



UPPSALA
UNIVERSITET

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

Electrical engineering with specialization in automatic control

Swedish title: Elektroteknik med inriktning mot reglerteknik

TNELTE01, TNELTE02

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 2010-08-10.

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

Utgående från den grundläggande utbildningen inom ämnesområdet skall utbildningen på forskarnivå ge ytterligare insikter och fördjupade kunskaper inom ämnet. Genom handledning och avhandlingsarbete skall doktoranden göras väl förberedd för en kritisk, kreativ och självständig forskningsverksamhet eller för annan yrkesverksamhet, där höga krav ställs på djupgående ämnesinsikt och forskningskunnande.

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 subject area automatic control comprises theory, methods and technology for the study of dynamic systems and their control. The general control problem concerns how to make a given system to achieve specified goals under presence of disturbances and various technical limitations. The subject area includes also modeling and estimation problems for dynamic systems.

Automatic control has many applications in various fields such as process industry, vehicles and servo systems. It can also be used in nontechnical areas such as economy and medicine. Automatic control is close to other system-related areas such as signal processing and



UPPSALA
UNIVERSITET

communications, as well as to applied mathematics and system theory. Automatic control is not coupled to any particular application area but gives a general methodology for studies, analysis and synthesis of dynamic systems. Therefore the subject area is primarily mathematical and methodological in character. This does not prevent though that PhD theses can also be oriented to technical applications.

Eligibility

Basic Eligibility

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

Special Eligibility

Special eligibility is achieved by those who has satisfactorily obtained knowledge in automatic control and in courses relevant for automatic control achieved at least 120 HE credits. Special eligibility is regarded to be fulfilled by those who have obtained one of

- a) Master of Science in engineering at a Swedish university and passed courses in automatic control of at least 15 HE credits
- b) Master of Science in natural sciences and passed courses in automatic control of at least 15 HE credits
- c) In other ways, within or outside Sweden, obtained knowledge of the same level as above, in particular in automatic control

For persons with other educational background, complementary studies can be necessary for eligibility. Information can on individual basis be obtained from the responsible professor.

Admission

Applicants for third level program in electrical engineering with specialization in automatic control must submit an application to the head of Department of Information Technology or the head of Department of Engineering Sciences. Admissions to places in third level programs take place normally several 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.



UPPSALA
UNIVERSITET

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 may partly be selected among courses at the student's home department. There is an informal cooperation with the corresponding departments at the Royal Institute of Technology with the aim to provide a broad set of courses. Some of the courses may be taken from the second level, provided that they have not been accounted for in the student's Master of Science. For the PhD exam courses comprising at least 90 HE credits are required, and for licentiate exam at least 60 HE credits.

The course credits can be combined from several blocks of courses, as described below, where the combination may reflect if the student's research has a theoretical or practical direction. The student should though take courses of at least 50 HE credits for PhD and of at least 30 HE credits for licentiate exam from the two blocks Control design and Signal and system theory.

As the range of courses offered is revised continuously, only generic course names are used below.

Control design (can be courses in optimal control, linear-quadratic control, multivariable control, adaptive control, robust control)



UPPSALA
UNIVERSITET

Signal and system theory (can be courses in linear systems, stochastic systems, system identification, nonlinear systems)

Signal processing (can be courses in statistical signal processing, adaptive filtering, recursive identification, array signal processing, spectral analysis, detection and estimation, telecommunications)

Mathematics (can be courses in linear algebra, matrix theory, optimization, multivariate statistics, probability theory, numerical analysis)

Project specific courses (may be courses coupled to specific projects, or more advanced studies of courses from the blocks above)

Other courses (may be courses in didactics, project managements, scientific writing, entrepreneurship, etc)

Courses that have been used to achieve special eligibility, can not be re-accounted for in the third level program.

The major course work takes normally place during the first part of the third level studies.

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



UPPSALA
UNIVERSITET

Further information can be obtained from www.it.uu.se (check the Division of Systems and Control) and www.signal.uu.se