



## General syllabus for third-cycle studies in the third-cycle subject area Computer Science

**Decided by:** The deans jointly.

**Effective from:** 2024-01-01

**Dnr:** BTH-5.1.4-0209-2023

**Note:** This is a translation of the established Swedish-language version of the General Syllabus in the subject. In the event of discrepancies, the Swedish-language version takes precedence.

## **1 Description of the third-cycle subject at BTH**

Computer science concerns practical and theoretical aspects of computing and related applications. The area includes systematic studies and evaluation of performance, structure, security and implementation aspects of algorithms, methods, and mechanisms for collecting, representing, processing, storing and communicating information handled by computer systems.

## **2 Structure of the programme**

Doctoral studies that conclude with a licentiate degree comprise two years of net study time (120 credits) and consist of a course component of at least 40 credits and a licentiate thesis of at least 80 credits.

Doctoral studies that end with a doctoral degree comprise four years of net study time (240 credits) and consist of a course component of at least 60 credits and a thesis of at least 180 credits.

Doctoral students who have been admitted to a doctoral degree are given the opportunity to obtain a licentiate degree (as above) after a part of at least 120 credits has been completed of the education that is to conclude with a doctoral degree.

An individual study plan is drawn up for each doctoral student<sup>1</sup>. The individual study plan describes the individual structure of the education. The individual study plan is revised and followed up annually in accordance with the routines established at BTH. The study plan should convincingly demonstrate how the objectives of the doctoral student's doctoral education can be achieved within the available time.

In accordance with the Higher Education Ordinance, at least two supervisors are appointed, one of whom is appointed as principal supervisor. According to the Higher Education Ordinance, an examiner must also be appointed for each doctoral student for assessment and grading of doctoral education. The appointment of supervisors and examiners must be made in accordance with BTH's guidelines. The supervisor, who is not the main supervisor of the two, must have a PhD. In addition, additional supervisors may be attached to the doctoral student, for example from the business sector, if it is of benefit to the doctoral student's studies. For these additional supervisors, there is no requirement to have a PhD.

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<sup>1</sup> In BTH's general syllabus, the word "doctoral student" is used synonymously with the Higher Education Ordinance "doctoral student" (according to Chapter 1, Section 4 of the Higher Education Ordinance (1993:100)). The choice of words is made to avoid confusion with doctoral studentships and that as a doctoral student, you can be admitted to a licentiate degree and not just a doctoral degree.

## **2.1 Purpose of the education**

BTH conducts doctoral education to contribute to solutions to society's complex challenges and meet the demands of a changing labour market.

Specifically, the doctoral education aims to develop the doctoral student's knowledge in the subject area and ability to conduct independent research, development, teaching, and investigative work based on a scientific basis in different areas of society. In addition, the purpose of the doctoral degree is to give the doctoral student the ability to critically and independently plan, initiate and lead such work.

## **2.2 Objectives of the programme**

According to the System of Qualifications in the Higher Education Ordinance (1993:100) as set out in the appendix.

## **2.3 Implementation of the education**

The doctoral student conducts research and writes and defends a scientific work (licentiate thesis/doctoral thesis). To support this, the programme may include lectures, seminars, literature studies, project assignments, group supervision and individual supervision. Courses for each individual doctoral student are determined individually in consultation with the supervisors and the examiner and are included in the individual study plan.

The supervision in the programme aims to assist the doctoral student in the choice of research area, scientific method, and the organisation and planning of the scientific work and associated studies. The supervisors shall assist with subject expertise and ensure that the work maintains an international level of quality. The supervision also aims to introduce the doctoral student to the scientific community and its requirements for ethics, integrity, and critical thinking.

The doctoral student will participate in national and international contexts and present his/her own research.

During the study period, the doctoral student will take part in the scientific activity conducted within the research environment at the department/faculty by attending seminars and guest lectures, and normally give one seminar per year on his/her thesis work.

The doctoral student will carry out an oral popular science presentation of his/her research before the licentiate degree and the public defence of the doctoral thesis and write a popular science summary to be included in the licentiate thesis and doctoral thesis, respectively.

