



UNIVERSITY OF I GÄVLE

STUDY PLAN

ADVANCED LEVEL

**MASTER´S PROGRAMME IN ELECTRONICS /
TELECOMMUNICATIONS**

Programme code: TAEMA

Confirmed by the NT-board 2006-09-21

Revised by the NT-board 2007-09-25

**Study Plan
Master´s Programme in Electronics /
Telecommunications, 120 ECTS**

**This study plan applies to students registered autumn term 2007 or
later**

**MASTER'S PROGRAMME IN ELECTRONICS /
TELECOMMUNICATIONS**
University of Gävle

1 General organisation

The programme is made up of 120 university credits and leads to a master's degree in electronics with focus on telecommunications. The education builds on studies equivalent to a bachelor's in electronics or similar. The separate courses contain courses from the subject areas microwave technology, radio measurement technology, signal processing and antenna theory. The education concludes with an independent degree thesis.

2 Objectives

2.1 Objectives for higher education at advanced level according to the Higher Education Act, chap 1, § 9 and the degree description according to the Higher Education Ordinance appendix 2

2.1.1 Objectives for higher education at advanced level according to the Higher Education Act, chap 1, § 9

Education at advanced level will essentially build on the proficiency which students gained within the education at basic level or equivalent attainment. Education at advanced level shall involve a deepening of knowledge, skills and abilities in relation to the education at basic level and shall, in addition to that which applies for the education at basic level,

- further develop the students ability to independently integrate and use knowledge,
- develop the students ability to manage complex facts, problems and situations, and
- develop the students qualifications for a working life which places great demand on independence or for research and development work.

2.1.2 Degree description according to the Higher Education Ordinance, appendix 2

Master's Degree

Extent

The masters degree is obtained after the student has completed the course requirements of 120 university credits with particular focus decided on by the individual college, with a minimum of 60 credits for specialisation within the main area of study. A further demand is a completed bachelor's degree; artistic bachelor's degree, professional degree of a minimum 180 university credits or equivalent foreign degree.

Exception from the demand of a previous degree can be given for a student who has been accepted for the programme without having a basic qualification in the form of a degree. This however does not apply if on acceptance an exception has been made according to chap 7 § 28 second paragraph because the degree certificate has not yet been issued.

Objectives

Achievement and understanding

To gain a masters degree the student shall

- show achievement and understanding within the main area of study, including both a broad knowledge of the area as well as considerable specialised attainment within certain sections of the subject along with an in-depth insight of current research and development work, and
- show advanced knowledge of method within the main area of study

Skill and ability

To gain a masters degree the student shall

- show the ability to critically and systematically integrate knowledge and to analyse, form an opinion of and manage complex facts, problems and situations even with limited information,
- show the ability to critically, independently and creatively identify and formulate problems as well as plan and with adequate methods carry out qualified tasks within a given time and in that way contribute to the development of knowledge and to evaluate this work
- show the ability to in both a national and international context report clearly both orally and in writing and discuss their conclusions and the knowledge and arguments which form the basis for these in dialogue with different groups, and
- show the skills needed to take part in research and development work or to be able to work in another qualified activity

Assessment ability and attitude

To gain a masters degree the student shall

- show the ability to make judgements within the main area of study with consideration to relevant scientific, social and ethical aspects as well as show awareness of ethical aspects in research and development work,
- show insight into the possibilities and limitations of science, its role in society and mankind's responsibility for how it is used, and
- show the ability to identify their need of further knowledge and to take responsibility for their own development of knowledge

Independent work (thesis)

To gain a masters degree the student shall within the framework of the course requirements have completed an independent work (degree thesis) of a minimum of 30 university credits within the main area of study. The independent work may consist of less than 30 credits, though at least 15 credits, if the student has already completed an independent work at advanced level of a minimum of 15 credits within the main area of the education or equivalent from a foreign education.

