

## Master of Science in Wireless Communication

Study programme valid from: 2007/08  
Study programme approved: 2007-08-15

In addition to the study programme for the Master of Science in Wireless Communication, the general regulations for and information from the Faculty of Engineering at Lund University also apply.

### 1 Aims and Objectives

#### 1.1 Aims

The aim of this Master of Science course is to provide knowledge, skills and values in wireless communication. The course is designed with foreign students in mind. The increasing importance of telecommunication as a field of technology has been accompanied by considerable and significant recent developments in wireless communication. Systems have become more complex and people working in this field must keep abreast of the latest developments. There is a current and continuing need for qualified people who can deal with both systems and applications.

The master's programme in wireless communication aims to meet the needs of qualified engineers who

- can apply wireless communication technology to the development of new wireless systems,
- can profit by and contribute to research in this field and
- can apply systems thinking in which theory and practice constitute a whole.

The programme has profited from the research into wireless communication carried out at the Faculty of Engineering and by the proximity of a research intensive telecommunications industry in the region.

#### 1.2 Objectives for the Master of Science in Wireless Communication

(The general objectives are stated in the Higher Education Ordinance 1993:100. The following is concretisation of these objectives) (*Translation based on the official English translation of the Higher Education Ordinance*)

##### Objectives

##### Knowledge and understanding

To satisfy the requirement of the Degree of Master of Science in Wireless Communication the student must:

- demonstrate advanced knowledge of the scientific foundations of the sub-fields included in the field of wireless communication,
- be able to analyse an entire system as well as the sub-systems in wireless communication,
- understand how different sub-systems are used and how they integrate with each other, and
- demonstrate an understanding of the nature of research and development in wireless communication.

##### Skills and Abilities

To satisfy the requirement of the Degree of Master of Science in Wireless Communication the student must:

- demonstrate an ability to identify, formulate and treat complex issues in the field of wireless communication from an holistic perspective and in an independent and creative manner,
- be able to analyse and evaluate critically different technical solutions in wireless communication,
- demonstrate an ability to participate in research and development projects in the field of wireless communication,
- demonstrate an ability to acquire new knowledge in a critical and systematic manner in the field of wireless communication and to be able to integrate this with previous knowledge,
- demonstrate an ability to design, simulate and evaluate systems or parts of systems for wireless communication,

- demonstrate an ability to plan and execute advanced assignments involving wireless communication in an independent manner,
- demonstrate an ability to develop and design wireless systems and their constituent parts with regard to human needs and abilities, and the goals of society for sustainable development, and
- demonstrate an ability, in an international context, both orally and in writing, to present clearly knowledge acquired and various types of project, including details of background materials, experiments and findings, to specialist and non-specialist audiences.

##### Judgement and Approach

To satisfy the requirement of the Degree of Master of Science in Wireless Communication the student must:

- demonstrate an ability to make judgements with regard to relevant scientific, social and ethical aspects in the field of wireless communication,
- demonstrate an ability for team work and cooperation with variously constituted groups, and
- demonstrate an ability to identify his/her need of further knowledge in the field and continuously deepen and widen his/her knowledge and skills in the field of wireless communication

### 2 The Scope and Levels of the Programme

#### 2.1 The Scope of the Programme

The programme of study for a Master of Science in Wireless Communication is a 2-year postgraduate programme comprising 120 higher education credits.

#### 2.2 Levels

The courses included in the programme have been divided into levels of difficulty. The level is stated in the syllabus for each course. The levels used are Level 1 and Level 2. These levels are defined in the Higher Education Act Chapter 1 §§ 8-9. In the Faculty of Engineering, the courses at Level 1 are further divided into Level 1a and level 1b, in-depth studies. The Level 1b, in-depth studies denotes a progression in difficulty from Level 1a.

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The courses at Level 2 can constitute specialist studies in a master's degree.

