



## HÖGSKOLAN I GÄVLE

### Master Programme in Electronics/Automation (online) 60cr

*Magisterprogram i elektronik med inriktning mot automationsteknik (online) 60hp*

Set by -

#### Version

Set at	Valid from
10/26/16	ST17
10/3/17	HT17
5/14/18	HT18
8/23/19	HT20

<b>Education level</b>	Second cycle
<b>Programme code</b>	TAAUA
<b>Credits</b>	60cr
<b>Diary number</b>	HIG-UTB 2016/166

#### 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.

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 sensors and measurement technology
- very good ability in multivariable and non-linear systems
- very good ability in robotics
- very good ability in computerized image processing and machine vision

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 (60 credits) is awarded after the student has completed the courses required to gain 60 credits with a defined specialisation determined by each higher education

institution itself, of which at least 30 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, a Degree of Bachelor of Fine Arts, a professional or vocational qualification of at least 180 credits or a corresponding qualification from abroad is required.

**Knowledge and understanding**

For a Degree of Master (60 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both an overview of the field and 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 (60 credits) the student shall

- demonstrate the ability to 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 autonomously as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames,
- demonstrate the ability in speech and writing 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 employment in some other qualified capacity.

**Judgement and attitudes**

For a Degree of Master (60 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**

Major subject Electronics

The major subject of the education is Electronics. However, the educational program is specialized towards the part of the major subject which is related to automation technology. All subject courses contained by the program are on the advanced level in the major subject. One of the subject courses is also classified as Computer Science.

Main disposition of the program

The educational program is of 60 credits (ECTS) and leads to a Master's degree in Electronics. The education is performed as distance education, a so called online education. The pace of study is halftime speed but can be decided individually after discussion with the program director. All instruction, communication, and examination are done in English in order to expand the availability of the education to be global. The education is performed with automation technology as a cohesive theme, and is considered to fulfil a need from relevant industry. The education is requiring subject-specific knowledge from the major subject in order to ensure the academic height of the course contents as well as to ensure the progression within the program. The required knowledge may have been achieved in the Bachelor's education or in similar basic academic education in Electrical Engineering.

The progression within the educational program is given by the course sequence at the end of this document, and for each individual course there are prerequisites. The education is finished through a thesis assignment at advanced level in the major subject. This assignment should be connected to the program specialization of automation technology.

**Other degree**

A requirement for the award of a Degree of Master (60 credits) is completion by the student of an independent project (degree project) for at least 15 credits in the main field of study.

**Degree title**

Master of Science (60 Credits)

**Prerequisites**

A completed Bachelor's degree, corresponding to a Swedish Bachelor's degree (180 cr), or

equivalent academic qualifications from an internationally recognised university.

- Electronics as Major 90 cr
- at least 30 cr mathematics including linear algebra, multivariable analysis and stochastic processes
- courses Algorithms and datastructures 7.5 cr, Applied Mechanics II 7.5 cr, Signal Processing 7.5 cr, and Control Theory 7.5 cr or corresponding.

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

### Year 1

Period	Identifier	Title	Level	Credits	Field
1:1	EEA005	<i>Statistical Signal Processing</i>	A1N	7.5cr	Electronics
1:2	EEA004	<i>Multivariable and Nonlinear Control Systems</i>	A1N	7.5cr	Electronics
1:3	EEA308	<i>Computerized Image Processing and Machine Vision</i>	A1F	7.5cr	Electronics, Computer Science
1:4	EEA003	<i>Robotics</i>	A1N	7.5cr	Electronics

### Year 2

Period	Identifier	Title	Level	Credits	Field
2:1	EEA002	<i>Sensors and Measurement Technology</i>	A1N	7.5cr	Electronics
2:2	EEA312	<i>Advanced Digital Control Systems</i>	A1F	7.5cr	Electronics
2:3	EEA702	<i>Master's Thesis in Electronics, Online</i>	A1E	15cr	Electronics