



General syllabus for third-cycle studies in Industrial Economics and Management

Decided by: The deans jointly.

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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

The research in Industrial Engineering and Management at BTH focuses on the interplay between technology, innovation and business dynamics. The focus is on the conditions and consequences of the technology's commercial realization. This includes technology-based business and entrepreneurship, strategy, innovation in established as well as in new and emerging industries and industries. At BTH, the research has two main focuses: *Management of Innovation and Technology* and *Industrial Dynamics and Technological Change*.

Management of Innovation and Technology has a company, project or project organization as the natural starting point. Here, the focus is on analyses of resource bases, strategies and skills, and how they interact with technology development and innovation. The focus includes research on business models, strategy, investment risks, and the composition and development of skills.

Industrial Dynamics and Technological Change focuses on analysis of markets, industry and company dynamics, and the impact of policy. The area includes studies of entrepreneurship, the emergence of new industries and industries, the diffusion of innovations and new technologies, as well as transformation processes that cut across the business world in time and space, such as digitalization. Within the Technological Change part, issues related to efficiency and productivity and factors that affect them are also studied.

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 30 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 160 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 student¹. 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

¹ 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.

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. A supervisor cannot be the examiner for the doctoral student they supervise. 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.

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 after permission from the examiner.

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.

Doctoral students at the Department of Industrial Economics must present their scientific work at the department's internal seminars at least once per semester, participate in meetings with the department's board of supervisors and follow the routines for the department's internal follow-up of doctoral students.

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 doctoral studies in Industrial Economics and Management, the applicant must have been awarded a second-cycle degree in economics or a technical/mathematical-natural sciences field or have otherwise acquired knowledge 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). Courses that are intended to be included in the programme shall, with permission from the examiner, be included in the coming year's individual study plan. After completion and passing of the course, the course must be approved by the examiner.

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

For a doctoral degree, at least 30 credits must consist of applied research methods and for a licentiate degree, at least 15 credits of applied research methods. For both degrees, the following courses, or equivalent, are compulsory:

- Industrial Engineering and Management – An Overview Course, 7.5 credits
- Philosophy of Science, 7.5 credits

Doctoral studies in Industrial Economics and Management leading to both a licentiate degree and a doctoral degree also include the following compulsory method courses, or equivalent, of 15 credits.

- Mathematical Economics 7.5 credits
- Applied Quantitative and Qualitative Methods, 7.5 credits

The compulsory courses aim to ensure the required subject-wise and methodological breadth. They are preferably taken at BTH but can also be taken at other universities provided that it is approved by the appointed examiner.

The choice of courses should be characterized by flexibility with regard to the doctoral student's prior knowledge and the focus of the research work. 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 should normally be designed as a summary – a framework report – with associated scientific papers, i.e., a compilation thesis. As a rule, a licentiate thesis consists of two publishable theses and an introductory chapter, and a doctoral thesis consists of four publishable articles and an introductory chapter. Articles should be published

in quality-assured and reputable journals² and not by publishers or in journals that can be perceived as non-serious, so-called predatory³. 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. The thesis must have previously been quality assured as described in "Appendix – Quality assurance of doctoral thesis". 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 is⁴ 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 Degree of Doctor of Philosophy.

The prefix must be clarified in the individual study plan.

² Quality-assured journals are those that, in addition to being included in the web of science, are also found in other ranking systems, such as SCIMAGO (<https://www.scimagojr.com/>), Norway's register of scientific publication channels (<https://kanalregister.hkdir.no/publiseringsskanaler/Forside>), ABS (<https://charteredabs.org/>).

³ For management, see for example <https://predatoryreports.org/>

⁴ 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 study plan. 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 - Quality assurance of doctoral thesis

The quality of the doctoral thesis is continuously assured throughout the doctoral education. This is done by each doctoral student presenting their research in the department's seminar series at least once per semester. This gives the board of supervisors (all the department's active and potential supervisors) the opportunity to continuously follow the process.

The Board of Supervisors meets at least twice a year and at these meetings reconciliations are made about progression. At one of the meetings, normally the February meeting, updated individual study plans for all doctoral students are discussed.

The public defence is preceded by a final seminar with an external opponent. In addition to discussing the various parts of the thesis, the external opponent's duties include providing a statement on whether the prospective doctoral thesis has the potential to become an approved doctoral thesis within a reasonable time limit. The final seminar is usually held at least three months before a preliminary date for examination.

Immediately after the final seminar, the examiner, principal supervisor and supervisor hold a meeting with an adjunct opponent appointed for the final seminar. At the meeting, the examiner decides to recommend the doctoral student and his/her supervisor to either book a date for the public defence or to adjust the thesis and planning. The examiner's assessment after the final seminar as to whether the thesis is ready for public defence is documented and registered.

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.

Goals

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.

Goals

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.