate thesis of at least 82.5 credits.

The thesis and the courses shall together amount to 120 credits for a Degree of Licentiate.

4.2 Titles of degree

- After the completion of the Degree of Doctor in Quality Technology and Logistics, doctoral student is awarded the title Doctor of Philosophy in Science.
- After the completion of the Degree of Licentiate in Quality Technology and Logistics, the doctoral student is awarded the title Licentiate of Science.

A request of a title of degree other than the stipulated may be submitted in accordance with laid down guidelines.

5. Programme structure and implementation

5.1 Programme scope and structure

The doctoral (third-cycle) programme includes two blocs; courses and thesis work. The programme comprises four years (two years for the licentiate degree). In case the doctoral student has a doctoral studentship and carries out departmental duties to a certain extent (no more than 20% of the whole programme), a corresponding prolonged period may be approved.

5.2 Individual study plan and supervision

An individual study plan outlining the implementation of the studies is drawn up for each doctoral student. The plan is established in consultation with the supervisor and is decided by the Head of Department by delegation of the Vice-Chancellor. The plan is reviewed and revised at least once a year.

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

The Head of Department shall appoint at least two supervisors, one of whom is appointed principal supervisor, for each doctoral student. The person appointed principal supervisor shall have at least qualifications required for appointment as a docent and be employed by the University. A principal supervisor who no longer meets the job requirements may continue as supervisor until the doctoral student completes his or her studies, by an individual agreement with the relevant department. The doctoral student is entitled to supervision during the studies, unless the Vice-Chancellor has decided otherwise in accordance with the Higher Education Ordinance (2010:1064) Chapter 6 Section 30. A doctoral student who so requests may have another supervisor (Higher Education Ordinance (2010:1064) Chapter 6 Section 28). The request does not need a justification.

5.3 Courses

The individual study plan shall specify the courses to be included in the doctoral student's education. The goal attainment is examined according to the examination procedure specified in the course syllabus. Credits may be transferred in accordance with the local guidelines in the Admissions procedure for doctoral (third-cycle) studies.

Courses that are compulsory for studies at the graduate level in Quality Engineering and Logistics include general and university-wide courses within the fields of scientific theory or scientific method comprising at least 7.5 credits, a university pedagogic course equivalent to at least 7.5 credits, and a course aimed at scientific publishing or writing, comprising of at least 7.5 credits. The general and joint university-wide courses thus correspond to at least 22.5 credits.

It is also mandatory to undergo three elective and subject-specific courses from the following options: a course in quality technology with a statistical basis, such as Experimental Methods and Experimental Design, a course with a quantitative basis in logistics, such as Logistic Systems Management and Control, a management-oriented course, such as Quality Management - Theoretical and Conceptual Issues (as well as an environmental orientated course, such as Stakeholder Management and CSR (7.5 credits). Together, the elective courses must comprise at least 17.0 credits and each of these at least 4.0 credits. Other courses may replace the elective courses by agreement with the subject chair.

The above courses provide a broad knowledge base. Other courses are chosen so that a progression is achieved with a focus on the PhD student's specialization, and these courses are specified in the student's individual study plan in consultation with the PhD student's supervisor(s).

Knowledge about gender equality is to be ensured before either the licentiate or the PhD degrees can be awarded. Such knowledge can be obtained through a course or by other means.

The above are requirements for the doctoral degree. The requirements for the licentiate degree are that half of the above courses must be completed with an approved grade. The total course requirements according to paragraph 4 still apply.

5.4 Thesis

The thesis may take the form of either a single coherent work (a monographic thesis) or a compilation comprising a number of scientific articles interrelated by an introductory summary

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

chapter (a compilation thesis). Quality and scope requirements for the research activities do not differ between the two alternatives. The scientific articles or, as appropriate, the monograph must be of such quality that they meet reasonable requirements for publication in a peer-reviewed scientific forum.

