Doctoral programme — Information and Communication Technology

The programme description was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.

Programme description (KTHIKT)

Programme name

Information and Communication Technology (Informations- och kommunikationsteknik)

Subject area

The doctoral programme's overall purpose and learning outcomes

Graduated PhDs should be ready for careers in both research intense industrial and academic environments. The three concerned research units within the School of ICT have a unique combined skill set and potential to give an industrially relevant vertical integrated third-cycle programme.

Specialisation 1. Communication; Services and Infrastructure/CSI

The completed doctor should have broad skills that concerns the interface between services and software, and infrastructure for calculation, storage and communication. A specialisation should be made within one of the fields software and service systems, distributed and parallel software and computer systems, and networking technology, including wired, wireless, and mobile communication in such a way that the work results in internationally publishable results.

Specialisation 2. Electronic systems/ES

The completed doctor should have a broad background in electronic system architecture and design, from circuit theory to system construction. A specialisation within one of the fields analog construction, digital construction, or embedded systems should lead to internationally publishable results.

Specialisation 3. Micro and nano electronics/MNE

The completed doctor should have a broad background in electronics and semiconductor physics for components and circuits on the micro and nano scales. A specialisation within one of the fields materials, components, or circuits should lead to internationally publishable results.

The doctoral programme’s size and recruitment

We plan for 125 doctoral students and an average production of 25 doctors per year.

Students from all over the world with a qualified educational background in second-cycle studies in the field of ICT who want to deepen their knowledge through third-cycle studies, specifically at the software and hardware interface , with a strong focus on communication, electronic systems, or components and circuits.

Future doctoral students normally have a background within Computer Engineering, Electrical engineering, Engineering physics or Material Physics, some depending on the specialisation.

Specialisation 1. CSI

The research area will after certain restructuring have the directorship of the Master's programmes (be given in English): Communication System, and Software Engineering of Distributed System that has among the highest applicants per place among Master's programmes at KTH. The research area also has an essential responsibility for the Mastrer of Science in Engineering programme Information Technology. The Master's programme have an excellent recruitment base for doctoral students within the area. Recruitment of doctoral students also takes place from other Master's programmes such as wireless systems and system-on-chip design. The Erasmus Mundus exchange agreements for incoming students and the Erasmus Mundus master program have also led to several recruitments of doctoral students.

Specialisation 2. ES

The research area Electronic Systems has the programme directorship of the Master's programme System-on-Chip Design and the newly established Master's programme Embedded Systems. Both

are characterised as an excellent recruiting ground for doctoral students in the area. Recruitment of doctoral students also takes place from the E and D programmes at KTH, and equivalent programmes at other Swedish universities.

Specialisation 3. MNE

The research area Integrated Devices and Circuits have the programme directorship of the Master's programme Nanotechnology and the engineering programme Microelectronics that is an excellent recruiting ground for doctoral students in the area. Recruitment of doctoral students also takes place from the Master's programme System on Chip and Embedded System. The Erasmus Mundus exchange agreement for degree projects has led to several doctoral student recruitments.

There are today 39 principal supervisors in the programme, distributed as 20 on CSI, 9 on ES and 10 MNE. A list of individuals who have the right to be principal supervisors, stated with name and subject areas, is enclosed in appendix 2.

Funding

Doctoral studentships have been financed with external direct government fundings normally from e g Vinnova, VR (project grants and frame grants), the government agency for energy, SRC (Semiconductor Research Corporation), EU (FP6/7, network of excellence, European Research Council Advanced Researcher Grant etc) and SSF (strategic investments, pioneering electronics et al).

The following employment types occur:

Doctoral studentship
Employment type: Temporary, according to The Higher Education Ordinance chapter 5 (5 year including the departmental duties of 20%)
Salary: According to KTH's agreement for PhD student salaries ("doktorandlöner")

Doctoral grant with an additional position as an assistant ("assistenttjänst")
Employment type: Temporary, according to ordinance on doctoral grant for doctoral students SFS 1995:938
Salary: Doctoral grant and position as assistant 20% according to KTH's agreement for PhD student salaries ("doktorandlöner")

Note that when two year of the education remain, the funding is normally converted to employment as a PhD student ("doktorandtjänst").

Only scholarships of the type CSC and HEC occur. Our intention is to apply scholarship funding more and more restrictively (the aim is at most 10% of the number of doctoral students).

