General syllabus for third-cycle courses and study programmes for the third-cycle subject area Computer science (Datavetenskap)

1 Description of the doctoral subject at BTH

Computer science deals with practical and theoretical aspects of data processing and related applications. The area includes systematic studies and evaluation of performance, structural, security and implementation aspects of algorithms, methods and mechanisms for collecting, representing, processing, storing and communicating information managed by computer systems.

2 Structure of the course/programme

Third-cycle courses and study programmes which finish with a Degree of Licentiate comprise an actual period of study of two years (120 higher education credits) and consist of a course component of minimum 40 higher education credits and a licentiate thesis of minimum 60 higher education credits.

Third-cycle courses and study programmes which finish with a Degree of Doctor comprise an actual period of study of four years (240 higher education credits) and consist of a course component of minimum 60 higher education credits and a dissertation of minimum 150 higher education credits.

A third-cycle student who is admitted to the Degree of Doctor is given the possibility to take a Degree of Licentiate (according to the above) after having completed minimum 120 higher education credits of the programme that is to be finished with a Degree of Doctor.

For each third-cycle student an individual study plan is set up. The individual study plan describes the individual set-up of the studies. The individual study plan is revised and followed up yearly in accordance with the routines that are established at BTH. The study plan is to show in a convincing way how the goals for the third-cycle student's studies can be attained within the available time period.

In accordance with the Higher Education Ordinance at least two supervisors are appointed for each third-cycle student of whom one is appointed principal supervisor. For examination and grading in the third-cycle education, the Higher Education Ordinance also requires that an examiner is appointed for each third-cycle student. The supervisors and the examiner will be appointed according to BTH's guidelines. A supervisor, who is not the principal supervisor of the two, must have a doctoral degree. In addition, further supervisors may be affiliated to the third-cycle student, e.g., from the business sector, if this is for the benefit of the third-cycle student's studies. For these additional supervisors there is no demand on having a doctoral degree.

2.1 Purpose of education

BTH conducts third-cycle education in order to contribute with solutions to the complex challenges in society and to meet the demands of a changeable labour market.

Specifically, the third-cycle courses and study programmes aim at developing the third-cycle student's knowledge in the subject area and her/his capacity to independently carry on research-, development-, teaching- and investigatory work based on a scientific foundation in different areas of society. The purpose of the Degree of Doctor is, in addition, to give the third-cycle student the capacity to critically and independently plan, initiate, and lead such work.

2.2 Goals of education

According to the System of Qualifications in the Higher Education Ordinance (1993:100) according to enclosure.

2.3 Realization of the education

The third-cycle student carries on research and writes a scientific work (licentiate thesis/doctoral dissertation). In support of this, the education may include lectures, seminars, literature studies, project assignments, group supervision and individual supervision. Courses for each third-cycle student are established individually in consultation with the supervisors and the examiner and are entered into the individual study plan.

The supervision of the education aims at assisting the third-cycle student regarding choice of research domain, scientific method and organization and planning of the scientific work and pertaining studies. The supervisors are to assist with subject competence and see to that the work holds an international quality level. Furthermore, the supervision aims at introducing the third-cycle student to the scientific community and its demands on ethics, honesty and critical thinking.

The third-cycle student is to participate in national and international contexts and present her/his own research.

During the education period the third-cycle student is to take part of the scientific activities which are conducted in the scientific environment at the department/faculty by attending seminars and guest lectures, and, in the normal case, give one seminar per year about her/his thesis work.

The third-cycle student is to carry out a popular science-based presentation of her/his research before the Degree of Licentiate and public defense of the doctoral dissertation and write a popular science-based summary which is to be included in the licentiate thesis respective the doctoral dissertation.

A third-cycle student, employed by the higher education institution as a doctoral student, is recommended to dedicate certain time (not more than 20 per cent of full working hours) to teaching in first- and second-cycle courses and programmes. Such work is financed by the first- and second-cycle courses and programmes and is to be accounted for in the individual study plan.

The education should be organized so that the third-cycle student attains the stipulated examination targets. How the knowledge needs of each individual third-cycle student are to be fulfilled in order to attain the examination targets is stated in respective individual study plan.

