

General syllabus for the third-cycle programme in Production Technology

Decision-making body	Research and Education Board
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Version	
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1 Subject description

Production Technology within Mechanical Engineering comprises the knowledge and skills required to produce products with specified performance in an environmentally sustainable, efficient, economical and safe manner. The subject is limited to production technology within mechanical engineering as applied in the manufacturing industry.

2 Purpose and intended learning outcomes of the programme

Upon completion of third-cycle studies, the doctoral student shall be well prepared for independent, continued and high-quality research in Production Technology within both academia and industry. The doctoral student shall acquire sound scientific competence within a broad area of Production Technology and be able to communicate research results to the wider community.

The qualification requirements for third-cycle degrees are specified in the Higher Education Ordinance, Annex 2, Qualifications Ordinance.

Degree of doctor

The degree of doctor is awarded after the doctoral student has completed studies corresponding to 240 credits in a third-cycle subject.

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 deep and up-to-date specialist knowledge within a defined area of the field; and
- demonstrate familiarity with scientific methodology in general and with the methods of the specific research field in particular.

Competence and skills

For the degree of doctor, the doctoral student shall:

- demonstrate the capacity for scientific analysis and synthesis and for the independent critical examination and assessment of new and complex phenomena, issues and situations;
- demonstrate the ability critically, independently and creatively, and with scientific rigour, to identify and formulate research questions and to plan and conduct research and other advanced tasks using appropriate methods within predetermined timeframes, as well as to review and evaluate such work;
- demonstrate through a thesis the ability to make a substantial contribution to the development of knowledge through their own research;
- demonstrate the ability, in both national and international contexts, to present and discuss research and research findings with authority, orally and in writing, in dialogue with the academic community and society at large;
- demonstrate the ability to identify the need for further knowledge; and
- demonstrate the capacity to contribute to societal development and support the learning of others both in research and third-cycle education and in other advanced professional contexts.

Judgement and approach

For the degree of doctor, the doctoral student shall:

- demonstrate intellectual independence and scientific integrity, as well as the ability to make ethical research assessments; and
- demonstrate a deep understanding of the possibilities and limitations of science, its role in society and people's responsibility for how it is used.

Degree of licentiate

The degree of licentiate is awarded either after completion of studies corresponding to at least 120 credits in a third-cycle subject, or after completion of at least 120 credits of a programme intended to lead to a doctoral degree. Upon completion of studies leading to a licentiate degree, the doctoral student shall be able to:

Knowledge and understanding

For the degree of licentiate, the doctoral student shall:

- demonstrate knowledge and understanding within the research field, including current specialist knowledge within a defined area of the field and advanced knowledge of scientific methodology in general and of the methods of the specific research field in particular.

Competence and skills

For the degree of licentiate, the doctoral student shall:

- demonstrate the ability critically, independently and creatively, and with scientific rigour, to identify and formulate research questions, plan and conduct a limited research project and other advanced tasks within predetermined timeframes, thereby contributing to the development of knowledge and evaluating such work;
- demonstrate the ability, in both national and international contexts, clearly to present and discuss research and research findings orally and in writing in dialogue with the academic community and society at large; and

- demonstrate the skills required to participate independently in research and development work and to work independently in other qualified professional activities.

Judgement and approach

For the degree of licentiate, the doctoral student shall:

- demonstrate the ability to make ethical research assessments within their own research;
- demonstrate understanding of the possibilities and limitations of science, its role in society and people's responsibility for how it is used; and
- demonstrate the ability to identify their need for additional knowledge and to take responsibility for their own knowledge development.

3 Entry requirements, selection and admission

A person is eligible for admission to third-cycle studies if they meet the requirements for general and specific entry qualifications and are otherwise considered capable of successfully completing the programme.

3.1 General entry requirements

According to the Higher Education Ordinance, general eligibility for third-cycle studies is held by a person who has:

- been awarded a second-cycle qualification;
- completed course requirements of at least 240 higher education credits, of which at least 60 credits are at second-cycle level; or
- acquired substantially equivalent knowledge in some other way, in Sweden or abroad.

The Research and Education Board may grant an exemption from the requirement for general eligibility for an individual applicant if special grounds exist (Higher Education Ordinance, Chapter 7, Section 39).

3.2 Specific entry requirements

Specific eligibility for third-cycle studies in Production Technology is held by applicants whose second-cycle qualification has a relevant specialisation related to the subject. The degree may be in Production Technology or a related field of engineering.

Applicants whose first language is not English, Swedish, Norwegian or Danish must possess the language skills in Swedish or English required for the programme. The requirements are specified in each call for applications.

3.3 Selection and admission

The Admission Regulations of University West govern admission to third-cycle education. Selection among qualified applicants is based on their ability to benefit from the programme. The Research and Education Board decides on admission and determines the assessment criteria to be applied.

The fact that an applicant may be granted credit transfer for previous education or professional experience may not, in itself, give that applicant priority over other applicants.

In addition to the assessment criteria specified in the admission regulations, the following shall normally be considered when assessing applicants' ability to benefit from the programme:

- relevance of previous qualifications, such as first-cycle and second-cycle education or professional experience related to the research subject;
- education and experience in relevant scientific theories and methods;
- the applicant's analytical ability; and
- the applicant's ability to present advanced work orally and in writing.

Examples of evidence for such assessment may include course selections, thesis topics from previous studies, participation as an assistant in research or research-related projects, methodology and analysis sections of degree projects, and subject-related discussions during a personal interview.

In addition to the assessment of application documents, interviews shall always be conducted with the applicant or applicants considered most suitable among the qualified candidates.