Doctoral students, employed by the university as doctoral students, are recommended to devote some time (no more than 20 percent of full time) to

teaching undergraduate education. Such initiatives are funded by undergraduate education and must be described in the individual study plan.

The programme must be designed so that the doctoral student achieves the applicable qualitative targets. How each individual doctoral student's knowledge needs are to be ensured in order to fulfil the qualitative targets is stated in each individual study plan.

### **3 Eligibility 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**

To be eligible for admission to third-cycle studies, the applicant must have been awarded a second-cycle degree in a technical or mathematical-natural sciences field or have acquired knowledge in some other way to be able to benefit from third-cycle studies in the subject.

#### **3.3 Selection**

According to Chapter 7. 41 § in the Higher Education Ordinance (1993:100) and current admission regulations at BTH. Selection shall be made with regard to the applicants' ability to benefit from the programme. The basis for selection among eligible applicants is the degree of ability to benefit from the doctoral education, as well as the availability of supervision and other resources with regard to the planned focus of the licentiate thesis/doctoral thesis.

The assessment criteria applied in the selection process for doctoral studies are:

- Familiarity with the theory and applications of the subject,
- Relevant work experience, if applicable,
- Ability to express oneself in speech and writing,
- Familiarity with English,
- Creativity, initiative, independence and ability to cooperate.

The basis for assessing the applicant's fulfilment of the assessment criteria is the results of completed university courses, the quality of the independent project and any publications, references, interviews and a personal letter from the applicant describing the applicant's expectations and intentions for the programme. In some cases, the applicant may be required to undergo special work samples.

Admission to doctoral studies takes place continuously.

#### **4 Tests included in the education**

The programme consists of courses and scientific work. Examinations that are part of doctoral studies are assessed with the grade pass/fail. The grade of the course and the licentiate thesis is determined by a specially appointed examiner. The grade of the doctoral thesis is decided by a specially appointed examining committee.

For any credit transfer, please refer to the current credit transfer procedure and guidelines for credit transfer.

#### **4.1 Courses**

To support the research work, and for the fulfilment of the qualitative targets in general, the doctoral student takes a number of courses. Courses completed at BTH as well as other higher education institutions can be included.

For doctoral courses given at BTH, there must be a written course description that states, among other things, the name of the course in Swedish and English, the course objectives, content and credits. The individual study plan must regulate which courses may be included in the programme and how many credits each course is to be counted as (when participating in a course that is originally intended for first- or second-cycle level, please refer to the guidelines for credit transfer of courses in third-cycle education).

The course Introductory Course for PhD Students at BTH of 3 credits is compulsory for both a licentiate degree and a PhD in Computer Science.

Elements of the education in the following areas are compulsory. How these are examined, through a course or other element, is regulated in each individual study plan.

- Research Methodology
- Information retrieval for researchers
- Scientific writing and review
- Ethics in research

The choice of courses shall be characterized by flexibility with regard to the doctoral student's prior knowledge and the focus of the research work and shall be determined in consultation between the doctoral student, supervisor and examiner. The form of examination is determined by the examiner in consultation with the supervisor. Goal fulfilment is assessed by the examiner.

All compulsory courses or components must be completed before the doctoral thesis is orally defended at a public defence. Other courses and modules should be chosen so that the doctoral student has both breadth and depth within the research area. The courses should also benefit the doctoral student's skills and abilities, his or her studies or scientific work.

## 4.2 Scientific work

Scientific work in the form of a licentiate thesis/doctoral thesis shall be designed as a coherent, scientific work (monograph) or as a summary with associated scientific papers (compilation), which the doctoral student(s) have authored alone or jointly with another person. The scientific work is written in English or Swedish.

The licentiate thesis must be defended orally at a public licentiate seminar. For further information, please refer to the "Rules for licentiate seminars" established by the university.

