Doctoral programme — Industrial Economics and Management

Programme description (KTHIEO)

Programme name

Industrial Economics and Management (Industriell ekonomi och organisation)

Subject area

The doctoral programme’s overall purpose and learning outcomes

The aim is that the doctoral students should become independent, excellent researchers in Industrial economics and management. The doctoral student should after completed studies be able to:

- describe and explain theories and empirical results within Industrial economics and management
- formulate concrete research issues within Industrial economics and management
- use scientific methods and provide new knowledge through own scientific studies
- participate in interdisciplinary cooperations between humanities/social studies and engineering science
- analyse the research role in the development of the society
- critically analyse and evaluate applied methods and results from own and others' scientific studies
- present and discuss research results in the scientific community
- present research in an pedagogical way outside the science community and in educational situations
- assess ethical aspects of research in Industrial economics and management and act from these
- identify need of new knowledge and have knowledge of to initiate and lead research.

Furthermore, the ambition is that the doctoral student after completed studies should be able to:

- participate in interdisciplinary cooperations between humanities/social studies and engineering science.
- analyse the role of research in the development of society.

The doctoral programme’s size and recruitment

The program is planned to admit about 10 doctoral students a year, resulting in a total of about 50 doctoral students over five years. Exact numbers is completely depending on acquired external funding. There is currently no fixed number of students recruited every year.

The program is open for students with different topic-specific backgrounds, who has a scientific interest in the interface between technology, economics and management.

Recruitment of doctoral students takes place partly through external advertisements nationally and internationally, partly by identifying students with good research potential in the Masters programme education. Admission takes place throughout the year.
Suitability for third-cycle courses and study programmes is decided from a combination of grades, previous activities, interest and ability of independent assessment and critical analysis. In connection with the admission, a funding plan approved by the head of the department, for the doctoral student's entire programme duration should (licentiate or doctor) be presented. Admission is determined in accordance with KTH's regulatory framework.

All doctoral students admitted during the previous academic year join at the start of the autumn semester to participate in the introductory third-cycle courses of the programme.

**The principal supervisors of the program**

To the program, there are currently nearly 30 professors, guest and adjunct professors and docents connected, who can act as principal supervisors within respective subject (23 within Industrial economics and organisation and 5 within Economics, see in appendix 3).

**Funding**

The program is mainly financed in two ways; partly through the faculty appropriation from KTH, partly by external research funding to individual supervisors being used to finance doctoral students. In addition, a minor share of the doctoral students can be admitted as industry-based doctoral students and be financed by his employers outside KTH.

**Courses**

The courses within the doctoral programme are all offered within a third-cycle subject and are therefore presented in the study plan for the subject.

**Quality enhancement activities**

**Education environment**

Doctoral students with Ph.D. student employment (doctoral studentship) are offered an office (or shared office), full access to computer, printer, office services, etc., and participation in the joint activities of the department, seminars, information meetings and similar.

For industry-based doctoral students, agreements on the access to infrastructure, office services, etc., are made in each individual case. The intention is that each industry-based doctoral student should enrich the academic environment through an active participation in the activities of the department. Preferably, an industry-based doctoral student should spend at least 30% of his working hours at the department.

**Program management**

The program is led by a programme co-ordinator together with a Programme Council consisting representatives for principal supervisors and doctoral students from the different third-cycle subject areas.

**Supervisor assembly/Programme council**

All principal supervisors connected to the programme are included in the supervisor assembly that also constitutes the Programme council of the programme. The supervisor assembly constitutes the academic arena for collegiate discussions of supervision issues, research quality, final reviews, doctoral students' progress, follow up on study plans, third-cycle courses, etc. The supervisor assembly convenes 3 times/semester.

**Quality assurance**

Each doctoral student should, in addition to internal work seminars, present his/her research at at least three official programme seminars during his/her doctoral period:

1. Research plan (after about 1 year of studies),
2. Intermediate/licentiate seminar (about halfway)
3. Final review seminar (when it is estimated to be 6-12 months left to the public defence of the doctoral thesis).
At these seminars, all doctoral students and researchers connected to the programme are invited to participate. At the seminar, the manuscript is reviewed by an external expert reviewer that is not involved in the doctoral student's work. At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors.

Written material should be delivered to the invited persons, no later than a week before the seminar.

At the intermediate/licentiate seminar the reviewer should preferably be docent.

**Final review seminar**

Before the completion of the doctoral thesis, the doctoral student should present his manuscript at a final review seminar. The final review seminar is a part of the quality audit within the doctoral -programme and aims at ensuring the the doctoral thesis is of high scientific quality.

