JÖNKÖPING UNIVERSITY
School of Engineering

General study plan for the third-cycle programmes concerning

Materials and Manufacturing

within the Graduate School of Industrial Product Realisation

Approved by the Board of Education and Research Education (NUF), September 7, 2015

Third-cycle subject area: Materials and manufacturing

Titles of qualifications: Licentiate and Doctor of Philosophy
Licentiate of Science/Doctor of Philosophy in Science (Materials and Manufacturing)

The regulations of the Award of Certain Degrees Licensing Act (1993:792) form the basis of third-cycle courses and study programmes at Jönköping University (JU). The requirements laid down for third-cycle qualifications can be found in the Higher Education Ordinance (1993:100), Appendix 2, System of Qualifications. Also applicable are the degree requirements approved in the general syllabus for third-cycle programmes concerning the subject area and the local regulations education approved by the Board of Education and Research Education (NUF) at JU (*Regulations and guidelines for first, second and third-cycle education at Jönköping University).*

Description of the subject area

The subject area of materials and manufacturing includes a knowledge of how moulded components, primarily cast components, can be manufactured and how the material structures and properties of components can be influenced; a significant element of industrial product realisation. This subject area includes experimental methods for examining phenomena, material characterisation, micro scoping and analysis, and modelling/simulation. The emphasis in this research is on cast materials and processes. This research is interdisciplinary and is supported by disciplines such as fluid dynamics, applied mechanics, solid mechanics, material science, materials technology and chemistry, as well as simulation and optimisation.

Structure of the study programme

The programme length for third-cycle students should normally be two years for a Licentiate and four years for a Doctor of Philosophy. Admissions may be made for Licentiate or Doctor of Philosophy level. The study programme includes a course element and a thesis (see also under the heading Degree requirements). Doctoral students are expected to participate actively in seminars relating to their own third-cycle subject area and within the Graduate School.

Individual study plans will be compiled for each doctoral student. This must be approved by the research education study advisor at the School of Engineering following a proposal from the principal supervisor in consultation with the doctoral student. The doctoral

student and principal supervisor must sign the proposal and be notified of the approval. The individual study plan must include, as a minimum:

- a schedule for the doctoral student's study programme,
- information on how the supervision of the doctoral student is organised,
- a description of the general undertakings of the doctoral student and the school throughout the period of education, and
- other information required to allow the study programme to take place effectively.

During follow-up sessions, the doctoral student and principal supervisor must notify the research education study advisor at the School of Engineering of the progress of the study programme. The research education study advisor must document the results of follow-ups so that it is possible to monitor the development of the doctoral student during his or her period of study.

Supervision

At least two supervisors must be appointed for every doctoral student. At least one of these supervisors must have completed supervision training or have equivalent expertise. One of the supervisors will be appointed principal supervisor, and this person must be qualified as a reader (docent) or professor. The assistant supervisor must hold a Doctor of Philosophy. Following a report by a research leader within the research area in question, the head of research education approves the proposed supervisors in connection with the admission. A decision on an allocated supervisor can be altered on application by a doctoral student or supervisor, or for other reasons. The head of research education also approves the proposal in the event of a change of supervisor. Doctoral students are entitled to supervision for the total time which may be regarded as being necessary for the prescribed study programme of 120 credits or 240 credits respectively.

Courses within the third-cycle programmes

Mandatory courses within the Graduate School of Industrial Product Realisation

There are four mandatory courses within the Graduate School of Industrial Product Realisation, totalling 17 credits.

- Industrial Product Realisation (5 credits)
- Theory of Science and Research Methodology (5 credits)
- Teaching and Learning (4 credits)
- Information Literacy and Scholarly Communication (3 credits)

Courses on the subject area (materials and manufacturing)

In the subject area material and manufacturing three (3) of the following courses are mandatory:

- Casting (7.5 credits)
- Mathematical Modeling of Casting (7.5 credits)
- Metallurgy, Solidification and Modeling of Cast Iron (7.5 credits)
- Light metal (7.5 credits)

Other courses

Other courses can be selected from the range of courses available to doctoral students at Jönköping University or at other higher education institutions. Courses may be teacher-supervised or of literature study type. Courses may also be selected from the range of relevant second-cycle courses and study programmes. Mathematical Modelling, Casting Simulation, Advanced Cast Materials, etc. are examples of courses relevant to the subject area.

A plan of which courses are to be included in the third-cycle programmes will be compiled in consultation between the principal supervisor, the assistant supervisor and the doctoral student and documented in the student's individual study plan.

Entry requirements

For admission to third-cycle programmes, applicants must:
1. meet basic entry requirements and the special entry requirements prescribed for a specific subject area, and
2. be deemed to have the sufficient general ability required to benefit from the study programme.

A person meets the general entry requirements for third-cycle 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.

Besides this minimum level, specific entry requirements are applicable for the subject area, which at the School of Engineering are equivalent to a Master (60 or 120 credits) or a Master of Science in Engineering related to the subject area in question.

In selecting between applicants, their ability to benefit from the programmes will be taken into account.

Degree requirements

After completing the third-cycle programmes, the doctoral student will be well prepared for ongoing independent and high-quality research and teaching in academia or industrial work in which significant elements may comprise research and development. The objective is to educate Licentiates of Science and Doctors of Philosophy in Science, giving them outstanding scientific expertise within a broad range of applications (industrial product realisation) and specialist expertise within their own third-cycle subject area (materials and manufacturing).

To be awarded a Licentiate or Doctor of Philosophy, the Higher Education Ordinance (1993:100), Appendix 2, System of Qualifications requires completion of a study programmes amounting to at least 120 credits within a third-cycle subject area (Licentiate) or completion of a study programmes amounting to at least 240 credits (Doctor of Philosophy) within a third-cycle subject area. To be awarded a Licentiate, the

doctoral student must also have been awarded a pass for a scholarly essay (licentiate thesis) amounting to at least 60 credits; and to be awarded a Doctor of Philosophy, the doctoral student must have been awarded a pass for a scholarly thesis (doctoral thesis) amounting to at least 120 credits.

Degree of Licentiate

120 credits are required to be awarded a Licentiate, of which 30 credits will need to be acquired from the course element and the remaining 90 credits from a licentiate thesis. The mandatory joint courses Industrial Product Realisation, Theory of Science and Research Methodology, and Information Literacy and Scholarly Communication must be completed before a Licentiate can be awarded. The licentiate thesis must be presented verbally in English or Swedish at an open seminar. This essay will be awarded a pass or a fail.

Degree of Doctor of Philosophy

A further 120 credits (totalling 240 credits) are required to be awarded a Doctor of Philosophy, of which 30 credits (totalling 60 credits) will need to be acquired from the course element and the remaining 90 credits (totalling 180 credits) from a doctoral thesis. The thesis must be defended verbally in English or Swedish at a public defence of the doctoral thesis. The thesis will be awarded a pass or a fail. All mandatory courses in the Graduate School and in the subject area must be completed for a Doctor of Philosophy to be awarded.

Testing knowledge

Knowledge may be tested during the third-cycle course of study programmes by means of written or verbal examination or in another appropriate manner.