The doctoral thesis must be defended orally at a public defence. Prior to this, the thesis must have been quality assured as described in "Appendix – Pre-evaluation process for doctoral theses in computer science". For further information, please refer to the "Rules for public defences" established by the university.

## 5 Degree

### 5.1 Qualitative targets

Objectives according to the System of Qualifications in the Higher Education Ordinance (1993:100), "Appendix - System of Qualifications (Higher Education Ordinance (1993:100))".

In addition to the objectives of the System of Qualifications in the Higher Education Ordinance, the doctoral student must demonstrate knowledge of gender equality issues in research.

### 5.2 Title of qualification

The title of the doctoral degree at BTH consists of a general degree with the addition of a prefix.

A doctoral student who is pursuing a licentiate degree in the subject and who has a technical qualification is<sup>2</sup> normally awarded the title of Degree of Licentiate. In other cases, the title of the degree is Degree of Licentiate.

A doctoral student who is pursuing a doctoral degree in the subject and who has a technical qualification is normally awarded the title of Doctor of Philosophy. In other cases, the title of the degree is Doctor of Philosophy.

The prefix must be clarified in the individual study plan.

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<sup>2</sup> In this context, technical education refers to a Master of Science in Engineering, a Degree of Master of Science or equivalent in a technical or mathematical-natural sciences field.



## **6 Entry into force and transitional provisions**

This general syllabus enters into force on 1 January 2024.

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

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

### 1. Introduction

The pre-evaluation process described in this document applies to doctoral theses that are part of the doctoral education at Blekinge Institute of Technology in the subject of computer science. This process complements already existing quality assurance measures used at the Department of Computer Science when reviewing doctoral theses in Computer Science. Pre-evaluation processes for doctoral theses 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. These assessments should also be made well in advance of the date of the public defence.

**It is important to emphasize 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 public defence.**

### 2. External reviewers

The external reviewers who will pre-evaluate doctoral theses are the senior researchers who will be part of the grading committee. So, if, for example, a planned grading committee were to include three (3) senior researchers, all individual pre-evaluation reviews would be conducted using the form attached in the appendix to this document. Thus, the formal requirements for those who can be appointed as pre-evaluation examiners are the same as those that prescribe who may be members of the examining committee at the dissertation at Blekinge Institute of Technology.

### 3. Format of a pre-assessment 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 out in the next subsection.

### 4. Deadline for the pre-evaluation

The completed review form must be returned to the doctoral student's principal supervisor at least three (3) months before the date of the planned public defence.

### 5. Process for the pre-evaluations

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



1. It is the doctoral student's principal supervisor who is responsible for sending the pre-evaluation form, preferably by e-mail, to each of the reviewers prior to the evaluation, i.e. the senior researchers who will be included in the examining committee. The form should be sent out in good time so that each of the reviewers has sufficient time to assess the draft thesis, publications, etc., before the evaluation, and then submit the review form before the deadline set out above.
2. Each **pre-evaluation reviewer** assesses the draft thesis, publications, etc., and then fills in the review form according to the instructions in the form. The forms must then be signed and returned to **the principal supervisor**.
3. **The principal 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 [diarium@bth.se](mailto:diarium@bth.se).
4. If all forms for pre-evaluation of review are positive, the planned public defence will take place according to plan. **The principal supervisor should** attach the pre-evaluation review forms to the application form when applying for a public defence. If one (or more) of the pre-evaluation reviews turns out to be negative, the principal supervisor informs the **dean, the doctoral student** and the other supervisors well in advance. **The principal supervisor is then responsible** for developing a strategy in dialogue with the **dean** on how to proceed in each individual case.



## Pre-Evaluation Form for PhD 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 advisory in nature only and does not bind you to make a particular decision in the defense itself. A positive opinion does not need to be followed by any reasoning or commentary. However, a negative opinion must be followed by a brief reasoning. If you summarize your considerations in written format below, keep in mind that it is a public document.