The final review seminar deals with what is considered to be the second last version of the thesis manuscript, which implies that the thesis is complete (though not completely finished). The seminar is carried out, when it is assessed by the principal supervisor to be 6-12 months of work left to the public defence of the doctoral thesis. To the seminar, an external, independent reviewer is invited, who has not been previously involved in the doctoral student's thesis. The reviewer should preferably be docent.

The final review seminar should be announced to all supervisors and doctoral students of the programme.

At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors.

In addition, the quality assurance routines of KTH and ITM for public defence of doctoral thesis apply.

**National and international network**

Industrial economics and organisation

Industrial economics and organisation is a subject that exists at essentially all well renowned technical universities in the world. In Scandinavia, KTH is one of the leading actors within Scandinavian Academy of Industrial Engineering and Management, which among other activities arranges an annual Scandinavian subject area conference. The subject is also closely connected to the social science of Business Administration through the Nordic Academy of Management.

In addition, there is an established cooperation on third-cycle courses, sharing of experiences, etc., with other Management departments at the higher education institutions within Stockholm-Uppsala University Network (SUUN), primarily the Stockholm school of economics, Swedish University of Agricultural Sciences in Ulltuna, Uppsala University, Stockholm University and Karolinska Institutet medical university. Third-cycle courses are furthermore given in collaboration with the other institutes of technology and technical universities in Sweden and within the Stockholm School of Entrepreneurship (SSES) with the Stockholm school of economics, Karolinska institutet, University college of arts, craft and design (Konstfack) and Stockholm University.

Within the third-cycle subject area, the program courses are coordinated with the Erasmus Mundus Joint Doctoral programme European Doctorate in Industrial Management which KTH/Industrial economics and organisation lead in collaboration with Politecnico di Milano, Italy; and Universidad Politécnica de Madrid, Spain (see www.kth.se /edim).

The supervisors within the subject area have a large number national and international relations. Currently, organised exchanges take place with Politecnico di Milano, Italy; Universidad Politécnica de Madrid, Spain; Gubkin Russian State University of Oil and Gas, Russia; Scandinavian Consortium of Organizational Research (SCANCOR) at Stanford University, USA; Science and Technology Policy Research Unit (SPRU) at University of Sussex, Great Britain; and University of Western England, Bristol, Great Britain.

**Economics**
Within the third-cycle subject area of Economics a close cooperation is established around third-cycle courses with equivalent doctoral programmes at Stockholm University and Stockholm school of economics (Stockholm Doctoral Program in Economics, Econometrics, and Finance, SDPE). In addition, there are cooperations with George Mason University and Max Planck Institute and currently there is ongoing work to develop an exchange programme for doctoral students and researchers at Hitotsubashi University.

The economics research is most closely related to the research at the Centre of Excellence for Science and Innovation Study (CESIS), that is run by KTH in collaboration with JÃ¶nkÃ¶ping University.

The above is enumerated and defined in appendix 3.

**Further instructions for registration**

**Appendixes**

Appendix 1: Study plan for third-cycle subject Industrial Economics and Management (INDEKO).

Appendix 2: List containing names and subject areas of supervisors within the programme

Appendix 3: Presentation of the programme’s national and international network
Doctoral programme — Industrial Economics and Management

Appendix 1: Study plan for third-cycle subject Industrial Economics and Management (INDEKO).

The subject plan was approved by Fakultetsnämnden (Faculty Board) June 1, 2010. Valid from Autumn 10.

Subject title
Industrial Economics and Management (Industriell ekonomi och organisation)

Subject description and programme outcomes

Scientific field
The subject Industrial Economics and Management was established at KTH in 1912 and have had a professorship since 1939. Sweden's first doctoral thesis in Industrial Economics and Management was presented at KTH in 1973.

Industrial Economics and Management include theoretical and practical knowledge formation central for management of innovation, production and marketing in established and emerging industries. Central topics are development of efficient industrial operations, technology-based businesses and how to create (favourable) conditions for innovation, development and growth. The subject is characterised by a diversity of approaches at different levels of analysis. The natural starting point is the organisation (the company/the department/the project) and its activities but the subject also includes studies of e.g. sectoral structures and transformation processes that span over several organisations in time and space and studies of work processes and working conditions from a co-worker perspective.

Industrial Economics and Management is an applied subject in the border between technology, social sciences and humanities. In focus is development and use of the technology for the benefit of man, companies and the society.