Withing the ICT-school so called excellence positions will be funded in association to the Ph.D. program linked to the school. We also suggest that a part of the faculty funds for the research areas

("verksamhetsbaser") directly associated to the doctoral programme be utilised to fund excellence positions. Also in the past, excellent doctoral students could be financed with direct government funding for research and third-cycle programmes.

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

We intend to reinforce the compulsory annually occurring updating of the individual study plan in the following way. The follow-up is concentrated to a couple of days/a week yearly when we systematically allow all doctoral students/supervisors to publically at a meeting of each concerned research area account for the progress of the year. The plan is updated in connection with this. The ICT school has already introduced as a policy that all abnormalities in positive and negative direction should be noted in writing. The renewal of employments or other associations is also connected to this occasion.

We strongly recommend but set no requirements on Licentiate as an intermediary degree.

We have already introduced, but will further systematise, a system with a so called ´thesis proposal´, where the doctoral student about one year before the planned public defence of the doctoral thesis /the licentiate seminar presents a sketch on the coming thesis/the essay (in writing and orally) for an externally appointed reviewer at an open seminar. We have also introduced a system with so called . ´pre-seminars´ where, also in open form, the almost completed thesis is presented and reviewed before the formal examination procedure starts.

The publication norm for the field is a combination of internationally reviewed conference papers and journal articles. The most common dissertation form is a compilation thesis with on average 6-8 articles of which the main part should be published (this is a minimum norm that in many cases is exceeded). Monographs can occur, but then the monograph is normally based on underlying journals of the same quality as for the compilation thesis. Both forms of dissertations will be allowed within the doctoral programme.

A professor acting as programme co-ordinator and a director of studies for the third-cycle courses will be appointed, the later substituted earlier directors of studies for the third cycle on the three associated research areas. The coordinators (directors of studies) for the research areas (departments) will be responsible for the respective specialisations and included in a steering group together with the Programme co-ordinator and FA at the School of ICT. A reference group with representatives from EIT ICTLabs, platforms at KTH (ICT, energy and material) and the industry will be assembled. Student representatives, one per specialisation, will be included in a programme committee together with representatives for the activities.

The school has a well-working and complete environment for the development of analog and digital integrated circuits and for development and prototypes of embedded systems. There is an extensive

license agreement with Mentor, Cadence and Synopsys that implies all important industrial development tools available for research and education. KTH has for several years by means of funds from Wallenberg and other direct government sources invested significantly in the Electrum laboratory in Kista, that is included in the national clean room network MyFab.

The entire set of postgraduate courses of the doctoral programme will obtain updated course syllabi with expected learning outcomes. Each course occasion will be followed up with a course questionnaire and a course analysis in the same way as the courses within the first-cycle and second-cycle programmes, so that the range of courses offered can be reviewed annually.

National and international network

Description of network building within the program through joint activities, apart from concerning the course module, in e g summer schools, interaction with the industry and with other higher education institutions et cetera. and description of international contacts and exchanges within the doctoral programme. The above is listed and defined in appendix 3.

The above is enumerated and defined in appendix 3.

Further instructions for registration

Appendixes

Appendix 1: Study plan for third-cycle subject Information and Communication Technology (INFKOMTE).

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 — Information and Communication Technology

Appendix 1: Study plan for third-cycle subject Information and Communication Technology (INFKOMTE).

The subject plan was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.

Subject title

Information and Communication Technology (Informations- och kommunikationsteknik)

Subject description and programme outcomes

Scientific field

1.1 Scientific field

Information and communication technology can be divided into three parts: Communication: Services & Infrastructure, Electronic Systems and Micro and Nano Electronics.

The study in the subject Communication: Services & Infrastructure includes the interface between Services and Software respective to Infrastructure for calculation, storing and communication. A

specialisation should be made within one of the fields Software and Service Systems, Distributed and Parallel Software and Computer Systems and Network Technology including both fixed and wireless and mobile communication. Both theory, design, implementation and evaluation of these systems are relevant.

Studies in the subject Electronic Systems include among other things design and analysis of electronic systems, computer systems and other systems that include electronics and/or computers and theories and methods for design, implementation and analysis of these. The subject can include the study of hardware and software, together or each in its own right.

The topic Micro and Nano Electronics is defined as the study of the physical and technological problems that occur in the context of interaction between electromagnetic fields and materials in the solid state. Of interest is also the technology for the production of these materials as well as components and circuits produced thereof and their function.

