Computer Science

Study plan for third-cycle subject

The subject plan was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.

Subject title

Computer Science (Datalogi)

Subject description and programme outcomes

Scientific field

The computer science is the method science for design of software and other representations of calculations. The subject has a practical and a theoretical side.

Among the subareas of the computer science, the following can be mentioned

- development and analysis of fundamental computational algorithms
- analysis and classification of computational problems with respect to complexity
- artificial intelligence
- autonomous systems
- image processing and computer vision
- computational biology and bio-modelling
- computer security and cryptography
- graphical computing and communication human-machine
- Internet and grid technology

- modelling and analysis of computer-based systems
- neuron net modelling, neural calculations
- software engineering, semantics and programming languages
- applications within computational mathematics and computational logic

Description of possible specialisation

1. Computer Science

Specification of how the programme outcomes are to be achieved

Currently, the subject has no specialisations.

Computer Science

Description of the specialisation

Computers become all more common in the everyday life. Within computer science, the issue is which types of calculations that are possible to introduce in computer-based systems.

The issue can be tackled at a basic level where we look for general principles and fundamental borders for what is possible, but also based on a certain family of imagined application fields or be inspired by how living organisms may be functioning.

One of the reasons of study the field is to clarify the preconditions to create sustainable IT infrastructures in the society.

The application fields that are of current interest at KTH are biology, information systems, Internet technology, robot technology, seeing systems and language technology.

Current research

The research activity in computer science at KTH is in general organised in groups, where the parts of the subject that are stated above are studied. Considerable cooperation may exist between the groups and also with external interested parties.

A detailed description of the research in computer science can be found in the current development plan and the latest annual review for the research at the school of computer science and communication. The extent of the activities varies between the fields and also with time.

Programme structure

The education for third-cycle studies can lead to the Degree of Licentiate or Degree of Doctor.

The education, total 120 credits for Degree of Licentiate and 240 credits for Degree of Doctor, consists of coursework and thesis work. The coursework includes 60-90 credits for Degree of Doctor and 40-60 credits for Degree of Licentiate.

The thesis work thus corresponds to 150-180 credits for Degree of Doctor and 60-80 credits for Degree of Licentiate.

At admission, the doctoral student is assigned a principal supervisor and an assistant supervisor.

The assistant supervisor should have the doctoral degree and the principal supervisor should be Docent. They should have connection to KTH, and at least one of them should have KTH as main employer. At least one of the supervisors should have gone through supervisor education or of the faculty board been assessed to have equivalent skills. An individual study plan should be established and updated normally once a year, in consultations between doctoral student and supervisor. The established or revised study plan is established by the Director of Third-Cycle Education (FA) at KTH CSC. The study plan should convincingly show how the aims for the doctoral student's third-cycle studies can be achieved within available time.

Deviations from the stated points may be done if special circumstances apply.

Teaching of courses for third-cycle studies can be given in the form of lectures, seminars, literature courses and project assignments. The courses for each individual doctoral student are established individually in consultation with supervisors and are introduced in the study plan.

Doctoral students should under their education take part in and contribute to the scientific activity that is carried out at the school/KTH by attending seminars and give, normally, one seminar a year about their thesis.

Doctoral students are recommended to devote certain time (a maximum of 20 % of full-time) to teaching in first and second cycle courses. Such actions are financed by the first and second cycle education and should be included in the individual study plan.

Compulsory and recommended courses

In the coursework must be included elements of theory of knowledge and research methodology. In the coursework can also be included courses on teaching and learning in higher education. Such courses are however a requirement only if teaching in first and second cycle courses should take place during the studies.

An essential part of the courses (at least about 30 credits for Degree of Doctor) should be third-cycle courses in computer science and computer systems or correspond to computer science and

engineering courses for the Master of Science in Engineering education in Computer science and engineering. The latter should be second cycle courses. At least 15 of these credits should lie outside the subject of the thesis.

In KTH's local Degree Ordinance for education for third-cycle studies is the level of courses in the coursework regulated: for Degree of Doctor, at least 60% of the credits should be third-cycle courses; for Degree of Licentiate 50%. For none of these higher education qualifications, any first-cycle course within the technology main field of study may be included. If these rules be deviated from, should the causes for this be stated in the individual study plan.

Other courses may be third-cycle courses or second-cycle courses at other programmes than the ones being stated in section 3.1, paragraphs 1 and 2, and in other subjects than computer science. The aim of these can be to give an advanced knowledge within applied computer science subjects and subjects that concern the thesis work, broadening to some application field or other skills, e g languages. Language courses should be at university level (first-cycle or second-cycle) and should not exceed 6 credits. Students admitted according to point 4 in section 3.1 below should choose bridging courses in computer science.

Thesis

The work with the thesis or the licentiate thesis should be started as soon as possible after the third-cycle studies have been started. The subject for the thesis should be chosen in consultation with the subject responsible person and principal supervisor, and should connect to the existing research at the department.

The thesis or the licentiate thesis is a compulsory part of the education for third-cycle studies. The education aims in this part that the student should develop an ability to give independent contributions to the research and also an ability to scientific cooperation, within and outside the own subject. The thesis or the licentiate thesis should contain new research results that the student has developed alone or in collaboration with others. The scientific main results should satisfy the quality requirements for publication in internationally recognised magazines with referee systems. The student's contributions to in the thesis included texts that have several authors should be able to be distinguished.

The thesis or the licentiate thesis should normally be written in English. It can either be designed as a compilation of scientific articles or as a monograph thesis. In the previous case, there should be a dedicated written summary. Irrespective of if the thesis is intended to become a monograph or compilation thesis, international publication of achieved results should be sought during the doctoral studies.

Entry requirements and selection

General and special admission requirements and prior knowledge

Entry requirements for third-cycle studies are that the applicant satisfy both general entry requirements and specific entry requirements and has such ability in other respects that is needed to fulfill the education.

Selection rules and procedures

The selection is made among the applicants that satisfy the entry requirements. At the selection, the grade of the applicant's maturity, ability to independent assessment and critical analysis constitute important aspects. Strong emphasis is placed at learning outcomes in advanced courses or in the form of individual projects such as the degree project.

The programme's degrees and examinations

Degree of Licentiate and Degree of Doctor (PhD)

Degree of Licentiate and Degree of Doctor are to be taken in accordance with KTH's general rules.

These imply for example that the thesis should be examined at public defence of doctoral thesis (Degree of Doctor) or licentiate seminar (Degree of Licentiate).

The programme's examinations

No other compulsory tests are included in the education.