Current research
The research in Industrial Economics and Management is eclectic and multi-disciplinary and encompasses economics, leadership and management issues relevant to engineering work and technology-intensive activities. The research is carried out within the fields such as: Productions strategies, operations strategy, innovation management, operations management, supply-chain management, industrial marketing, project management, industrial dynamics, technology development, leadership, R&D management, the funding and financial control of companies, company strategies, knowledge management, work organisation, gender and diversity and technology-based business development and entrepreneurship.

Description of possible specialisation
1. <strong>Industrial Engineering and Management</strong>
2. <strong>Economics</strong>

Specification of how the programme outcomes are to be achieved
The aim of all third-cycle education of KTH is to provide the society with qualified researchers that can contribute to a sustainable social progress.
The goal is that KTH's doctoral students should become independent, excellent researchers. The doctoral student should after completed studies be able to:

- describe and explain theories and empirical results within the current field,
- formulate concrete research issues within the current field
- use scientific methods and provide new knowledge through own scientific studies
- analyse and evaluate applied methods and results critically from own and others' scientific studies,
- present and discuss research results in science community
- present research in an pedagogical way outside the science community and in education
- assess ethical aspects of research within the current field and act from these and
- identify the need for new knowledge and have knowledge of how to initiate and lead research.

Furthermore, the ambition is that the doctoral student after completed studies should be able to:

- participate in interdisciplinary cooperations within the current problem area and
- analyse the role of research in the development of society.

**Industrial Engineering and Management**

**Description of the specialisation**

The third-cycle subject area of Industrial Engineering and Management is included in the doctoral programme "Industrial economics and management".

The aim of all third-cycle education of KTH is to provide the society with qualified researchers that can contribute to a sustainable development of the society.

The goal is that KTH's doctoral students should become independent, excellent researchers. The doctoral student should after completed studies be able to:

- describe and explain theories and empirical results within the current field,
- formulate concrete research issues within the current field
- use scientific methods and provide new knowledge through own scientific studies
- critically analyse and evaluate applied methods and results from own and others' scientific studies,
- present and discuss research results in science community
- present research in a pedagogical way outside the science community and in education
- assess ethical aspects of research within the current field and act from these and
- identify the need for new knowledge and have knowledge of how to initiate and lead research.

Furthermore, the ambition is that the doctoral student after completed studies should be able to:

- participate in interdisciplinary cooperations within the current problem area and
- analyse the role of research in the development of society.

**Current research**

The research within the subject industrial management, the funding and financial control of companies, company strategies, knowledge management, work organisation, gender and diversity and technology-based business development and entrepreneurship.

**Programme structure**

The third-cycle studies are carried out under the guidance of a principal supervisor together with one or several assistant supervisors, in accordance with an individual study plan. The education consists of a course module and a thesis module and require an active participation in the activities at the department.

**Supervision**
Each doctoral student works under the guidance of a principal supervisor together with one or several assistant supervisors. The principal supervisor should be a professor, a visiting professor or an adjunct professor, that is employed at KTH. If an adjunct professor is the principal supervisor, he/she should also be docent at KTH. Other individuals that are docent and have a permanent post (tenure) at KTH can also be appointed the principal supervisor.

Assistant supervisors are appointed partly to meet requirements of supplementary specialist competence that can be required for the research specialisation, partly to obtain a supplementary discussion partner for the doctoral student. The assistant supervisor should have a doctoral degree.

The supervisor is appointed by the Director of Third-Cycle Education at the ITM school. The doctoral students have the right to request a change of supervisor during their education.

**Individual study plan**

Each doctoral student should have an individual study plan that has been approved by the Director of Third-Cycle Education (FA) of the ITM school, according to KTH's regulatory framework. The individual study plan should be adapted to the student's prior knowledge and to the specialisation of the thesis.

The individual study plan constitutes an important document for the planning of the research- the plan can be regarded as a course syllabus where the department clarifies the doctoral student's rights and commitments the in the Ph.D. studies. Creation and update of the study plan are done jointly by the doctoral student, the principal supervisor and the assistant supervisors.

The individual study plan is established in connection with the admission to the postgraduate studies. The study plan should be updated once a year. In connection with review and update of the individual study plan, the doctoral student’s progress should be assessed. The established/updated study plan should be registered in KTH's administrative systems.

**Departmental duties**

Within the framework for third-cycle studies, departmental duties of 20% is normally included (counted over the entire Ph.D. study period), usually by participating in the department's first and second cycle education. Apart from being an important teaching resource, the departmental duties mean that the doctoral student becomes a natural member of the work staff. By participating in the teaching at the department, the doctoral student's pedagogical skills will also be trained.