1.2 Specialisations

The specialisations are:

l. Communication: Services & Infrastructure/Communication: Services & Infrastructure (CSI)

2. Electronic Systems (ES)

3. Micro and Nano Electronics/MNF

The specialisations represented within the third-cycle subject area have joint parts, while they have specialised parts both when it comes to theory, method and application.

Doctoral students in the subject Information and Communication Technology should be given an extensive training in research methodology and acquire a good analytical ability. Active participation in national and international research networks within the knowledge field is strived for.

The aim with the education is that the doctoral students should become independent, excellent researchers. The research student should after completed studies be able to:
- describe and explain theories and empirical results within his/her specialised field
- formulate concrete research issues within the subject area Information and Communication Technology
- use scientific methods and provide new knowledge through own scientific studies
- analyse and evaluate critically applied methods and results from own and others'scientific studies
- present and discuss research results in the scientific community
- present research in an pedagogical manner outside the science community in education contexts
- assess ethical aspects around research within the subject area Information and Communication Technology and act from these and
- identify needs of new knowledge and have knowledge of how to initiate and lead research.

The education should also aim towards that the doctoral student after completed studies should be able to:
- participate in interdisciplinary cooperations within the problem area and
- analyse the role of research in the development of society.

Description of possible specialisation

1. Specialisation in Communication: Services & Infrastructure
2. Specialisation in Electronic Systems
3. Specialisation in Micro and Nano Electronics

Specification of how the programme outcomes are to be achieved

Specialisation in Communication: Services & Infrastructure

Description of the specialisation

The study in the subject Communication: Services & Infrastructure includes the interface between Services and Software respective to infrastructure for calculation, storing and communication. A specialisation should be made within one of the fields Software and Service Systems, Distributed and Parallel Software and Computer Systems and Network Technologies including both fixed and wireless and mobile communication. Both theory, design, implementation and evaluation of these systems are relevant.

Courses within the following areas are recommended for doctoral students in Communication: Services & Infrastructures:

Dimensioning and performance analysis of communication systems

Architectures and protocols for communication systems

Communication related services and service platforms

Information & Communication theory

Wireless systems

Distributed Systems

Logic, Automata Theory, Complexity Theory, Artificial Intelligence

Data Security

Human Machine Interaction

Tele Economy (cost and business models, regulation).

Courses from other areas as well as complementary courses (e.g. project management, teaching and learning and presentation techniques) may be included depending on the focus of the essay or thesis.

Current research

Research within Communication Systems includes theory, design, implementation and evaluation of communication systems and communication services. In particular, fixed and wireless nets are treated, applications, systems for networks and service management, communications protocols and architectures for communication systems but also economic and regulative aspects on communication system. The research also includes the following fields:

Data Security, Human Machine Interaction and Applied Artificial Intelligence.

Programme structure

The education for third-cycle studies consists of a course module and a thesis module. Course modules consist of lectures, literature studies and problem-solving activities, including active participation in seminars and conferences. Courses can be studied within the school or in collaboration with other national and international research departments.

The education for third-cycle studies are carry out under the guidance of a principal supervisor together with one or several assistant supervisors in accordance with an individual study plan that has been accepted by the person responsible for research education. The student's individual study plan should be adapted to the prior knowledge and to the specialisation of the 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 made by the student and his/her main supervisor.

Before completing a licentiate thesis or doctoral thesis, an internal review of the manuscript should be done by a specially appointed censor. The doctoral student should also participate in national and international conferences within the knowledge field.

Compulsory and recommended courses

A degree of Licentiate consists of a course module of at least 30 credits and a thesis module of at least 60 credits, so that the sum amounts to 120 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least half should be for third-cycle studies.

A degree of Doctor consists of a course module of at least 60 credits and a thesis module of at least 120 credits which in all should give 240 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least 60 percents should be for third-cycle studies.

The course module for both degree of Licentiate and Degree of Doctor consists of compulsory and optional courses. The courses should be taken in accordance with an agreement between the student and his/her main supervisor, stated in an individual study plan.

Compulsory courses should be carried out equivalent to 7.5 credits for Degree of Licentiate and Degree of Doctor. The compulsory course and its credit are the following: - Theory of Science and Research Methodology, 7.5 credits (provided this knowledge is not present from the second cycle studies)

Courses can, by agreement with principal supervisors, be included from earlier education. At credit transfers, regulations in KTH's Degree Ordinance for the higher education qualifications should be observed for third-cycle studies. At Degree of Doctor at least 60 % and at the Degree of Licentiate at least 50 % of the total course module should be for third-cycle studies. Further according to the Degree Ordinance courses for first-cycle studies within the disciplinary domain Technology may not be included in doctor and Degree of Licentiate. From education for first-cycle studies and second cycle 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 parts of courses that supervisors and students jointly deem important for the essay or the thesis may also be included in the course module of the Degrees of Licentiate or Doctor. Such credited activities can be individual literature courses, qualified actions in the research activity of the department or other qualified scientifically related activities. Because such activities should may be included, agreement in advance is required between principal supervisors and students with credits that are established in the individual study plan.

