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Translation of Curriculum Statement for Graduate Level (Third-level) Education

Electrical Engineering with specialization in Signal Processing

Swedish title: Elektroteknik med inriktning mot Signalbehandling

TNELTE03

TNELTE04

Swedish Curriculum adopted by the Board of the Faculty of Science and Technology (Board for Third-level Education) on 2008-07-02. Translation approved on 2010-09-03.

The Curriculum Statement for Third-level Education consists of three parts: a general part, this subject specialized curriculum statement, and each doctoral student's individual study plan.

Objective

Based on the undergraduate and graduate education within the area the post graduate education should add increased insight and in depth knowledge. By the provided supervision, and through the thesis work, the student will be well prepared for independently conducting his/her own research or any other professional activity with requirements on in depth knowledge of the subject and research ability.

The doctoral student shall also be able to present her/his own goals and results orally and in writing to different target groups in English and, in the case of Swedish-speaking doctoral students, in Swedish.

Subject description

The area Signal Processing comprises theory, applications, and implementation aspects. Methods for analysis, synthesis, evaluation, processing and transmission of signals and their contents constitute central aspects. In this context, relevant information can, for example, be the message embedded in the signal, or the shape of the signal either with respect to time or space, or its frequency contents or a parametric model representing the shape or the statistical properties of the signal.



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A general goal is to obtain optimal results according to specified criteria, under certain assumptions and constraints. The methods used can be parametric or non- parametric using either a deterministic or statistical framework.

Applications include telecommunications, radar, sonar, speech, pattern recognition, neurophysiology, audio, and non-destructive evaluation of materials.

Eligibility

Basic Eligibility

The basic eligibility for third level education is described in the general part of the curriculum statement.

Special Eligibility

A person has special eligibility she/he has passed examination in courses comprising at least 120 HE credits in areas of relevance for the area signal processing or in other ways acquired the same competence.

Special eligibility is fulfilled, should the applicant fulfill either of the following conditions:

1. The applicant has obtained, from a Swedish university, the exam “Civilingenjör” or an exam from a “Natural Science Program” comprising courses in signal processing of at least 15 HE credits.
2. The applicant has, within or outside Sweden, acquired knowledge and skills comparable to 1. above with particular emphasis on signal processing.

Admission

Applicants for third level program in Electrical Engineering with specialization in Signal Processing must submit an application to the head of the department of engineering science or the department of information technology. Admissions to places in third level programs take place normally two to six times per year.

In connection with the admission it must be stated how it is planned to finance both the personal maintenance of the doctoral student, and her/his research.



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Program structure

In connection with the admission, each doctoral student and her/his supervisor shall draw up an individual study plan after consultation with the professor in charge of the third level program. The plan is to be approved by the head of the department (by delegation of the Faculty Board), in connection with the admission.

The individual study plan shall be reviewed jointly by the doctoral student and her/his supervisor, annually, and be provided with a summary of the achieved results and the plans for the coming year. Significant changes and any disagreement on the individual study plan shall be reported to the head of the department or, if deemed necessary, to the Board for Third-level Education.

Courses

Within the third level program there may be different kinds of courses, such as lectures, literature studies, practical training, field studies, etc. The courses are intended to provide wider insights into the subject as a complement to the specialist competence acquired in the research work. The courses included in the individual study plan can be selected from available courses within the students own department as well as from other departments at Uppsala University and KTH. The course curriculum will be revised from time to time. However, the student is supposed to select courses from the following blocks:

Signal Processing: Courses in statistical signal processing, adaptive filtering, recursive identification, array signal processing, spectral analysis, detection and estimation, and telecommunications.

Signal and Systems Theory: Courses in linear systems, stochastic systems, system identification, and non-linear systems.

Mathematics: Courses in linear algebra, matrix theory, optimization, multivariate statistics, probability theory, and numerical analysis.

Project Specific Courses: Courses within the specific research area or courses which constitute in depth studies within some of the areas above.

Miscellaneous Courses: General courses within areas such as project management, scientific writing, entrepreneurship, and pedagogy.



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The student is expected to have taken courses adding up to at least 55 HE credits for PhD degree and 30 HE credits for Licentiate degree from the course blocks Signal Processing and Signal and Systems Theory, respectively. Some of the courses may be taken from the advanced level, should they not already be included in the exam granting eligibility.

Requirements for doctoral degree

The requirements for doctoral degree consist of on one hand passed examinations in the courses included in the approved individual study plan of each doctoral student, and on other hand passed public defense of the doctoral thesis. The program leading to the doctoral degree amounts to 240 higher education credits (four years of full-time studies), of which the thesis part amounts to a minimum of 120 higher education credits and the course part to a minimum of 90 higher education credits.

Requirements for licentiate degree

A stage of at least 120 higher education credits (two years of full-time studies) in the third level program may be completed with a licentiate degree. The requirements for this are that the doctoral student both has passed the examinations included in the program stage and has got an academic paper amounting to a minimum of 60 higher education credits passed. The course part amounts to a minimum of 60 higher education credits.

Other

More information can be obtained from the websites www.teknik.uu.se and www.it.uu.se.