



Reg. No. 3.1.3-2015/0358

General Syllabus for Computer Science and Engineering at Mälardalen University

Valid for all doctoral students admitted to the third-cycle subject from 17 March 2015 onwards.

Doctoral students admitted before 17 March 2015 have the right to complete their studies up to the public defence of their thesis according to the syllabus that was valid at the time of their admission to the third-cycle study programme. The doctoral student may also choose to follow the new syllabus.

Deciding authority: The Faculty Board

This document is a policy document for the third-cycle subject area and shall be revised/reviewed no later than four years after the latest ratification. The *School of Innovation, Design and Engineering* is responsible for revision.

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Introduction

Pursuant to Chapter 6, Section 25 of the Higher Education Ordinance, HF, (1993:100), the Faculty Board at Mälardalen University (MDH) has established subjects which shall be arranged within third-cycle studies. Each third-cycle subject area shall have a ratified general syllabus in which the main contents of the study programme, specific entry requirements and other regulations necessary shall be stated in accordance with HF Chapter 6, Sections 26 and 27.

The School is responsible for establishing and revising the general syllabuses valid for the third-cycle subject areas for which the School acts as the host School. The Faculty Board ratifies the established or revised general syllabuses for the subjects in which third-cycle studies are arranged at MDH.

Furthermore the local policy document Rules and Regulations for Third-cycle Studies at Mälardalen University (MDH 3.1-382/12) stipulates that the criteria for general entry requirements, description of selection criteria, description of compulsory modules and requirements for thesis work and course demands shall also be stated in the general syllabus for the subject. In addition, recommendations for prior knowledge which do not constitute formal entry requirements, as well as other relevant information, may be given.

Subject description

Research domain

At Mälardalen University the research domain of *Embedded Systems* comprises two third-cycle subject areas: *Computer Science and Engineering* and *Electronics*. These subjects are both necessary and complementary modules for the research domain, which together give a systems perspective within the area.

Third-cycle subject area

The subject of Computer Science and Engineering is a broad subject, comprising the theoretical and empirical studies of computer systems, their construction and applications.

The subject deals with methods and theories for computers and their applications.

Area- and subject-specific qualitative targets

The general objectives of the third-cycle studies regarding knowledge and understanding, aptitudes and accomplishments, as well as the ability to evaluate and assess, are specified in the System of Qualifications (Higher Education Ordinance, Annex 2, SFS 2006:1053).

In addition to the objectives stated in the Higher Education Ordinance, the Faculty Board at Mälardalen University has ratified general objectives according to the Guidelines for Third-cycle Studies.

Furthermore the programme for third-cycle studies in Computer Science and Engineering has the specific objective that the Doctor and Licentiate graduates shall be prepared for a number of different functions, from industrial expertise to academically qualified teachers and researchers.

Programme structure

For each research student an individual study plan shall be established, in which the structure of the study programme is planned in detail in accordance with the instructions in the *Guidelines for Third-cycle Studies*.

Courses

Courses are chosen in consultation the supervisor and documented in the individual study plan. For a licentiate degree a course in research methodology is recommended and for a doctoral degree a course in pedagogy, in addition to research methodology, is recommended.

If the doctoral student wishes to have credits transferred from previous courses, it is for the principal supervisor to take a decision on this.

Entry requirements

General entry requirements

The general entry requirements for admission to third-cycle studies are regulated in the Higher Education Ordinance, Chapter 7, Section 39.

Specific entry requirements

For specific entry requirements for third-cycle studies in Computer Science and Engineering, the doctoral student shall hold a Master's degree (240 HE credits) in Computer Science from MDH, or an equivalent degree from another higher education institution. Students with equivalent prior knowledge may also be admitted.

Selection

Selection among applicants fulfilling the entry requirements is made according to the following assessment criteria:

- relevant prior knowledge,
- the ability to cooperate,
- the capacity of supervisors,
- suitability in relation to accessible funding, and
- an assessment of the ability to complete the study programme within the time stipulated.

The prospective principal supervisor is responsible, with the support of the Supervisor's Council, for making an assessment of the student's knowledge.

Otherwise selection is made according to the principles laid down in the *Guidelines for Third-cycle Studies*.

Examination

Third-cycle studies are concluded with a doctoral degree, or if the student so wishes, a licentiate degree. The student has also the right, but no obligation, to take a licentiate degree as a stage in the third-cycle studies.

In the study programme an academic paper shall be included, documented in a licentiate thesis and/or a doctoral thesis. General guidelines are laid down in the *Guidelines for Third-cycle Studies*.

The paper/thesis shall be written in English and may consist of a compilation thesis or a monograph.

Degree of Licentiate

Guidelines for a Degree of Licentiate are given in the *Guidelines for Third-cycle Studies*.

In addition the following applies for a Degree of Licentiate regarding Computer Science:

- A Pass grade on courses of at least 45 HE credits
- A Pass grade on an academic paper whose scope corresponds to studies of at least 75 HE credits

The licentiate thesis and courses together must correspond to 120 HE credits.

The licentiate thesis shall be examined at a licentiate seminar. Guidelines for the order of the seminar and for the choice of examiner are laid down in the *Guidelines for Third-cycle Studies*.

The licentiate thesis shall be of such a quality that it can be published or presented internationally. It is recommended that parts of or the whole of the thesis have been presented at international conferences or workshops at the time of the review of the licentiate seminar.

Degree of Doctor

Guidelines for a Degree of Doctor are given in the *Guidelines for Third-cycle Studies*.