Courses in teaching and learning in higher education are a requirement, if teaching within first cycle and second cycle are to take place during the period of education.

Thesis

The essay or the thesis is a compulsory part of the education for third-cycle studies. This part of the education aims at developing the student's ability to give independent contributions to research and cooperating to scientific studies within and outside his/her own subject. The essay/the thesis should contain new research results that the student has developed alone or in collaboration with others. The main scientific results should satisfy the quality requirements for publication in internationally recognised journals using a peer review system. The doctoral student's contributions to texts included in the essay/the thesis that have several authors should be distinguishable.

A licentiate thesis 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 earlier research within the chosen subject area. Irrespective of whether the licentiate thesis is presented as a monograph or as a joinder of scientific articles, it should be of such quality that it is judged to constitute ground for at least two normal articles that can be published in internationally respected magazines utilising a peer review system.

A thesis for the Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area that the student has developed via theoretical or empirical research. It should

also contain an overview of earlier research within the chosen subject area. Irrespective of whether the doctoral thesis is presented as a monograph or as a joinder of scientific articles it should be of such quality that it is assessed to constitute ground for at least four normal articles that can be published in internationally respected magazines utilising a peer review system.

Specialisation in Electronic Systems

Description of the specialisation

Studies in the subject Electronic Systems include among other things Design and Analysis of Electronic Systems, Computer Systems and other systems that include electronics and/or computers and theories and methods for design, implementation and analysis of these. The subject can include the study of hardware and software, together or each in its own right.

Current research

Research within electronic systems includes parts of the main fields of study Electrical Engineering and Computer Science. KTH carries out research within such subareas of Electronics and Computer Systems that are particularly relevant to Information and Communication Technology, such as Radio Electronics, Circuit Theory, Electronics, Electronic Construction Methods, Construction of Electronic Systems, Digital Technology, Embedded Systems, Compiler Technology, Computer Architecture, Parallel and Distributed Computer Systems, Performance Analysis of Computer Systems, Real Time Systems and Programming Languages, Software, Algorithms and theory of such systems.

Programme structure

The education for third-cycle studies consists of a course module and a thesis module. Course modules consist of lectures, literature studies and problem-solving activities, including active participation in seminars and conferences. Courses can be studied within the school or in collaboration with other national and international research departments.

The education for 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 that has been approved by the person responsible for research education. The student's individual study plan should be adapted to the prior knowledge and to the specialisation of the thesis. The progress of the doctoral student should be assessed at least once a year in connection with audit of the individual study plan that should be made by the student and the principal supervisor.

Before completing of licentiate thesis or doctoral thesis, an internal review of manuscripts should take place with a particularly appointed censor. The doctoral student should also participate in national and international conferences within the knowledge field.

Compulsory and recommended courses

A degree of Licentiate consists of a course module of at least 30 credits and a thesis module of at least 60 credits, so that the sum amounts to 120 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least half should be for third-cycle studies.

The degree of Doctor consists of a course module of at least 60 credits and a thesis module of at least 120 credits which in all should give 240 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least 60 percents should be for third-cycle studies.

The course module for both degrees of Licentiate and Doctor consists of compulsory and optional courses. The courses should be taken in accordance with an agreement between the student and his /her main supervisor, stated in the individual study plan.

Compulsory courses corresponding to 7.5 credits should be carried out for the Degree of Licentiate and the Degree of Doctor. The compulsory course and its credit are the following:
- Theory of Science and Research Methodology, 7.5 credits (if this knowledge is not present from the education in the second cycle)

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

Additional parts of the course as the supervisor and the student jointly deem important for the essay /thesis may also be included in the course module of Licentiate respective to Degree of Doctor. Such activities can be individual literature courses, qualified actions in the research activity of the department, or other qualified scientifically connected activities. In order for such activities to be included, an agreement in advance is required between the principal supervisor and the student with credits that are stated in the individual study plan.

Courses in teaching and learning in higher education are a requirement, if teaching within first cycle and second cycle should take place during the education period.