Parts that may be included in the departmental duties include e.g.:

- Teaching/supervision/grading in courses that are given by the department
- Participation in course development
- Supervision of degree projects
- Work with web pages, information materials, handling of computer tools, etc.

Each doctoral student should participate as a teacher in first and second cycle courses in Industrial economics and management. For industry-based doctoral students, this is desirable, but no requirement.

The departmental duties are planned in collaboration with the principal supervisor and the department management and should be documented in the individual study plan. The duties should be planned, so that it becomes a natural part of the third-cycle education. This also means that the departmental duties should if possible be planned, so that it is less duties during the final stage of the thesis.

**Seminar participation**

In the third-cycle studies, an active participation is required in the research seminars at the department. Each doctoral student should, in addition to internal work seminars, present his/her research at at least three official programme seminars during his/her doctoral period:

1. Research plan (after about 1 year of studies),
2. Intermediate/licentiate seminar (about halfway)
3. Final review seminar (when it is estimated to be 6-12 months left to the public defence of the doctoral thesis).

At these seminars, all doctoral students and researchers connected to the programme are invited to participate. At the seminar, the manuscript is reviewed by an external expert reviewer that not is involved in the doctoral student's work. At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors.

Written material should be delivered to the invited persons, no later than a week before the seminar.

At the intermediate/licentiate seminar the reviewer should preferably be docent.

**Final review seminar**

Before the completion of the doctoral thesis, the doctoral student should present his/her manuscript at a final review seminar. The final review seminar is a part of the quality audit within the doctoral programme and aims at ensuring that the doctoral thesis is of high scientific quality.

The final review seminar deals with what is considered to be the second last version of the thesis manuscript, which implies that the thesis is complete (though not completely finished). The seminar is carried out, when the principal supervisor estimates that 6-12 months of work remain until the public defence of the doctoral thesis. To the seminar, an external, independent reviewer is invited, who has not been previously involved in the doctoral student's thesis. The reviewer should preferably be docent.

The final review seminar should be announced to all supervisors and doctoral students of the programme.

At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors

**Compulsory and recommended courses**

The third-cycle education consists of a course module and an thesis module.

- For Degree of Licentiate, 120 credits are required, of which the thesis module is 75 credits and the course module should include at least 45 credits.
- For Degree of Doctor, 240 credits are required, of which the thesis module is 150 credits and the course module should include at least 90 credits.

It is recommended the majority of the courses are taken during the first years of the third-cycle studies. It can however also be relevant to acquire specialist knowledge later. It is important is that the course modules are described and explained in the individual study plan, related to the doctoral student's research specialisation.

Courses for third-cycle studies that are given at other higher education institutions of national doctoral schools and in international networks should be considered at the choice of courses.

All courses should approved by the doctoral student's principal supervisor and the programme co-ordinator for the doctoral programme.

**Compulsory courses**

For Degree of Doctor, the following course modules are compulsory:

- Introductory course to third-cycle courses and study programmes within the program (7.5 credits)
- Scientific theoretical course on knowledge creation traditions within the program specialisations and how these will be expressed in the research of the field (7.5 credits)
- Basic course on different qualitative research methods (7.5 credits)
- Basic course on different quantitative research methods (7.5 credits)

In addition, 60 credits of courses are required, to create topic-specific width and sufficient individual specialisation.
For Degree of Licentiate, the introductory course to the third-cycle courses and study programmes within the program is required (7.5) and at least one of other courses specified as compulsory for Degree of Doctor (7.5 credits). In addition, 30 credits of courses are required, to create required topic-specific width and sufficient individual specialisation.

**Recommended courses**

There is a high grade of flexibility at determination of the courses that should be included in the education. For each doctoral student, the course modules should be planned together with the supervisors and be documented in the individual study plan so that the courses are related to the knowledge acquisition that is required for the research.

Courses can, by agreement with principal supervisors, be included from previous education. At credit transfers, regulations in KTH's Degree Ordinance for third-cycle degrees should be observed. At Degree of Doctor, at least 60 % and at the Degree of Licentiate, at least 50 % of the total course module should be third-cycle courses. Further, according to the Degree Ordinance, courses for first-cycle studies within the disciplinary domain Technology may not be included in Degrees of Doctor and Licentiate. From education at first-cycle and second-cycle levels up to 240 credits, no courses may be included. No courses that are required for specific entry requirements to the education for third-cycle studies may be included.

Additional courses that the principal supervisor and the student consider to be important for the thesis work may also be included in the course module of Degrees of Licentiate and Doctor. Such activities can be individual literature courses, qualified actions in the research of the department or other qualified, scientifically related activities. Because such activities may be included, an agreement in advance is required between principal supervisor and the student, including credits that should be documented in the individual study plan.