In addition the following applies for a Degree of Doctor regarding Computer Science and Engineering:

- A Pass grade on courses of at least 75 HE credits.
- A Pass grade on a thesis whose scope corresponds to studies of at least 165 HE credits.

The doctoral thesis and courses together shall correspond to 240 HE credits.

The doctoral thesis shall be defended orally at a public defence proceeding. Guidelines for the order of the proceeding and the constitution of the examining committee are laid down in the *Guidelines for Third-cycle Studies*.

The doctoral thesis shall be of such a quality that it can be published in international journals of good repute. It is recommended that larger parts of the thesis have been accepted for publishing or have been published in scientifically reviewed international conferences or journals at the time of the public defence of the thesis.

Title of degree

The titles of degree that are used for the third cycle subject are Degree of licentiate in Computer Science and Engineering and Degree of Doctor in Philosophy in Computer Science and Engineering.

The local regulations for the titles of a degree are stipulated in the document *Lokal examensordning vid Mälardalens högskola*, MDH 2.1-147/14.

If the given degree title in the doctoral student's first-cycle degree is "filosofie", the doctoral student may apply to the Faculty Board to receive this title in the third-cycle degree too.

Internationalisation

Every research student should participate in at least one international academic conference before the licentiate seminar. Before the doctor's degree the research student should participate in at least one more international conference and there contribute with an individual presentation, poster or other active contribution.

Preview

A preview before the public defence of a doctoral thesis shall normally take place at a seminar held 6-12 months before the planned presentation of the thesis. Furthermore such a preview shall take place as stipulated in the *Guidelines for Third-cycle Studies*.

A preview before a licentiate seminar shall normally take place at a seminar held 6-12 months before the planned licentiate seminar.

Transitional provisions

Doctoral students admitted before 18 February 2015 have the right to complete their studies up to the public defence of their thesis according to the syllabus that was valid at the time of their admission to the third-cycle study programme. The doctoral student may also choose to follow the new syllabus.

Appendix A– Degree of Licentiate

Given below are the degree requirements of the system of qualifications and requirements for fulfilment to obtain a Degree of Licentiate, Appendix 2, HF.

Scope

A Degree of Licentiate is obtained either when the doctoral student has completed a study programme of at least 120 HE credits within a third-cycle subject, or after the doctoral student has completed one part of at least 120 HE credits of a study programme leading to a Degree of Doctor, if the University decides that such a licentiate degree can be awarded at the University.

Outcomes

Knowledge and Understanding

For a Degree of Licentiate the doctoral student shall:

- demonstrate knowledge and understanding within the research domain, inclusive of current specialist knowledge within a limited area of this, as well as a specialised knowledge of research methodology in general and of the specific research domain in particular.

Aptitudes and Accomplishments

For a Degree of Licentiate the doctoral student shall:

- demonstrate the ability to identify and formulate questions with scientific meticulousness, critically, independently and creatively, and to plan and undertake, using adequate methods, a limited research project and other qualified assignments within stipulated time limits and thereby contribute to the development of knowledge as well as to evaluate this work,

- demonstrate the ability, in national as well as international contexts, to clearly present and discuss, orally and in writing, research and research findings in dialogue with the academic community and society in general, and

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

Ability to Evaluate and Assess

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 people for how it is used, and

- demonstrate the ability to identify the personal need for further knowledge and take responsibility for the development of such knowledge.

Academic Paper

For a Degree of Licentiate the doctoral student shall have been awarded a Pass grade for an academic paper of at least 75 HE credits.

Miscellaneous

For the award of a Degree of Licentiate with a defined specialisation, the specific requirements determined by each HEI itself within the parameters of the requirements laid down in this qualification descriptor shall also apply.

Appendix B– Degree of Doctor

Given below are the degree requirements of the system of qualifications and requirements for fulfilment to obtain a Degree of Doctor, Appendix 2, HF.

Scope

A Degree of Doctor is awarded after the doctoral student has completed a study programme of 240 HE credits within a third-cycle subject.

Outcomes

Knowledge and Understanding

For a Degree of Doctor the doctoral student shall:

- demonstrate a broad knowledge within and a systematic understanding of the research domain, as well as in-depth and current specialist knowledge within a limited area of this, and
- demonstrate familiarity with research methodology in general and of the specific research domain in particular.

Aptitudes and Accomplishments

For a Degree of Doctor the doctoral student shall:

- demonstrate the capacity for scientific analysis and synthesis as well as to review and assess new and complex phenomena, questions and situations, independently and critically,
- demonstrate the ability to identify and formulate questions with scientific meticulousness, critically, independently and creatively, and to plan and undertake research and other qualified assignments using adequate methods and within stipulated time limits, and to review and evaluate such work,
- demonstrate through a thesis the ability to make a significant contribution to the development of knowledge through his or her own research,
- demonstrate the ability, in national as well as international contexts, to authoritatively present and discuss, orally and in writing, research and research findings 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 the development of society and to support the learning of others both through research and education as well as in other qualified professional capacities.

Ability to Evaluate and Assess

For a Degree of Doctor the doctoral student shall:

- demonstrate intellectual independence 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 people for how it is used.

Academic Thesis (Doctoral Thesis)

For a Degree of Doctor the doctoral student shall have been awarded a Pass grade for an academic thesis (doctoral thesis) of at least 165 HE credits.

Miscellaneous

For the award of a Degree of Doctor with a defined specialisation, the specific requirements determined by each HEI itself within the parameters of the requirements laid down in this qualification descriptor shall also apply.