Courses within the following areas are recommended for doctoral students in Electronic Systems:

Formal Design Techniques Digital Systems Engineering Theory of Distributed Systems Concurrent Programming Semantics for Programming Languages Systems Modelling Systems ASIC Design Communication Systems

Thesis

The essay / thesis is a compulsory part of the education for third cycle studies. This part of the education aims at developing the student's ability to give independent contributions to research and cooperating to scientific studies within and outside his/her own subject. The essay/the thesis should contain new research results that the student has developed alone or in collaboration with others. The main scientific results should satisfy the quality requirements for publication in internationally recognised journals with peer review systems. The doctoral student's contributions to texts that have several authors, and are included in the essay/the thesis should be distinguished.

A licentiate thesis 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 earlier research within the chosen subject area. Irrespective of whether the licentiate thesis is presented as a monograph or as a joinder of scientific articles it should be of such quality that it is assessed to constitute ground for at least two normal articles that can be published in internationally respected magazines with peer review systems.

A thesis for Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area that the student has developed via theoretical or empirical research. It should also contain an overview of earlier research within the chosen subject area. Irrespective of whether the doctoral thesis is presented as a monograph or as a joinder of scientific articles it should it be of such quality that it is assessed to constitute ground for at least four normal articles that can be published in internationally respected magazines with peer review systems. .

Specialisation in Micro and Nano Electronics

Description of the specialisation

The subject Micro and Nano Electronics is defined as the study of the physical and technological problems that occur in connection with the interaction between electromagnetic fields and materials in the solid state. Of interest is also the technology for the production of these materials both as components and circuits produced thereof and their function.

Current research

Research within Micro and Nano Electronics includes parts of the main topics Physics and Electrical Engineering. At KTH, research is carried out within subareas of Micro Electronics and Applied Physics that are particularly relevant to Information and Communication Technology, such as Semiconductor Materials, Integrated Components, Circuits, Photonic Components, Radio Electronics, Circuit Theory, Electronics and Electronic Construction.

Programme structure

The education for third-cycle studies consists of a course module and a thesis component. Course modules consist of lectures, literature studies and problem-solving activities, including active participation in seminars and conferences. Courses can be studied within the school or in collaboration with other national and international research departments.

The education for 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 that has been approved by the person responsible for the research education. The student's individual study plan should be adapted to the prior knowledge and to the specialisation of the thesis. The Doctoral student's progress should be assessed at least once a year in connection with the audit of the individual study plan that should be made by students and principal supervisors.

Before completing of a licentiate thesis or a doctoral thesis an internal prescreening of manuscripts should take place with a particularly appointed censor.. The doctoral student should also participate in national and international conferences within the knowledge field.

Compulsory and recommended courses

A degree of Licentiate consists of a course module containing at least 30 credits and a thesis module containing at least 60 credits, so that the sum amounts to 120 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least half should be for third-cycle studies.

A degree of Doctor consists of a course module containing at least 60 credits and a thesis module containing at least 120 credits which in all should give 240 credits. The exact balance between course module and thesis module should be established in the individual study plan. Of the total course module at least 60 percents should be for third-cycle studies.

The course module for both the degree of Licentiate and the degree of Doctor consists of compulsory and optional courses. The courses should be taken in accordance with an agreement between the student and his/her main supervisor, following an individual study plan.

Compulsory courses should be carried out equivalent to 7.5 credits for the degree of Licentiate and the degree of Doctor. The compulsory course and its credit are the following:
- Theory of Science and Research Methodology, 7.5 credits (provided this knowledge is not covered by the student's education for second-cycle studies)

Courses from earlier education can be included, by agreement with the principal supervisor. At credit transfers, regulations in KTH's Degree Ordinance for the higher education qualifications should be observed for third-cycle studies. For a Degree of Doctor at least 60 % and for a Degree of Licentiate at least 50 % of the total course module should be for third-cycle studies. Further obtains according to the Degree Ordinance courses for first-cycle studies within the disciplinary domain

technology not be included in doctor and Degree of Licentiate. For education from the first-cycle and second cycle up to 240 credits no inclusion may occur. Obtained including not make courses that are required for specific entry requirements to the education for third-cycle studies.

Additional parts of the course as supervisors and students joint assess important for essay-/the thesis may also be included in the course module of licentiate- respective Degree of Doctor. Such activities can be individual literature courses, qualified actions in the research activity of the department, or other qualified scientifically connected activities. In order for such activities to be included, an agreement in advance is required between the principal supervisor and the student with credits that are established in the individual study plan.