## 3 The Structure of the Programme

The programme includes an obligatory foundation block, comprising 64.5 higher education credits, which gives an orientation in modern wireless communication systems. The foundation courses begin with basic courses in digital communication and radio, and then continue with systems-oriented courses in wireless communication (wireless systems, advanced telecommunications, methods of digital transmission, a project in wireless communication) and specialised courses in a number of sub-fields (advanced course in digital communication, channel modelling for wireless communication, antenna engineering). In this way a sufficient depth and requisite breadth are achieved which enable an understanding of how the various sub-systems integrate with each other. The programme includes optional courses of at least 25.5 higher education credits which enable the student to specialise in areas of particular interest. The students may also be permitted to join courses on the doctoral programme that are suited to the master's programme and to choose other courses at Lund University which are not included in the master's programme to a value of 7.5 higher education credits. The programme is completed with a degree project of 30 higher education credits and the obligatory courses comprise 87.5 higher education credits at Level 2.

### 3.1 Courses Offered in the Master of Science in Wireless Communication

The courses included in the first year are detailed in the curriculum and schedule.

### 3.2 Degree Project

To satisfy the requirements of a Master of Science in Wireless Communication, the student must have completed an independent study (degree project) of at least 30 credits which has been examined at the Faculty of Engineering, Lund University. The degree project must be completed in accordance with the approved syllabus for the programme in civil engineering with the exception of the number of credits required

for eligibility. The student may commence work on the degree project when he/she has completed at least 50 higher education credits that can be included in his/her degree.

The degree project is to be in a relevant field of study.

## 4 Grading

Grades are given for the full courses and for interim tests. The interim tests for each course are specified in the relevant syllabi. For each full course one of two scales is used, either Fail, 3, 4, 5 or Fail/Pass. In cases where alternative systems of grading are used for interim courses this is stated in the syllabus. The transcript of the degree certificate only includes full courses which the student has passed (G, 3,4,5). Grades in the Swedish educational system are goal-oriented, i.e. the student's achievements are measured in relation to the goals of the programme of study and bear no relation to any ranking of a particular group of students.

## 5 Degree

### 5.1 Degree Requirements

To be awarded a Master's Degree in Wireless Communication the student shall have successfully completed 120 higher education credits in the courses specified of which the degree project shall constitute 30 higher education credits. At least 90 higher education credits, which also include the degree project, are to be studied at the Faculty of Engineering, Lund University. The number of credits at Level 2 shall be at least 75 higher education credits and include the degree project.

### 5.2 Degree Certificate and Title

When the requirements of the degree programme have been satisfied, the student has the right, on application, to be given a degree certificate for the Degree of Master of Science (two years) in Wireless Communication.

## 6 Specific Admission Requirements

### 6.1 Eligibility

To be eligible for admission to the Master of Science in Wireless Communication requires a first degree of at least 180 higher education credits specialising in electronics, computer science, information technology, or the equivalent. The applicant ought to have basic knowledge and understanding of probability theory, signal processing, telecommunications, circuit theory and electromagnetic fields equivalent to at least 6 months full-time study.

Students are required to have a good knowledge of English. Applicants with an upper secondary education from the Nordic countries are assumed to satisfy the basic requirements of a knowledge of English. Other applicants are expected to satisfy the following requirements: TOEFL at level 550 (213 for computer-based TOEFL and 80 for on-line TOEFL) or more, IELTS 6.0, or the Cambridge Certificate of Proficiency. Exemption can be made for students with English as their mother tongue or have completed a higher education course in English that satisfies eligibility requirements.

### 6.2 Selection Criteria

The applicant is accepted, in the first instance, on the basis of his/her grades or equivalent. The content of the eligibility qualification is used together with the grades. Equal opportunities apply and candidates of the minority gender are given preference when other merits are equal.

## 7 Accreditation

Students have the right, on request and following examination, to have previous studies accredited. Decisions regarding accreditation are taken by the Faculty Board. In deciding on accreditation an assessment is made on whether previous studies can be considered to be equivalent to a specific course in the programme or whether previous studies are consistent with the goals of the programme. The decision taken will decide whether the course replaced is included in the degree certificate or whether the course that is accredited is included. The decision by the board will state which course is to be included in the degree

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certificate. At least 90 higher education credits, which also include the degree project, are to be studied at the Faculty of Engineering, Lund University. Courses that are cited as satisfying the admission requirements for the programme cannot be accredited.