*Courses in teaching and learning in higher education are a requirement, if the doctoral student during his/her doctoral studies participates in KTH’s teaching of first and second cycle courses.*

**Conferences**

Participation in conferences constitutes a central element in all education for third-cycle studies and entitles to credit. For participation and presentation of own article in a for the subject relevant international conference be granted 1 credit. No more than a total of 5 credits can be assigned for conference participation.

The conference participation must be planned in advance together with the principal supervisor.

**Other**

It is common that research specialisation lead to knowledge acquisition in a field where there are no established courses. In such cases, it is possible to join a literature study course. Such a course should be described with learning outcomes, delimitations, extent and plan for execution and it is normally presented in a report and at a seminar. Special literature study courses are established for this purpose.

**Thesis**

The thesis is a compulsory part of the education for third-cycle studies, which aims at the doctoral student developing an ability to give independent contributions to the research and the science community. The thesis can either be written as a monograph or as a compilation thesis including scientific articles. In the latter case, the thesis should include a specifically written summary (so-called summarising chapter). Irrespective of form, the thesis is assessed as a whole.

The doctoral thesis can be based on the licentiate thesis.

The thesis should normally be written in English or Swedish (for Swedish-speaking theses, special permission from the ITM school is required).

**Licentiate thesis**
A thesis for a Degree of Licentiate should contain an application of existing scientific knowledge within a new field, that the student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research.

Whether the licentiate thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed to correspond to at least two articles published in internationally recognised, scientific magazines with peer review. For a compilation thesis, the doctoral student should be the sole author of at least one article.

After approval of the principal supervisor, the thesis is presented at a public seminar, according to KTH's rules.

**Doctoral thesis**

A thesis for a Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area, that the doctoral student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research. Whether the doctoral thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed to correspond to at least four articles published in internationally recognised scientific magazines with peer review.

A monograph should normally include 80,000-100,000 words, i.e. 220-260 pages.

A compilation thesis should, apart from a summarising chapter of normally about 30-50 pages, include at least four publishable scientific articles (the international norm in the area). The doctoral student should be responsible first author of at least one article and the sole author of at least one article. Furthermore, at the time of the public defence of the thesis, at least two articles should be accepted for publication in internationally recognised scientific magazines with peer review.

**Economics**

**Description of the specialisation**

The third-cycle subject area Economics is included in the doctoral programme "Industrial economics and management".

The subject Economics has strong connections to both engineering, mathematics and industrial economics and organisation. So for example, historically the economic production theory has been developed and fed from engineering science, and the financial mathematics currently play a crucial role within the fast growing part of economics that is usually called financial economics. There are also interfaces between optimisation and the analyses of equilibrium states on different markets in Economics, and e.g. between technical development and possibilities to establish new markets. Ongoing globalisation of different markets assumes modern information and communication techniques, such as many modern pricing and charging systems.

The aim of the third-cycle education of KTH is to provide the society with qualified researchers that can contribute to a sustainable development of the society.

The goal of KTH's education for third-cycle studies is that the doctoral students should become independent, excellent researchers. The research (third-cycle) students should after completed studies be able to:

- describe and explain theories and empirical results within the current field
- formulate concrete research issues within the current field
- use scientific methods and provide new knowledge through own scientific studies
- critically analyse and evaluate applied methods and results from own and others' scientific studies
- present and discuss research results in the scientific community
- present research in a pedagogical way outside the science community and in education
- assess ethical aspects of research within the current field and act from these
- identify the need for new knowledge and have knowledge of how to initiate and lead research

The third-cycle education should also have the ambition that the doctoral student after completed studies should be able to:
• participate in interdisciplinary cooperations within the current problem area
• analyse the role of research in the development of the society

The third-cycle courses and study programmes in Economics aim at the student acquiring both advanced subject knowledge in economic theory, and good ability to apply the economic theory. The student should also acquire critical consciousness, skills in research methodology and independent research experience and after completed third-cycle courses and study programmes be well prepared for continued scientific activities.

Current research

Programme structure

For a Degree of Doctor, the education consists of a course module that should include at least 90 credits and a thesis module that includes 150 credits. For a Degree of Licentiate, at least 45 credits of courses should be included and a Licentiate thesis that includes 75 credits.