Courses in teaching and learning in higher education are a requirement, if teaching within first cycle and second cycle should take place during the period of education.

Courses within the following areas are recommended for doctoral students in Micro and Nano Electronics:

Solid State Physics Characterization Techniques for Micro Electronics and Photonics Optics Microwave Engineering Fibre Optic Communication Photonics Electrical Analytical Methods and Test Structures Power Semiconductor Components

Thesis

The essay/the thesis is a compulsory part of the education for third-cycle studies. This part of the education aims at developing the student's ability to give independent contributions to research and cooperating to scientific studies within and outside his/her own subject. The essay/the thesis should contain new research results that the student has developed alone or in collaboration with others. The main scientific results should satisfy the quality requirements for publication in internationally recognised journals with referee systems. The doctoral student's contributions to texts that have several authors included in the essay/the thesis should be distinguishable.

A licentiate thesis 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 earlier research within the chosen subject area. Irrespective of whether the licentiate thesis is presented as a monograph or as a joinder of scientific articles it should be of such quality that it is assessed to be able to constitute ground for at least two normal articles that can be published in internationally recognized magazines with a peer review system.

A thesis for Degree of Doctor should contain new theoretical or empirical research results within the chosen subject area that the student has developed via theoretical or empirical research. It should also contain an overview of earlier research within the chosen subject area. Irrespective of whether the doctoral thesis is presented as a monograph or as a joinder of scientific articles, it should be of such quality that it is assessed to constitute ground for at least four normal articles that can be published in internationally respected magazines utilising a peer review system.

Entry requirements and selection

General and special admission requirements and prior knowledge

General entry requirements for education for third-cycle studies consist of

- qualification awarded for second-cycle studies, or
- completed course requirements about at least 240 credits of which at least 60 credits should be for second-cycle studies or
- equivalent knowledge acquired in another way within or outside the country.

As requirements of specific entry requirements apply according to Higher Education Ordinance 7 chapter section 40 the requirement that are set because doctoral student should be able to absorb education. The requirements may intend:

- knowledge from higher education or the equivalent education,
- special professional or vocational experience, and
- necessary language skills or other conditions that are determined by the education.

For requirements of specific entry requirements at KTH, see

Admission regulations for education for third-cycle studies

Doctoral students are expected to be able to read and write scientific English and to be able to speak English fluently.

Selection rules and procedures

Admission to education for third-cycle studies is decided by the dean of the school after preparation by the director of studies or the equivalent and where appropriate by the person responsible for the research education (at assessment of qualifications).

Apart from that the applicant has been tested to be eligible, it is the grade of maturity and ability to independently assess and critically analyse that is placed underlying selections. Of great interest in this assessment is earlier study results in courses of specialisation in academic first-cycle and second-cycle courses and study programmes or independently performed scientific work. To obtain a comprehensive decision-making basis, the applicants are interviewed by the director of studies or the equivalent together with the intended supervisor. Contact is normally taken with teachers at the

education that the applicant has earlier gone through. Selection among applicants to education for third-cycle studies are made by the dean of school in consultation with a director of studies or the equivalent and the intended principal supervisor in connection with the admission office.

The programme’s degrees and examinations

Degree of Licentiate and Degree of Doctor (PhD)

Degree of Licentiate and Degree of Doctor (PhD)

The degree of Licentiate consists of a course module of at least 30 credits and a thesis module containing at least 60 credits so that the sum amounts to 120 credits. The degree of Licentiate consists of a course module of at least 30 credits and a thesis module containing at least 60 credits so that the sum amounts to 120 credits. The essay should be submitted and defended in accordance with KTH's general regulations.

A degree of Doctor consists of a course module containing at least 60 credits and a thesis module containing at least 120 credits so that the sum amounts to 240 credits. The exact balance between course module and thesis module should be established in the individual study plan. The thesis should be submitted and defended in accordance with KTH's general regulations. Courses and thesis work that are included in the Licentiate degree may also be included in the PhD degree.

The programme’s examinations

In courses for third-cycle studies a written examination should be included. In certain cases, this can be substituted by an oral test. The design of the examination should in an individual case be such that examiner can convince himself that the student has acquired the whole course content.

Belongs to: KTH ICT

Last changed: 2010-09-14

Doctoral programme — Information and Communication Technology

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

The programme description was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.

Doctoral programme — Information and Communication Technology

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

The programme description was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.