Doctoral student's name	
Name:	

Preliminary title of the doctoral thesis	
Title:	

Pre-evaluation of doctoral thesis	
<input type="checkbox"/> I believe that the thesis is of such quality that it can be presented in a public defence.	
<input type="checkbox"/> I do not consider the thesis to be of such quality that it can be presented in a public defence.	
<i>If you do not believe that the thesis is of such quality that it can be presented and defended in a public defence, please summarize your consideration below.</i>	
Comments:	

Signature	
Name:	
Date:	
Signature:	

## Appendix - System of Qualifications (Higher Education Ordinance (1993:100))

### **Licentiate degree**

#### **Extent**

A licentiate degree is awarded

either after the doctoral student has completed a course of study of at least 120 credits in a subject for third-cycle studies,

or after the doctoral student has completed a part of at least 120 credits of a course of study that is to conclude with a doctoral degree, if the higher education institution decides that such a licentiate degree can be awarded at the higher education institution.

#### **Target**

##### **Knowledge and understanding**

For a licentiate degree, the doctoral student must

- demonstrate knowledge and understanding in the field of research, including current specialist knowledge in a limited part of this area as well as specialised knowledge of scientific methodology in general and the methods of the specific research area in particular.

##### **Competence and skills**

For a licentiate degree, the doctoral student must

- demonstrate the ability to identify and formulate issues critically, autonomously and creatively and with scientific accuracy, and to plan and, using appropriate methods, carry out a limited research project and other advanced tasks within predetermined time frames and thereby contribute to the formation of knowledge and to evaluate this work,

- demonstrate the ability to present and discuss, orally and in writing, research and research results in both national and international contexts in dialogue with the scientific 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.

##### **Judgement and approach**

For a licentiate degree, the doctoral student must

- demonstrate the ability to make assessments of research ethics in their own research,
- demonstrate insight into the possibilities and limitations of science, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify his or her need for further knowledge and to take responsibility for his or her knowledge development.

### **Scientific paper**

For a licentiate degree, the doctoral student must have had a scientific thesis of at least 60 credits approved.

### **Other**

For a licentiate degree with a certain specialisation, the specified requirements that each higher education institution itself determines within the framework of the requirements in this qualification descriptor shall also apply.

### **Phd**

#### **Extent**

A doctoral degree is awarded after the doctoral student has completed a course of study of 240 credits in a subject for third-cycle studies.

#### **Target**

#### **Knowledge and understanding**

For a doctoral degree, the doctoral student shall:

- demonstrate broad knowledge and a systematic understanding of the research area as well as in-depth and up-to-date specialist knowledge in a defined part of the research area, and
- demonstrate familiarity with scientific methodology in general and with the methods of the specific research area in particular.

#### **Competence and skills**

For a doctoral degree, the doctoral student shall:

- demonstrate the ability to conduct scientific analysis and synthesis as well as to independently critically examine and assess new and complex phenomena, issues and situations,

- demonstrate the ability to identify and formulate issues critically, independently, creatively and with scientific accuracy, and to plan and, using appropriate methods, conduct research and other advanced tasks within predetermined time frames, and to review and evaluate such work,
- demonstrate by means of a thesis the ability to make a significant contribution to the formation of knowledge through their own research,
- demonstrate the ability to present and discuss research and research results in both national and international contexts, orally and in writing, in dialogue with the scientific community and society in general,
- demonstrate the ability to identify the need for further knowledge, and
- demonstrate the ability to contribute to the development of society and support the learning of others, both in research and education as well as in other qualified professional contexts.

### **Judgement and approach**

For a doctoral degree, the doctoral student shall:

- demonstrate intellectual independence and scientific probity as well as the ability to make assessments of research ethics, and
- demonstrate in-depth insight into the possibilities and limitations of science, its role in society and the responsibility of the individual for how it is used.

### **Scientific dissertation (doctoral thesis)**

For a doctoral degree, the doctoral student must have received a passing grade for a scientific thesis (doctoral thesis) of at least 120 credits.

### **Other**

For a doctoral degree with a certain specialisation, the specified requirements that each higher education institution itself determines within the framework of the requirements in this qualification descriptor shall also apply.