The third-cycle studies are carried out under the guidance of a principal supervisor together with one or several assistant supervisors, in accordance with an individual study plan. The education consists of a course module and an essay/thesis module. The course module consists of lectures, literature studies and problem-solving and active participation in seminars and conferences. Courses can be taken within the department or in collaboration with other national and international national research departments. The majority of the courses should be taken during the initial part of the third-cycle studies.

The third-cycle studies are carried out in accordance with an individual study plan that has been approved by the Director of Third Cycle Education. The individual study plan should be adapted to the specialisation of the essay/thesis. The doctoral student's progress should be assessed at least once a year in connection with a review of the individual study plan that should be done by the doctoral student and the principal supervisor together.

Degree of Licentiate may be taken as a part of Degree of Doctor or as a conclusion of the education for third-cycle studies. Courses and thesis that are included in Degree of Licentiate may also be included in a Degree of Doctor.

The teaching mainly consists of lectures, seminars and supervision. The student should participate in scientific activities at the department by attending seminars during the education, guest lectures, etc. Equivalent activities at other departments can also be included in the education. Also teaching and examination at other departments or other higher education institutions can be included, after permission from the principal supervisor.

Compulsory and recommended courses

For a Degree of Doctor, the following courses are compulsory:

• Introductory course to third-cycle courses and study programmes within the programme (7.5 credits)
• Theory of science course, dealing with different knowledge creation traditions within the fields of the programme, and how these will be expressed in the research of the field (7.5 credits)
• Basic course on different qualitative research methods (7.5 credits)
• Basic course on different quantitative research methods (7.5)

In addition, 60 credits of courses are required, to create required topic-specific width and sufficient individual specialisation.

For a Degree of Licentiate, the introductory course to the third-cycle courses and study programmes within the programme is required (7.5 credits) and at least one of the other courses specified as compulsory for Degree of Doctor (7.5 credits). In addition, 30 credits of courses are required, to create required topic-specific width and sufficient individual specialisation.

Other basic courses and advanced courses.
The courses intend to give subject-theoretical width within micro and macroeconomics, econometrics and theory of knowledge with doktorinhistoria. The majority of the basic courses are joint with the doctoral programmes at Stockholm University and Stockholm School of Economics. The advanced courses should give a specialisation within the subject and are established after consultation between the supervisor and the student. The education has applied microeconomics as main specialisation. Application fields are oriented against the interfaces between economics, technology and industrial economics and organisation.

_Doctoral students who teach at first or second cycle level should have taken a basic course in Teaching and learning in higher education._

**Thesis**

Thesis work is a compulsory part of the education for third-cycle studies, aiming at the doctoral student developing an ability to provide independent contributions to the research and the science community. The thesis can either be written as a monograph or as a compilation thesis including scientific articles. In the latter case, the thesis should include a specifically written summary (so-called summarising chapter). Irrespective of form, the thesis is assessed as a whole.

The doctoral thesis can be based on the licentiate thesis.

The thesis should normally be written in English or Swedish (for Swedish-speaking theses, special permission from the ITM school is required).

**Licentiate thesis**

A thesis for Degree of Licentiate should contain an application of existing scientific knowledge within a new field that the student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research.

Whether the licentiate thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed correspond to at least two articles published in internationally recognised, scientific magazines with peer review. For a compilation thesis, the doctoral student should be the sole author of at least one article.

After approval of the principal supervisor, the thesis is presented at a public seminar, according to KTH's rules.

**Doctoral thesis**

A thesis for Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area that the doctoral student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research. Whether the doctoral thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed correspond to at least four articles published in internationally recognised scientific magazines with peer review.

A monograph should normally include 80,000-100,000 words, i.e. 220-260 pages.

A compilation thesis should, apart from a summarising chapter, normally 30-50 pages, include at least four publishable scientific articles (the international norm in the area). The doctoral student should be responsible first author of at least one article and the sole author of at least one article. Furthermore, at the time of the public defence of the thesis, at least two articles should be accepted for publication in internationally recognised scientific magazines with peer review.

**Entry requirements and selection**

**General and special admission requirements and prior knowledge**

KTH's general entry requirements for admission to third-cycle education apply.

Doctoral students are expected to be able to read and write scientific English and be able to talk English fluently.
Selection rules and procedures

Admission of students to third-cycle courses and study programmes are decided by the dean of the ITM school. The ability to absorb education for third-cycle studies constitutes ground for selection. Primarily, the selection is made based on documents and material referred by the applicant. Furthermore, other bases for decision can be of significance, such as interview with the applicant and relations to his/her submitted education. Suitability for third-cycle courses and study programmes is decided from a combination of grades, previous activities, interest and ability to independent assessment and critical analysis. In connection with the admission, a funding plan approved by the head of the department, for the doctoral student's entire programme duration (licentiate or doctor) should be presented.

