



## Master Programme in Electronics/Telecommunications 120 cr

*Masterprogram i elektronik med inriktning mot telekommunikationsteknik 120 hp*

Set by NT-board

### Version

Set at	Valid from
9/21/06	ST07
1/16/14	ST14

<b>Education level</b>	Second cycle
<b>Programme code</b>	TAEMA
<b>Credits</b>	120 cr
<b>Diary number</b>	2006-09-21

### Programmespecific objectives

The education is based on scientific lines and proceeds from the students active responsibility for studies. Great emphasis is put on an active search for knowledge and a personal development. On completion of studies the student shall have a high academic competence and be prepared for continued research studies. After the education the student shall have good knowledge and skills to develop, construct, realise and implement systems in microwave technology, signal processing and antenna theory.

Moreover students of the Master's degree programme in Electronics shall on completion of the education understand and be able to put into practice advanced technical solutions that require

- very good ability in microwave technology
- very good ability in digital communication
- very good ability in antenna theory
- very good ability in the measurement technology in the area of radio frequency
- good ability in cell phone systems

As well as specific factual knowledge the student shall have

- experience of work in projects, with problem analysis, the formulation of problems, problem solving and evaluation
- experience in working in international groups as the education recruits students from different parts of the world.

### Target

A Degree of Master of Arts/Science (120 credits) is awarded after the student has completed the courses required to gain 120 credits with a defined specialisation determined by each higher education institution itself, of which at least 60 credits are for specialised study in the

principal field (main field of study) of the study programme. In addition the prior award of a Degree of Bachelor's degree, Degree of Bachelor's degree in fine arts, professional or vocational qualification of at least 180 credits or a corresponding qualification from abroad is required.

The requirement of the prior award of a qualification may be waived for a student admitted to the programme without the basic entry requirement in the form of a qualification. This does not, however, apply if a waiver was granted during admission pursuant to the second paragraph of Section 28 of the Chapter 7 of the Higher Education Ordinance (1993:100) on the grounds that the qualification had not yet been issued.

**Knowledge and understanding**

For a Degree of Master of Arts/Science (120 credits) the student shall

demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and demonstrate specialised methodological knowledge in the main field of study.

**Skills and abilities**

For a Degree of Master of Arts/Science (120 credits) the student shall

demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work

demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and

demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

**Judgement and attitudes**

For a Degree of Master of Arts/Science (120 credits) the student shall

demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work

demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and

demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

**Content and structure**

The main area for the education is electronics with the emphasis on telecommunication technology. The first courses in the programme shall give the student knowledge of measuring techniques in the area of radio frequency and basic knowledge of physical laws and phenomena in the area of microwave technology. Cell phone systems are studied early in the programme. The remainder of the education is specialisation within the area for microwave technology and signal processing.

The programme concludes with a thesis. In the thesis the student shall show that they can independently carry out a larger project where they can both show proof of their ability to integrate knowledge from the subject area and to choose relevant methods for solving complex problems. In general this means that the thesis applies, broadens and deepens knowledge from earlier studies. Students shall show through their thesis that the objectives for a master's education as given in the Higher Education Act and the particular aims given in this education plan have been achieved.

**Other degree**

Independent project (degree project)

A requirement for the award of a Degree of Master of Arts/Science (120 credits) is completion by the student of an independent project (degree project) for at least 30 credits in the main field of study. The degree project may comprise less than 30 credits, however no less than 15 credits, if the student has already completed an independent project in the second

cycle for at least 15 credits in the main field of study or the equivalent from a programme of study outside Sweden.

**Degree title** Master of Arts/Science (120 Credits)

**Prerequisites** A completed Bachelor's degree, corresponding to a Swedish Bachelor's degree (180 ECTS), or equivalent academic qualifications from an internationally recognised university.

Electronics as Major (90 ects) or equivalent and at least 30 ects mathematics (including Linear algebra and multivariable analysis )as well as a course in signal processing.

English language proficiency equivalent to (the Swedish upper secondary school) English course B/6.

**Other** For students admitted to a later part of the programme and for students who have had an interruption of studies a special syllabus is created as needed by the person responsible for the programme in consultation with the study advisor

The acceptance of previous studies made bee done on the condition that the progression of the education is maintained, the person responsible for the programme and the subject representative decide if acceptance can be given.

### Year 1

Period	Identifier	Title	Level	Credits	Field
1:1	FY008C	<i>Electromagnetic Fields and Waves</i>	G2F	7.5 cr	Physics
1:1	EEG503	<i>RF Measurement Technology</i>	G2F	7.5 cr	Electronics
1:2	EEA001	<i>Wireless Sensor Networks</i>	A1N	7.5 cr	Electronics
1:2	EEA000	<i>Elements of Microwave Engineering</i>	A1F	7.5 cr	Electronics
1:3	MA008C	<i>Stochastic Processes</i>	G1F	7.5 cr	Mathematics
1:3	EEA302	<i>Passive Microwave Devices</i>	A1F	7.5 cr	Electronics
1:4	EE444D	<i>Statistical Signal Processing</i>	A1F	7.5 cr	Electronics
1:4	EE422D	<i>Solid-State Electronics</i>	A1F	7.5 cr	Electronics

### Year 2

Period	Identifier	Title	Level	Credits	Field
2:1	EEA306	<i>Active Microwave Devices</i>	A1F	7.5 cr	Electronics
2:1	EE443D	<i>Modulation and Coding</i>	A1F	7.5 cr	Electronics
2:2	EEA307	<i>Advanced Projects in Electronics</i>	A1F	7.5 cr	Electronics
2:2	EE430D	<i>Radio Systems</i>	A1F	7.5 cr	Electronics
2:3	EE470D	<i>Master's Thesis in Electronics</i>	A2E	30 cr	Electronics