



GENERAL CURRICULUM FOR EDUCATION AT POST-GRADUATE LEVEL IN

MACHINE ELEMENTS

TFN Chair, 2007-09-10

1 Subject area

Machine Elements comprises the analysis and optimisation of machine components and component systems in order to enhance performance, longevity, energy-efficiency and reliability and to reduce environmental impact. Particular emphasis is placed on issues in the field of tribology.

2 Programme curriculum

Education at post-graduate level in Machine Elements that concludes with a licentiate degree comprises a total of two years' full time study (120 higher education credits) and consists of a study programme that gives 52.5-60 higher education credits and a licentiate thesis that gives 60-67.5 higher education credits.

Education at post-graduate level in History of Technology that concludes with a doctorate comprises a total of four years' full time study (240 higher education credits) and consists of a study programme that gives 82.5-90 higher education credits and a doctoral thesis that gives 150-157.5 higher education credits.

The education comprises four years of full-time study. Studies are preferably pursued within the framework of a post as employed post-graduate with at least 80% of the time reserved for the student's own programme. Teaching and departmental duties are normally included up to a maximum of 20%. The education's composition of research projects and courses are fixed in the post-graduate's individual study programme.

The course component consists partly of broad courses that aim to give the student a sound knowledge of the Machine Elements field and partly of individual courses involving studies of the latest research in the student's own field of research. A number of compulsory and elective courses are listed on the division's website.

The thesis work should in normal cases consist of both experimental and analytical work, Parts of the work for a licentiate thesis may also constitute parts of a doctoral thesis. The quality of those parts included in a licentiate or doctoral thesis shall be such that international publication in journals / conference proceedings subject to peer review is possible.

The research work is communicated to the scientific community and other external parties through article in scientific journals and at scientific conferences and through participation in conferences and collaborative projects.

An individual study programme is drawn up for every post-graduate student (according to a fixed model) where the study programme is specified in detail. The individual study



programme is followed up at least once a year by the post-graduate student and his/her supervisor and is then approved by the head of department, as delegated by the faculty board.

3 Eligibility and selection

3.1 General eligibility requirements

As specified in Section 39 of Chapter 7 of the Higher Education Ordinance and the local guidelines laid down in the Admission Rules for Post-graduate Education at Luleå University of Technology.

3.2 Specific eligibility requirements

A Master of Science degree in Engineering or a Master's Degree in one of the principal areas approved by the Board of the Faculty of Science and Technology.

Very good skills in oral and written communication in English and good skills in oral and written communication in Swedish.

3.3 Selection

As specified in Section 41 of Chapter 7 of the Higher Education Ordinance and the local guidelines laid down in the Admission Rules for Post-graduate Education at Luleå University of Technology.

For selection for education at post-graduate level in Machine Elements the following selection criteria apply:

- Knowledge relevant to the project in question
- The quality of the applicant's degree project
- Personal qualities relevant to education at post-graduate level.

4 Examinations included in the education

The education consists of courses and an academic thesis. Examinations included in post-graduate programmes are graded Pass or Fail. Course and licentiate thesis grades are decided by specially appointed teachers (examiners). Doctoral thesis grades are decided by a specially appointed grading committee.

4.1 Courses

A number of compulsory and elective courses are listed on the division's website. Goal attainment is tested by means of the form of examination specified in the syllabus.

4.1.1 Recognition of prior studies

As specified in the local guidelines laid down in the Admission Rules for Post-graduate Education at Luleå University of Technology.

4.2 Academic thesis

An academic project in the form of a dissertation/thesis in Machine Elements shall be presented as a homogenous, cohesive academic work (monograph) or a brief summary – comprehensive summary – of academic essays (composite thesis) that the post-graduate student has written alone or together with another person or persons.



Thesis manuscripts shall be presented at one or more research seminars or be subjected to equivalent review through the agency of the department.

The licentiate thesis is defended orally at a public licentiate seminar and is graded Pass or Fail. When the thesis is graded both the content of the thesis and the defence of the thesis are taken into consideration. The grade of a licentiate thesis is decided by an examiner appointed by the head of department.

The doctoral thesis is defended orally at a public disputation and is graded Pass or Fail. When the thesis is graded both the content of the thesis and the defence of the thesis are taken into consideration. The grade of a doctoral thesis is decided by a grading committee that is appointed for each thesis.

5 Degree

In Machine Elements, a post-graduate student who has been admitted to a doctorate has the possibility to take a licentiate degree after completing a portion giving at least 120 higher education credits of the education that will be concluded with a doctorate.

5.1 Degree objectives

As specified in the degree description (Higher Education Ordinance, Appendix 2 – Degree Ordinance. See also the appendix below.

A licentiate thesis shall contain at least two articles, of which

- at least two are articles publishable in international journals with a peer review procedure
- at least one has been presented, or will soon be presented, at an international conference.

A doctoral thesis shall contain at least four articles, of which

- at least two are articles that have been accepted for publication in international journals with a peer review procedure
- at least one other that is publishable in international journals
- at least two have been presented, or will soon be presented, at international conferences.

5.2 Degree title

A post-graduate student who takes a licentiate degree in Machine Elements receives the degree title of Licentiate in Technology.

A post-graduate student who takes a doctorate in Machine Elements normally receives the degree title of Doctor of Technology.

Requests for another degree title are made according to established guidelines.

6 Entry into effect and interim regulations



The previous general curriculum will cease to apply for post-graduate students who are admitted to education at post-graduate level after 1 July 2007. Post-graduate students admitted before this date may choose to either follow the previous curriculum or transfer to the present curriculum.



Qualifications ordinance (Higher Education Ordinance, Annex 2) Contents

the qualifications that may be awarded in the third cycles, and the requirements to be fulfilled for the award of each qualification (qualification descriptors).

THIRD-CYCLE QUALIFICATIONS

General qualifications

Degree of Licentiate [Licentiatexamen]

Scope

A Degree of Licentiate is awarded

either after a third-cycle student has completed a study programme of at least 120 credits in a subject in which third-cycle teaching is offered,

or after a third-cycle student has completed one part comprising at least 120 credits of a study programme intended to conclude with the award of a PhD, if a higher education institution decides that a licentiate of this kind may be awarded at the institution.

Outcomes

Knowledge and understanding

For a Degree of 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 Degree of Licentiate the third-cycle student shall have:

- 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 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, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

Thesis

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

Miscellaneous



Specific requirements determined by each higher education institution itself within the parameters of the requirements laid down in this qualification descriptor shall also apply for a Degree of Licentiate with a defined specialisation.

Degree of Doctor

Scope

A Degree of Doctor is awarded after the third-cycle student has completed a study programme of at least 240 credits in a subject in which third-cycle teaching is offered.

Outcomes

Knowledge and understanding

For the Degree of Doctor 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.
- 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 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 third-cycle 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.

Research thesis (doctoral thesis)

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

Miscellaneous

Specific requirements determined by each higher education institution itself within the parameters of the requirements laid down in this qualification descriptor shall also apply for a Degree of Doctor with a defined specialisation. Ordinance (2008:132)