The programme’s degrees and examinations

Degree of Licentiate and Degree of Doctor (PhD)

Thesis work is a compulsory part of the education for third-cycle studies, aiming at the doctoral student developing an ability to provide independent contributions to the research and the science community. The thesis can either be written as a monograph or as a compilation thesis including scientific articles. In the latter case, the thesis should include a specifically written summary (so-called summarising chapter). Irrespective of form, the thesis is assessed as a whole.

The doctoral thesis can be based on the licentiate thesis.

The thesis should normally be written in English or Swedish (for Swedish language theses, special permission from the ITM school is required).

Degree of Licentiate

For a Degree of Licentiate, 120 credits are required, of which the course module should include at least 45 credits.

After approval by the principal supervisor, the thesis is presented at a public seminar, according to KTH's general regulations.

A thesis for Degree of Licentiate should contain an application of existing scientific knowledge within a new field that the student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research.

Whether the licentiate thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed correspond to at least two articles published in internationally recognised, scientific magazines with peer review. For a compilation thesis, the doctoral student should be the sole author of at least one article.

After approval by the principal supervisor, the thesis is presented at a public seminar, according to KTH's rules.

Degree of Doctor

For Degree of Doctor, 240 credits are required, of which the course module should include at least 90 credits. Courses and the thesis that is included in a Degree of Licentiate may also be included for a Degree of Doctor.

The doctoral thesis should be submitted and defended on a public public defence of doctoral thesis according to KTHs general regulations. The thesis is assessed of one of KTH appointed examining committee consisting of three or five members.

A thesis for a Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area that the doctoral student has developed via theoretical or empirical research. It should also contain an overview of previous research within the chosen subject area and position the doctoral student's contribution in relation to previous research. Whether the doctoral thesis is presented as a monograph or as a compilation thesis, it should be of such quality that it is assessed to correspond to at least four articles published in internationally recognised scientific magazines with peer review.

A monograph should normally include 80,000-100,000 words, i.e. 220-260 pages.
A compilation thesis should, apart from a summarising chapter of 30-50 pages, include at least four publishable scientific articles (the international norm in the area). The doctoral student should be responsible first author of at least one article and the sole author of at least one article. Furthermore, at the time of the public defence of the thesis, at least two articles should be accepted for publication in internationally recognised scientific magazines with peer review.

**The structure of the education**

The third-cycle studies are carried out under the guidance of a principal supervisor together with one or several assistant supervisors, in accordance with an individual study plan. The education consists of a course module and a thesis module and require an active participation in the activities at the department.

**Supervision**

Each doctoral student works under the guidance of a principal supervisor together with one or several assistant supervisors. The principal supervisor should be a professor, a visiting professor or an adjunct professor, that is employed at KTH. If an adjunct professor is the principal supervisor, he/she should also be docent at KTH. Other individuals that are docent and have a permanent post (tenure) at KTH can also be appointed the principal supervisor.

Assistant supervisors are appointed partly to meet requirements of supplementary specialist competence that can be required for the research specialisation, partly to obtain a supplementary discussion partÄ-ner for the doctoral student. The assistant supervisor should have a doctoral degree.

The supervisor is appointed by the Director of Third-Cycle Education of the ITM school. The doctoral students have the right to request a change of supervisor during their education.

**Individual study plan**

Each doctoral student should have an individual study plan that has been approved by the Director of Third-Cycle Education of the ITM school (FA), according to KTH's regulatory framework. The individual study plan should be adapted to the student's prior knowledge and to the specialisation of the thesis.

The individual study plan constitutes an important document for the planning of the research- the plan can be regarded as a course syllabus where the department clarifies the doctoral student's rights and commitments the in the Ph.D. studies. Creation and update of the study plan are done jointly by the doctoral student, the principal supervisor and the assistant supervisors.

The individual study plan is established in connection with the admission to the Ph.D. studies. The study plan should be updated once a year. In connection with review and update of the individual study plan, the doctoral student's progress should be assessed. The established/updated study plan should be registered in KTH's administrative systems.

**Departmental duties**

Within the framework for third-cycle studies, departmental duties of 20% is normally included (counted over the entire Ph.D. study period), usually by participating in the department's first and second cycle education. Apart from being an important teaching resource, the departmental duties mean that the doctoral student becomes a natural member of the work staff. By participating in the teaching at the department, the doctoral student's pedagogical skills will also be trained.

