Syllabus for Graduate Education in Computer Science and Engineering at Mälardalen university

This syllabus has been established by the faculty board at Mälardalen university (MdH) 2001-02-14.

1. Subject Description

Computer Science and Engineering is a broad discipline that encompasses the theoretical and empirical study of computer systems, their construction, and computing applications. It includes Computer Science and Computer Engineering as subdisciplines.

Computer Science deals with methodologies and theory for computers and their applications: algorithms, complexity, formal semantics, programming and specification languages, software engineering, human-machine interaction, artificial intelligence and others. Computer Engineering often focusses more on system aspects and hardware-oriented topics, like: computer architecture, system-level hardware design, real-time systems and embedded systems, operating systems, databases, and parallel and distributed systems. There is no clear division between Computer Science and Computer Engineering.

The current focus is on the following subtopics:
* real-time and embedded systems,
* computer architecture and system-level hardware design,
* programming and specification languages,
* software engineering, and, to some extent,
* artificial intelligence and interactive systems (human-machine interaction, computer graphics).

Other thesis topics within Computer Science and Engineering are not necessarily excluded.

2. Objectives for the Graduate Education

Besides the objectives given in the Swedish university law (högskolelagen), the faculty board at MdH has decided on goals according to the Handbook of Graduate Studies. The program in Computer Science and Engineering shares these objectives and goals. However, it also has the more specific goal to serve the society with Ph.D's and Licentiates apt for a wide range of functions, ranging from industrial expertise over academically qualified teachership to academic research.

To meet these goals, the graduate education program must offer a variety of possible profiles, and it will be important that some graduated students have other skills besides purely academic research proficiency. For those who aim for an industrial career, the program should give skills in areas like project leadership and insight in industrial problems. Those who aim for careers in teaching should get a deep insight in their teaching topics and pedagogical proficiency. For those who aim for an academic research career, finally, the focus should be on excellence in research.

3. Degree Requirements

The graduate education ends with the doctoral degree (Ph.D.), or, if the student wishes, with the licentiate degree. The student also has the right, but not the obligation, to take the licentiate degree as a step towards the doctoral degree.

For the licentiate degree, the following is required:
* passed courses of at least 30 credits
* passed thesis of at least 40 credits

The thesis and the courses must, together, yield at least 80 credits.

For the doctoral degree, the following is required:
- passed courses of at least 50 credits
- passed thesis of at least 100 credits

The thesis and the courses must, together, yield at least 160 credits.

4. Entry Qualifications

The general rules for eligibility for graduate education are found in the Handbook of Graduate Studies. To be eligible as graduate student in Computer Science and Engineering, the following particular qualifications are required: Bachelor's degree (kandidat, 120p) or Master's degree (magister, 160p) in Computer Engineering or Computer Science from MdH. Students with corresponding qualifications, for instance from similar programs at other universities, may also be admitted.

In addition, it is required that the student has a good grasp of undergraduate level Mathematics, Computer Science, Computer Engineering, and immediately related areas. The indended main advisor is responsible for judging this. In particular, it is important that the knowledge of mathematics is assured since the degrees in Computer Science and Computer Engineering at MdH do not contain any formal requirements on mathematics.

Finally, the student must be judged to have the ability to complete the education with a degree within the stipulated time.

5. Selection

The basic principles for selection of students to graduate education, and who will do the selection, are described in the Handbook of Graduate Studies.

6. Courses

The graduate education must contain courses. Each course must have an examiner at the department giving the course. The examiner must establish a written plan for the course stating objectives, contents and credits. Further information is found in the Handbook of Graduate Studies.

For each student, the individual plan must specify the courses that are mandatory and optional, respectively, together with the number of credits that will be given the student for each course. Courses from other universities may be included.

7. Scientific Work

The education must contain a piece of scientific work documented in a licentiate- or doctoral thesis. The thesis should be written in English. It must be well written. It should contain a clear motivation of the work, an introduction to it understandable also for a non-specialist, give a survey of the literature in the area of research, and describe the contributions to the area in a clear manner while providing enough detail to enable a thorough scrutinization of the work.

General rules are given in the Handbook of Graduate Studies.

The licentiate thesis work should be of the quality that it could be published or presented internationally. It is highly recommended that parts or all of the thesis is presented at least at international conferences or workshops at the time of the thesis defence.

The Ph.D. thesis work should be of the quality that it could be published in an international quality journal. It is highly recommended that parts or all of the thesis is accepted for publication or published in reviewed international conferences or journals at the time of the thesis defence.