The variation in sub-fields of quality technology and logistics is considerable. For example, in some areas, a scientific contribution may require more extensive empirical work than in another, which may, on the other hand, require a greater theoretical/mathematical height. This variation affects both compilation and monograph theses. For compilation theses, the variation is greater still. The tradition of co-authoring works also varies within the subject. The difficulty of publishing in the subject's different journals varies greatly, as does the journal's editorial processes. Taking this variation into account, we can describe the median compilation thesis. Quality technology and logistics require postgraduate courses in a range of 60–75 credits, and thus the dissertation credits range between 165–180. A compilation thesis of the average degree of approximately 165 credits will include a summary and five appended articles. The appended articles could consist of two articles accepted for publication in credible scientific journals and additional contributions such as published conference presentations or submitted but not yet accepted journal articles. A thesis close to the maximum amount of credits needs to be stronger, manifested as three accepted journal entries or equivalent among the appended articles. Single-authored articles are not a requirement but are recommended to demonstrate the doctoral student's ability to write independently. Co-authored journal articles are often initially driven by seniors such as the doctoral student's supervisor. Therefore, it is common for supervisors or other senior researchers to be the first authors of articles early in the doctoral study process. Towards the end of the studies, the doctoral student is expected to be the driving force for co-authored work, visible from the appended works.

A licentiate dissertation cannot be equalled to half a doctoral dissertation since a doctoral study is a learning process, and the ability to publish should increase during the study period. The licentiate cannot be expected to be as skilled in scientific work as the doctor. Nor is it fair to assume that a licentiate dissertation contains half as many accepted journal articles as a doctoral thesis. Many journals have a long process between a submitted manuscript for acceptance, which will influence a licentiate thesis more due to the shorter period. The median licentiate compilation thesis includes an accepted, co-authored journal article and a co-authored conference publication.

The dissertation manuscript must be presented at one or more research seminars or undergo the corresponding examination by the auspices of the department.

The introductory summary chapter shall include a separate section describing the doctoral student's contribution to the articles.

The doctoral thesis shall be defended at a public defence seminar. The grades for the thesis are either 'pass' or 'failed'. When grading the thesis, the content and the defence of thesis shall be taken into account. The grade of a doctoral thesis is decided by an examining committee, appointed anew for each thesis.

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

A doctoral student wanting to be awarded a Degree of Licentiate shall, after consultation with his or her supervisor, request approval from the responsible Head of Department. The doctoral student defends his or her licentiate thesis at a licentiate seminar after which the thesis is graded 'pass' or 'failed'. When grading the thesis, the content and the defence of the thesis is taken into account. An examiner, appointed by the Head of Department, grades the licentiate thesis.

6. Entry into effect and interim regulations

The previous general syllabus will cease to apply for third-cycle students who are admitted to studies at third-cycle level after 2021-08-17.

If agreed between the third-cycle student and the supervisors, the new general syllabus (LTU-2183-2021) may be used as a steering document for a previously admitted third-cycle student. It must be documented in the third-cycle student's individual study plan which general syllabus that applies.

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

ANNEX: QUALITATIVE TARGETS

Qualitative target in accordance with the Higher Education Ordinance (HF)

Degree of Doctor

Knowledge and understanding

For the Degree of Doctor, the doctoral student shall

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

Competence and skills

For the Degree of Doctor, the doctoral student shall

3. 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
4. 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
5. demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research
6. 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
7. demonstrate the ability to identify the need for further knowledge, and
8. 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

9. demonstrate intellectual autonomy and disciplinary rectitude as well as the ability to make assessments of research ethics, and
10. 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.

Research thesis (doctoral thesis)

For the Degree of Doctor, the doctoral student shall have been awarded a pass grade for a research thesis (doctoral thesis) of at least 120 credits.

This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.

Degree of Licentiate

Knowledge and understanding

For a Degree of Licentiate, the doctoral student shall

1. demonstrate knowledge and understanding in the research domain 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

2. 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,
3. 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
4. demonstrate the skills required to participate autonomously in research and development work and to work autonomously in another qualified capacity.

Judgement and approach

For a Degree of Licentiate, the doctoral student shall

5. demonstrate the ability to make assessments of ethical aspects of his or her own research,
6. 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, and
7. demonstrate the ability to identify the need for further knowledge, and take responsibility for his or her ongoing learning.

Thesis

For a Degree of Licentiate, the doctoral student shall have been awarded a pass grade for a research thesis of at least 60 credits.