Other

For a masters degree with a particular direction the prescribed demands which each individual college has determined within the frame for the standards in this description shall also apply.

2.2 Particular objectives for the programme

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.

3 Description of the programme

3.1 Main area

3.1.1 Electronics with emphasis on telecommunication technology

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.

3.1.2 Degree thesis

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.

3.2 Tuition and examination

3.2.1 Tuition

The teaching in the programme is given mainly in the form of traditional lectures and exercises as well as laboratory work, project work and tasks to be handed in. Much emphasis is given on developing the students laboratory ability.

3.2.2 Examination

The types of examination in the course's programme are formed and adapted to the learning result that shall be achieved. This means that there will be several types. Much emphasis is put on showing ability in laboratory work

3.3 Internationalisation

The master's education is today wholly international. All teaching is given in English and students are recruited internationally.

The programme has at present exchanges with educational establishments in Portugal (Aviero), Spain alencia and Gandia), Lebanon (Beirut), China (Guiyang), Peru (Arequipa), Germany (Dresden), Belgium (Brussels) and Turkey (Mersin).

The possibility is given to study chosen courses and carry out thesis work abroad.

4 Courses within the programme

The master's programme is given as studies at full time over two years and is made up of 120 university credits. The programme is planned so that the courses included are read two at a time part time, except for the thesis work which is read full time. Students are themselves responsible for applying for courses the following term. Students always have priority to the courses within the programme. Changes to the order of courses can be made in discussion with those students taking part in the programme. Changes to the courses included in the programme are decided by the faculty board. Changes to the period when the course is given is decided at institution level. An alternative choice of course can be made in consultation with the person responsible for the course with the condition that the objectives for the programme are fulfilled.

A = Advanced level

B = Basic level

Year 1

	Course namn	Credits	Level	Main area
1:1	RF Measurement Technology	7,5	A	Electronics
1:1	Fields and Waves	7,5	B	Physics
1:2	Microwave Engineering I	10,5	A	Electronics
1:2	Cellular Radio Systems	4,5	B	Electronics
1:3	Stochastic Processes	7,5	B	Mathematics
1:3	Antenna Engineering	7,5	A	Electronics
1:4	Solid State Electronics	7,5	A	Electronics
1:4	Statistical Signal Processing	7,5	A	Electronics

Year 2

Period	Course name	Credits	Level	Main area
2:1	Modulation and Coding	7,5	A	Electronics
2:1	Microwave Engineering II	7,5	A	Electronics
2:2	Radio Systems	7,5	A	Electronics
2:2	GST - Course	7,5	A	Electronics
2:3-4	Master Thesis	30	A	Electronics

5 Qualification

Those qualified to be accepted for the Master's Programme in Electronics / Telecommunications are those who have a bachelor's degree within electronics or equivalent.

Relevant courses within electronics should be included in the degree (individual assessment is made), with at least 30 university credits mathematics as well as a course in signal processing.

Linear algebra and multivariable analysis should have been studied as part of mathematics.

6 Grades

Grades are set in the programmes included in the course according to the respective syllabus.

7 Degree regulations

7.1 Degree title

Master of Science with a major in Electronics with focus on telecommunications, 120 credits.

7.2 Degree criteria

To receive a master's degree it is necessary that the student, on top of the basic education of at least 180 university credits, has completed the course requirements of a minimum of 120 credits. Of these 105 credits are for specialisation in courses at advanced level within electronics. In all the student will therefore have completed courses of at least 300 university credits, of which at least 195 credits are in the main subject of electronics.

7.3 Degree Certificate

Students who fulfil the requirements for a degree shall on request receive a degree certificate. Every degree certificate will be accompanied by a degree supplement which describes the education and its position in the education system (Higher Education Ordinance chap 6 §15). The supplement is called the Diploma Supplement. The Diploma Supplement will make acknowledgement easier and count as a Swedish degree on employment and for continued studies in Sweden or abroad.

8 Other regulations

Transition stipulations

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.