Parts that may be included in the departmental duties include e.g.:

- Teaching/supervision/grading in courses that are given by the department
- Participation in course development
- Supervision of degree projects
- Work with web pages, information materials, handling of computer tools, etc.

Each doctoral student should participate as a teacher in first and second cycle courses in Industrial economics and management. For industry-based doctoral students, this is desirable, but no requirement.
The departmental duties are planned in collaboration with the principal supervisor and the department management and should be documented in the individual study plan. The duties should be planned, so that it becomes a natural part of the third-cycle education. This also means that the departmental duties should if possible be planned, so that it is less duties during the final stage of the thesis.

Seminar participation

In the third-cycle studies, an active participation is required in the research seminars at the department. Each doctoral student should, in addition to internal work seminars, present his/her research at at least three official programme seminars during his/her doctoral period:

1. Research plan (after about 1 year of studies),
2. Intermediate/licentiate seminar (about halfway)
3. Final review seminar (when it is estimated to be 6-12 months left to the public defence of the doctoral thesis).

At these seminars, all doctoral students and researchers connected to the programme are invited to participate. At the seminar, the manuscript is reviewed by an external expert reviewer that not is involved in the doctoral student's work. At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors.

Written material should be delivered to the invited persons, no later than a week before the seminar.

At the intermediate/licentiate seminar the reviewer should preferably be docent.

Final review seminar

Before the completion of the doctoral thesis, the doctoral student should present his/her manuscript at a final review seminar. The final review seminar is a part of the quality audit within the doctoral programme and aims at ensuring that the doctoral thesis is of high scientific quality.

The final review seminar deals with what is considered to be the second last version of the thesis manuscript, which implies that the thesis is complete (though not completely finished). The seminar is carried out, when the principal supervisor estimates that 6-12 months of work remain until the public defence of the doctoral thesis. To the seminar, an external, independent reviewer is invited, who has not been previously involved in the doctoral student's thesis. The reviewer should preferably be docent.

The final review seminar should be announced to all supervisors and doctoral students of the programme.

At the seminar, somebody from the supervisor assembly act as the chairman, however not the doctoral student's principal supervisor or assistant supervisors

The programme’s examinations

Courses for third-cycle studies are examined through written examinations which are substituted sometimes by oral examinations. The design of the examination is in each individual case such that examiner is convinced that the student has acquired the course content.
Doctoral programme — Industrial Economics and Management

Appendix 2: List containing names and subject areas of supervisors within the programme

The programme description was approved by Fakultetsnämnden (Faculty Board) June 1, 2010. Valid from Autumn 10.

List of principal supervisors in the doctoral programme in Industrial economics and organisation (March 2015)

Industrial economics and management

Angelis, Jannis, Docent, Industrial economics with a specialisation in Industrial Operations Strategy

Arvidsson, Niklas, Docent, Industrial economics, particularly industrial dynamics

Bengtsson, Lars, Professor, Industrial economics, docent in Industrial work science, KTH

Brown, Terrence, Docent, Industrial economics, particularly technology-based entrepreneurship

Ekman-Rising, Marianne, Visiting professor, Industrial work science

Engwall, Mats, Professor, Industrial economics

Hammarén, Maria, Docent, Working skills and technology

Holgersson, Charlotte, Docent, Gender, organisation and management

Kaulio, Matti, Docent, Industrial work science

Kutcherov, Vladimir, Adj professor, Industrial economics

Lindgren, Monica, Professor, Industrial economics and organisation, special gender, entrepreneurship and project management

Nicklas Lundblad, Adjunct professor, Innovation within technology driven service industries

Nuur, Cali, Docent, Industrial economics, particularly industrial dynamics

Packendorff, Johann, Docent, Industrial economics, organisation and particularly industrial project management

Annika Rickne, Visiting professor, entrepreneurship and innovation with a specialisation in Industrial dynamics

Sandström, Ulf, Visiting professor, Industrial dynamics

Salehi-Sangari, Esmail, Professor, Industrial Marketing

Sonnek, David, Adj professor, Industrial economics and organisation

Uggla, Henrik, Docent, Industrial Marketing
Wahl, Anna, Professor, Gender, organisation and management

Economics

Braunerhjelm, Pontus, Professor, Economics with a focus on entrepreneurship and internationalisation

Anders Broström, Docent, Economics

Fölster, Stefan, Adj professor, Economics

Östberg, His, Professor, Economics

Nyström, Kristina, Docent, Economics
Doctoral programme — Industrial Economics and Management

Appendix 3: Presentation of the programme’s national and international network

The programme description was approved by Fakultetshänder (Faculty Board) June 1, 2010. Valid from Autumn 10.