



## General syllabus for third-cycle education in the third-cycle subject area Industrial Economics and Management

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

Research in Industrial Economics at BTH focuses on the interaction between technology, innovation and business dynamics. In the centre stands the conditions for and consequences of the commercial realization of technology. This includes technology-based businesses and entrepreneurship, strategy, innovation in established as well as in new and emerging industries and sectors. At BTH the research has two main aspects: *Management of Innovation* and *Technology and Industrial Dynamics and Technological Change*.

*Management of Innovation and Technology*, has companies, projects or project organizations as the natural starting point. Here the focus lies on analysis of resource bases, strategies and skills, and how they interact with technology and innovation. The aspect includes research on business models, strategy, investment risks, and composition and development of skills.

*Industrial Dynamics and Technological Change* focuses on the analysis of markets, sector and business dynamics and the impact of policies. The area includes the study of entrepreneurship, the emergence of new industries and sectors, the diffusion of innovations and new technologies, and conversion processes that cut across the business in time and space, such as digitization.

### **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 45 higher education credits and a licentiate thesis of 75 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 90 higher education credits and a dissertation of 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.

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 industry, 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 the education**

BTH conducts third-cycle education 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 plan, initiate, and lead such work critically and independently.

### **2.2 Goals for the 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, e.g., 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.

Third-cycle students at the Department of Industrial Economics will present their scientific works at the department's internal seminars at least once per semester, participate in meetings



with the department's supervisor group and follow the practices of the department's internal follow-up of third-cycle students.

The third-cycle student is to carry out a popular science-based presentation of her/his research before the Degree of Licentiate and public defence of the doctoral dissertation and write a popular science-based summary which should be enclosed in the thesis and the 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 qualitative targets. How the knowledge needs of each individual third-cycle student are to be fulfilled to attain the qualitative targets is stated in respective individual study plan.

### **3 Entry requirements and selection**

#### **3.1 General entry requirements**

According to 7 Chap. 39 § in the Higher Education Ordinance (1993:100).

#### **3.2 Specific entry requirements**

Qualified to be admitted to third-cycle education in industrial economics and management is a graduate at second-cycle level in economic or technical or mathematical-natural sciences field or otherwise acquired knowledge in order to be able to benefit from third-cycle education in the subject.

#### **3.2 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.

Examples of 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.
- Ability to express oneself in speech and writing,
- Familiarity with English,
- Creativity, initiative, independence, and ability of cooperation.



To assess how the applicant fulfils the bases of assessment, the following are used: results from higher education courses, quality of the independent work and possible publications, references, interviews, possible personal knowledge, and a personal letter from the applicant which describes the applicant's expectations on and intentions with the education. In certain cases, the applicant may undergo specific work tests.

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

#### **4 Examinations that form part of the education**

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.

##### **4.1 Courses**

In support of the research work and for the fulfilment of the qualitative targets generally, the third-cycle student studies several 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).

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

Third-cycle education in Industrial Economics and Management toward a Degree of Doctor includes the following compulsory courses, or equivalent, of 52.5 higher education credits.

- - Applied Mathematics in Economic Analysis (7.5 credits)
- - Microeconomic Analysis (7.5 credits)
- - Industrial Organization and Dynamics (7.5 credits)
- - Strategy and Entrepreneurship (7.5 credits)
- - Philosophy of Science and Research Design (7.5 credits)
- - Statistics and Econometrics (7.5 credits)
- - Applied Econometrics (7.5 credits)



The compulsory courses aim at securing the required topical and methodological breadth. They are preferably studied at BTH but can also be taken at other institutions provided it is approved by the supervisor and the head of third-cycle education at the Department of Industrial Economics.

The choice of courses is to be characterized by flexibility about 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 a licentiate thesis/doctoral dissertation is to be designed as an integrated, connected scientific work (monograph) or as a summary – introductory part – together with pertaining scientific academic papers (compilation), which the third-cycle student has written alone or together with another person or persons. The scientific work is written in English.

The licentiate thesis is to be presented orally at a public licentiate seminar. For further information, please see "Rules for licentiate seminars" established by BTH.

The doctoral dissertation is to be defended orally at a public defence of doctoral dissertation. The dissertation must have been quality assured beforehand as described in "Enclosure – Quality assurance of a doctoral thesis". For further information, please see "Rules for the public defence of a doctoral dissertation" established by BTH.

### **5 Degree**

#### **5.1 Qualitative targets**

Goals according to the System of qualifications in the Higher Education Ordinance (1993:100) according to "Enclosure 2 – System of qualifications (Higher Education Ordinance 1993:100)".

#### **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.



Third-cycle student taking a Degree of Licentiate in Software Engineering normally receives the Swedish degree title teknologie licentiatexamen (Eng. Degree of Licentiate of Technology).

Third-cycle student taking a Degree of Doctor in Software Engineering 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<sup>1</sup> 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 Effective date and interim regulations**

This general syllabus becomes effective on July 1, 2022.

Third-cycle students admitted before July 1, 2022, will complete, as a general rule, their studies according to the older general syllabus. If a third-cycle student so requests and it is deemed suitable, the relevant examiner may accept a transfer to the new general syllabus. The third-cycle student will then report the transfer to the relevant Dean and attach a copy of an updated individual study plan updated according to the new general syllabus.

---

<sup>1</sup> 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.



## Enclosure 1 – Quality assurance of a doctoral thesis

The quality of the doctoral dissertation is ensured on an ongoing basis throughout the doctoral education. This is done by each doctoral student presenting their research at least once a semester in the department's seminar series. This gives the supervisor group (all the department's active and potential supervisors) the opportunity to continuously follow the process.

The dissertation 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 giving an opinion on whether the presumptive 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 (3) months before a preliminary date for examination.

Immediately after the final seminar, the doctoral student's examiner, main supervisor and supervisor hold a meeting with the opponent appointed for the final seminar as an adjunct. At the meeting, the examiner makes the decision to recommend the doctoral student and its supervisor to either book dates for the dissertation or to adjust the thesis and planning. The examiner's assessment after the final seminar if the thesis is ready for the dissertation is documented and registered.



## Enclosure – System of qualifications (Higher Education Ordinance 1993:100)

### **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.