3 Entry requirements and selection

3.1 General entry requirements
According to Chapter 7, Section 39 of the Higher Education Ordinance (1993:100).

3.2 Specific entry requirements
Qualified for entry to third-cycle education is she/he who has taken a second-cycle qualification in the fields of engineering or mathematics-sciences or who in some other way has acquired knowledge to be able to profit by the third-cycle studies of the subject

3.3 Selection
According to 7 Chap. 41 § in the Higher Education Ordinance (1993:100) and the current admission regulations at BTH. Selection is to be made in consideration of the applicants' capacity to profit by the education. The foundation for selection among the qualified applicants is the degree of capacity to profit by the third-cycle education, and the access to supervision and other resources in view of the planned specialization of the licentiate thesis/doctoral dissertation.

The bases of assessment applied at the selection for third-cycle education are constituted by:

- Familiarity with the theory and applications of the subject,
- Relevant work experience where appropriate,
- Skills in expression of speech and in writing,
- Familiarity with English,
- Creativity, capacity for initiative, independence and ability to co-operate.

Admission to third-cycle education is done on a continuous basis.

4 Tests included in the training
The education consists of courses and a scientific work. Examinations that form part of the third-cycle education are assessed with the grades pass/failed. A grade on a course and a licentiate thesis, respectively, is determined by a specially appointed examiner. A grade on a doctoral dissertation is determined by a specially appointed grading committee.

For a possible credit transfer, see the current order for credit transfers and the guidelines for credit transfers for first-cycle and second-cycle education.

4.1 Courses
In support of the research work and for the fulfilment of the examination targets generally, the third-cycle student takes a number of courses. Courses completed at BTH as well as courses from other higher education institutions can be included.

For third-cycle courses given at BTH there is to be a written course description which, among other things, states the title of the course in Swedish and English, the course objectives, content and credits. The individual study plan is to regulate which courses can form part of the studies and how many higher education credits each course should award (for participation in a course originally intended for first- or second-cycle see the guidelines for credit transfer of courses in third-cycle education).

The course Introductory course for doctoral students at BTH of 3 credits is compulsory for both a licentiate degree and for doctoral degrees in Computer Science.

Components of the education in the areas below are compulsory. How these are examined, through a course or other component, is regulated in each separate individual study plan.
- Research methodology
- Information search for researchers
- Scientific writing and scientific review
- Ethics in research

The choice of courses is to be characterized by flexibility with regard to the third-cycle student's prior knowledge and the specialization of the research work and is to be determined in consultation between the third-cycle student, supervisors and examiner. The examination format is determined by the examiner in consultation with the supervisors. Goal attainment is tested by the examiner.

All compulsory courses or components are to be completed before the doctoral dissertation is publicly defended at the public defence of the doctoral dissertation. Other courses and components are to be chosen so that the third-cycle student obtains both breadth and depth in the research domain. The courses are also to benefit the third-cycle student's competence and skills, her/his studies or scientific work.

4.2 Scientific work
Scientific work in the form of licentiate thesis/doctoral thesis shall be designed as a coherent, coherent scientific work (monograph) or as a summary – framework narrative – and related scientific papers (summary), which the doctoral student has authored alone or jointly with another person. The scientific work is written in English or Swedish.

The licentiate thesis shall be defended orally at a public licentiate seminar. For further information, please refer to the university's established "Rules at licentiate seminar".

The doctoral thesis must be defended orally at a public defence. The thesis must previously have been quality assured as described in "Appendix – Pre-evaluation process for doctoral theses in computer science". For further information please see "Regulations for the public defence of a doctoral dissertation" established by BTH.

5 Degree

5.1 Examination targets
Goals according to the System of Qualifications in the Higher Education Ordinance (1993:100) according to enclosure.

5.2 Title of qualification
The degree title of third-cycle studies in Swedish at BTH consists of a general degree with the addition of a prefix. The prefix is normally teknologie (Technology).

Third-cycle students studying for a Degree of Licentiate in Computer Science normally receives the Swedish degree title teknologie licentiatexamen (Eng. Degree of Licentiate of Technology).

Third-cycle students studying for a Degree of Doctor in Computer Science normally receives the Swedish degree title teknologie doktorsexamen (Eng. Degree of Doctor of Philosophy).

Exceptions to the prefix Technology in the Swedish degree: For individuals who do not have a second-cycle technical education[1] a degree of Philosophy will be awarded. The prefix should be clarified in the individual study plan. For a degree of Philosophy the Swedish degree title is:

Filosofie licentiatexamen (Eng. Degree of Licentiate of Philosophy).

Filosofie doktorsexamen (Eng. Degree of Doctor of Philosophy).

