

*This document is a translation of the Swedish original. In the event of any discrepancy between the translated document and the Swedish original, the original shall prevail.*

## **General syllabus for doctoral (third-cycle) studies in Electronic Systems at Luleå University of Technology**

Decided by the Chair of the Board of Faculty of Science and Technology on 2022-01-13.

### **1. Subject description**

Swedish name: Elektroniksystem

English name: Electronic Systems

Electronic systems include electronics design, measurement technology and electromagnetic compatibility for control, monitoring and instrumentation of technical processes and systems, with close connection to applications and applied research.

### **2. Programme aim and intended learning outcome**

The aim of the doctoral (third-cycle) studies in Electronic Systems at the University is to give the doctoral student specialised knowledge in Electronic Systems, in-depth knowledge of different research methods and a good understanding of the challenges related to research and its practical application. The overall objective of the programme is that the doctoral student develops into a critical and autonomous researcher in Electronic Systems, able to plan and carry out research projects. The doctoral student shall fulfil all the qualitative targets specified in the Higher Education Ordinance as well as in the locally decided qualitative targets, if any (see attached Annex A).

### **3. Admission requirements and selection**

#### 3.1 General entry requirements

An applicant meets the general entry requirements for doctoral (third-cycle) studies if he or she has been awarded a Master's (second-cycle) qualification, has satisfied the requirements for courses comprising at least 240 credits, of which at least 60 second-cycle credits, or has acquired substantially equivalent knowledge in another way, in Sweden or elsewhere. The university may, for an individual applicant, grant an exemption from the requirement for basic eligibility, if there are special reasons. (Higher Education Ordinance (2010:1064) Chapter 7 Section 39). See also LTU's local guidelines in the admission procedure for postgraduate education.

#### 3.2 Specific entry requirements

In addition to the requirement for basic qualifications, the main subject/main field on advanced level of study shall be one of the following: Electrical engineering, Electronics, Engineering physics and electronics, Engineering physics, Physics, Space Engineering, Computer Science, Mathematics, Mechanical engineering, Chemistry, Material science or a comparable subject.

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An applicant also meets the specific entry requirements if he or she has acquired substantially equivalent knowledge in another way, in Sweden or elsewhere.

### 3.3 Selection

In selecting among applicants who meet the requirements, their ability to benefit from the course or the study programme shall be taken into account. However, the fact that an applicant may be credited for previous courses and study programmes or for professional or vocational experience may not alone give the applicant priority over other applicants (Higher Education Ordinance (2010:1064) Chapter 7 Section 41). The University's local guidelines in the Admissions procedure for doctoral (third-cycle) studies must also be applied.

The following criteria will be used in the selection of applicants for doctoral (third-cycle) studies in Electronic Systems.

- Knowledge relevant to the project in question.
- Personal qualities relevant for third-cycle education.
- Grades obtained in relevant courses.
- Very good command of oral and written communication in English.

## **4. The degree**

The doctoral (third-cycle) studies lead to a Degree of Doctor. In Electronic systems, a student admitted to doctoral studies has the possibility to be awarded a licentiate degree after having completed at least 120 credits of the programme leading to a Degree of Doctor.

### 4.1 Degree requirements

For a Degree of Doctor, the doctoral student shall

- have been awarded a pass grade for courses of at least 60 credits
- have been awarded a pass grade for a research thesis (doctoral thesis) of at least 120 credits.

The thesis and the courses shall together amount to 240 credits for a Degree of Doctor.

For a Degree of Licentiate, the doctoral student shall

- have been awarded a pass grade for courses of at least 30 credits.
- have been awarded a pass grade for a licentiate thesis of at least 60 credits.

The thesis and the courses shall together amount to 120 credits for a Degree of Licentiate.

### 4.2 Titles of degree

- After the completion of the Degree of Doctor in Electronic Systems the doctoral student is awarded the title Doctor of Philosophy in Science
- After the completion of the Degree of Licentiate in Electronic Systems the doctoral student is awarded the title Degree of Licentiate of Science.

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A request of a title of degree other than the stipulated may be submitted in accordance with laid down guidelines.

## **5. Programme structure and implementation**

### 5.1 Programme scope and structure

The doctoral (third-cycle) programme includes two blocs; courses and thesis work. The programme comprises four years (two years for the licentiate degree). In case the doctoral student has a doctoral studentship and carries out departmental duties to a certain extent (no more than 20% of the whole programme), a corresponding prolonged period may be approved.

### 5.2 Individual study plan and supervision

An individual study plan outlining the implementation of the studies is drawn up for each doctoral student. The plan is established in consultation with the supervisor and is decided by the Head of Department by delegation of the Vice-Chancellor. The plan is reviewed and revised at least once a year.

The Head of Department shall appoint at least two supervisors, one of whom is appointed principal supervisor, for each doctoral student. The person appointed principal supervisor shall have at least qualifications required for appointment as a docent and be employed by the University. A principal supervisor who no longer meets the job requirements may continue as supervisor until the doctoral student completes his or her studies, by an individual agreement with the relevant department. The doctoral student is entitled to supervision during the studies, unless the Vice-Chancellor has decided otherwise in accordance with the Higher Education Ordinance (2010:1064) Chapter 6 Section 30. A doctoral student who so requests may have another supervisor (Higher Education Ordinance (2010:1064) Chapter 6 Section 28). The request does not need a justification.

### 5.3 Courses

The individual study plan shall specify the courses to be included in the doctoral student's education. The goal attainment is examined according to the examination procedure specified in the course syllabus. Credits may be transferred in accordance with the local guidelines in the Admissions procedure for doctoral (third-cycle) studies.

Knowledge of equal opportunities must be ensured in the doctoral (third-cycle) studies, and may be acquired within the range of generic courses offered or in other ways. The same applies to knowledge of acceptable academic conduct.

### 5.4 Thesis

The thesis in Electronic systems shall take the form of a compilation comprising a number of scientific articles which the doctoral student has written alone or jointly with another person. The articles are interrelated by an introductory summary chapter (a compilation thesis). The scientific articles or must be of such quality that they meet reasonable requirements for publication in a peer-reviewed scientific forum.

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In the thesis work, the student shall, with the guidance of the supervisor, independently formulate and solve a qualified research assignment. The student shall further independently discuss and present results at e.g. internal seminars, national and international seminars and / or conferences, as well as to the surrounding community. The research task can be part of a larger project with several parties where there are requirements for collaboration and sometimes it may be relevant with certain project management tasks, e.g. management of work packages or activities.

The introductory summary chapter shall include a separate section describing the doctoral student's contribution to the articles.

The doctoral thesis shall be defended at a public dissertation. The grades for the thesis are either 'pass' or 'fail'. When grading the thesis, the content and the defence of thesis shall be taken into account. The grade of a doctoral thesis is decided by the dissertation examination committee.

A doctoral student wanting to be awarded a Degree of Licentiate shall, after consultation with his or her supervisor, request approval from the responsible Head of Department. The doctoral student defends his or her licentiate thesis at a licentiate seminar after which the thesis is graded 'pass' or 'fail'. When grading the thesis, the content and the defence of the thesis is taken into account. An examiner, appointed by the Head of Department, grades the licentiate thesis.

## **6. Entry into effect and interim regulations**

The previous general syllabus will cease to apply for third-cycle students who are admitted to studies at third-cycle level after 2022-01-13.

If agreed between the third-cycle student and the supervisors, the new general syllabus LTU 4630-2021 may be used as a steering document for a previously admitted third-cycle student.

It must be documented in the third-cycle student's individual study plan which general syllabus that applies.

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