4 Programme structure and content

Third-cycle studies in Production Technology leading to a doctoral degree comprise 240 credits, corresponding to four years of full-time study. The programme consists of 60-90 credits of coursework and a doctoral thesis of 150-180 credits.

If the programme is completed with a licentiate degree, it comprises 120 credits, corresponding to two years of full-time study. The programme then consists of 30-45 credits of coursework and a licentiate thesis of 75-90 credits.

4.1 Courses

The doctoral student selects an appropriate combination of courses in consultation with the supervisors. Both breadth and depth of knowledge are sought in the programme. Breadth is primarily achieved through compulsory courses in the subject area, while depth is obtained through specialisation within a narrower field through elective courses. Due to the applied nature of the subject, considerable emphasis is placed on the student's own research work.

Compulsory courses

The subject includes compulsory courses corresponding to 30 credits (listed below). For a licentiate degree, the student must have completed at least 15 of these 30 credits.

- Higher Education Pedagogy for Doctoral Students, 2.5 credits (a common course for all third-cycle programmes at University West)
- Philosophy of Science and Research Ethics, 5 credits (a common course for all third-cycle programmes at University West)
- Scientific Research Methodology, Experimental Design and Publication Techniques, 7.5 credits
- Production Technology, 7.5 credits
- Advanced Industrial Production, 7.5 credits

Elective courses

All other courses included in the degree are elective and are selected in consultation with the supervisors. The range of elective courses offered at University West may be influenced by the wishes of the doctoral students. Elective courses may also be taken at other higher education institutions or as individual courses. Courses at second-cycle level may be credited towards the doctoral programme provided that:

- The principal supervisor proposes which courses may be included in the doctoral education programme.
- Full course credits from Master's and second-cycle courses may be transferred if the student has achieved a minimum grade of 4 (B or equivalent).
- A maximum of 75% of the credits may be transferred for courses graded as Pass or below grade 4 (B or equivalent), rounded to the nearest whole or half credit.

4.2 Individual study plan

Each doctoral student shall have an individual study plan, which must be updated and approved by the Subject Board for Production Technology at least once a year.

4.3 Structure of studies

The normal period of study is two years for a licentiate degree and four years for a doctoral degree. If a doctoral student is admitted to the later part of the programme after completing a licentiate degree, the normal period of study to the doctoral degree is two additional years.

The principal supervisor, together with the other supervisor(s), is responsible for the doctoral student's overall progression in the thesis project. In addition to regular supervision, continuous follow-up discussions shall be held concerning the doctoral student's overall progress.

To ensure a good start to the doctoral project, the doctoral student shall hold a public planning seminar at which the design of the thesis project, research questions, methodological approaches and implementation plan are presented and discussed. This seminar will normally be held within 12 calendar months of admission to third-cycle studies.

At the halfway point of the studies, the doctoral student shall hold a public mid-term seminar, during which the thesis project is presented and discussed/defended in its entirety in support of the student's continued work. The material presented shall include published work, planned manuscripts, ongoing research and continued planning towards the public defence of the thesis.

If the doctoral student wishes to be examined for a licentiate degree, the mid-term seminar is replaced by a public final seminar prior to the licentiate seminar, at which the work as intended for publication in the licentiate thesis (monograph or compilation thesis, including the summary chapter) is presented and discussed.

Prior to the doctoral thesis defence, the doctoral student shall hold a public final seminar, where the thesis work as intended for publication in the doctoral thesis (monograph or compilation thesis, including the summary chapter) is presented and discussed.

The final seminar before the licentiate seminar and the final seminar before the doctoral defence are intended to support the doctoral student through discussion, defence of the work and constructive criticism before completion of the thesis manuscript and formal application for the licentiate seminar or doctoral defence.

5 Thesis, dissertation and degree

Degree of doctor

To be awarded a doctoral degree, the doctoral student must have completed 240 credits, corresponding to four years of full-time study. The national learning outcomes specified in the Higher Education Ordinance must have been achieved through courses, thesis work and other activities specified in the individual study plan. In addition, the doctoral student shall:

- Have had a scientific doctoral thesis approved following oral presentation and defence at a public doctoral defence. The thesis may include material from a previous licentiate thesis. The doctoral thesis may take the form of either a monograph or a compilation thesis. It should normally be written in English and must include a Swedish title and summary.
- For a compilation thesis, it is normally required that at least four papers have been published or are publishable in scientific journals and/or peer-reviewed conferences relevant to the research field. Normally, at least three papers must have been accepted for publication.

The degree title is Doctor of Philosophy in Production Technology.

Licentiate degree

To be awarded a licentiate degree, the doctoral student must have completed 120 credits, corresponding to two years of full-time study. The national learning outcomes specified in the Higher Education Ordinance must have been achieved through courses, the licentiate thesis and other activities specified in the individual study plan. In addition, the doctoral student shall:

- Have had a scientific licentiate thesis approved following oral defence at a public seminar. The thesis may take the form of either a monograph or a compilation thesis. It should normally be written in English and must include a Swedish title and summary.
- For a compilation licentiate thesis, it is normally required that at least two papers have been published or are publishable in scientific journals and/or peer-reviewed conferences relevant to the research field. Normally, at least one paper must have been accepted for publication.

The degree title is: Licentiate of engineering in Production Technology.

5.1 Grading

The grading scale used for doctoral theses, licentiate theses and third-cycle courses is: Pass or Fail.

6 Transitional provisions

Doctoral students who were admitted before this general syllabus entered into force may, following consultation with their principal supervisor and the Subject Board for Production Technology, request to transfer to this syllabus. Any such change shall be documented in the individual study plan.