6 Entry into force and transitional provisions
This general study plan applies to students admitted from 1 October 2021.

As a rule, graduate students admitted before 1 October 2021 complete their studies according to the older study plan. If a graduate student wishes and it is deemed appropriate, the examiner concerned may approve the transition to a new general study plan. The doctoral student must then report the transition to the dean concerned and attach a copy of an individual study plan updated according to a new general syllabus.

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[1] A technical education refers to a Master's degree in Engineering, Master's degree in Science or equivalent in a technical or mathematical-scientific field.

Appendix - Pre-evaluation process for doctoral theses in computer science

1. Introduction
The pre-evaluation process described in this document applies to doctoral thesisar which is part of the doctoral programme at Blekinge Institute of Technology within the subject computer science. This process complements already existing quality assurance measures used at the Department of Computer Science in the review of doctoral documents in computer science. The pre-evaluation processes for doctoral thesis are carried out at most universities in Sweden.

The main purpose of the pre-evaluation process is for external reviewers to individually assess whether a thesis is of such quality that it can be submitted and defended at a public defence. In addition, these assessments should be made well in advance of the date of the public defence.

It is important to stress that the opinions of the external reviewers are only advisory in nature and do not bind them to make a particular decision at the actual defence.

2. External reviewers
The external reviewers who will evaluate doctoral thesis are the senior researchers who will be included in the grading committee. So, for example, if a planned grading committee were to include three (3) senior researchers, all individual pre-evaluation reviews are performed using the form attached in this document. Thus, the formal requirements for those who can be appointed as pre-evaluation examiners are the same as those who prescribe who may be members of the grading committee at the public defence at Blekinge Institute of Technology.

3. Format for a pre-evaluation review
The format of the pre-evaluation review must follow the "Pre-evaluation form for doctoral thesis in computer science". The form should be completed by each of the reviewers prior to the evaluation and they should submit the review form before the deadline set in the next subsection.

4. Deadline for pre-evaluation
The completed review form must be returned before evaluation to the doctoral student's main supervisor at least three **(3) months** before the date of the planned public defence.

5. Pre-evaluation process
Below is a description of the sequential process for collecting the pre-evaluation reviews from the reviewers. The roles in this process are the **doctoral student's main supervisor**, **pre-evaluation reviewers and dean** of the Faculty of Computer Sciences.

1. It is the doctoral student's main supervisor who is responsible for sending the pre-evaluation form, preferably via e-mail, to each of the reviewers before the **evaluation**, that is, the senior researchers who will be included in the grading board. The form must be sent out in good time so that each of the reviewers before

the evaluation has enough time to assess the draft thesis, publications, etc., and then submit the review form before the deadline set out above.

2. Each **pre-evaluation reviewer** assesses the draft thesis, publications, etc.m. and then fills out the review form according to the instructions in the form. After that, the forms should be signed and sent back to the main **supervisor.**

3. **The main supervisor** collects and saves each of the pre-evaluation forms that he/she receives. A copy of the pre-evaluation forms received must also be registered with the diarium@bth.se.

4. If all forms for pre-evaluation of review are positive, the planned public defence is done according to plan. **The main supervisor should** attach the pre-evaluation review forms to the application form when requesting a public defence. If one (or more) of the pre-evaluation reviews turn out to be negative, the **main supervisor** informs the dean as well as the doctoral student and the other supervisors in good time. **The main supervisor is** then responsible for developing a strategy in dialogue with **the dean** on how to proceed in each case.

Pre-evaluation form for doctoral thesis in computer science

Please use this form to inform Blekinge Institute of Technology if you believe that the thesis is of such quality that it can be submitted and defended in a public defence. It is important to note that the opinion is only advisory in nature and does not bind you to make a certain decision in the defenseitself. A positive opinion need not be followed by any reasoning or comments. However, a negative opinion must be followed by a brief reasoning. If you summarize your considerations in written format below, remember that it is a public document.

Doctoral student's name
Name:

Preliminary title of the doctoral thesis
Title:

Pre-evaluation of doctoral thesis
☐ **I believe that the thesis is of such quality that it can be presented in a public defence.**
☐ **I do not believe that the thesis is of such quality that it can be presented in a public defence.**
If you do not consider the thesis to be of such quality that it can be presented and defended in a public defense, please summarize your consideration below.
Comments:

Signature	
Name:	
Date:	**Signature:**

ANNEX - 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 Degree of 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

-   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 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.

Competence and skills

For the Degree of Doctor the third-cycle student shall

- demonstrate the capacity for scholarly analysis and synthesis as well as 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.