

**Programme Syllabus:**

**Master by Research in Electronics, 120 credits**

**General data**

<b>Code</b>	TMELA
<b>Cycle</b>	Second cycle
<b>Ref no</b>	MIUN 2009/97
<b>Credits</b>	120
<b>Answerable department</b>	Electronics Design
<b>Answerable faculty</b>	Faculty of Science, Technology and Media
<b>Established</b>	2019-11-11
<b>Date of change</b>	2022-01-25
<b>Version valid from</b>	2020-07-01

**Aim**

The objective of the Master by Research programme in Electronics is to provide an increased knowledge within the selected specialization preparing you for an academic career or within the electronics industry. During the education you are working with scientists with a specified research question and studying selected courses required to work in the specified field in one of largest research environments at Mid Sweden University.

**Programme objectives**

OUTCOMES ACCORDING TO THE HIGHER EDUCATION ORDINANCE FOR A MASTER OF ARTS/SCIENCE (120 CREDITS)

Knowledge and understanding

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

- demonstrated 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

- demonstrated specialised methodological knowledge in the main field of study.

#### Competence and skills

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

- demonstrated the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrated 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
- demonstrated 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
- demonstrated the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

#### Judgement and approach

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

- demonstrated 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
- demonstrated insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrated the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

#### OUTCOMES FOR MASTER BY RESEARCH IN ELECTRONICS

When having completed the programme the student should:

- based on a given problem in radiation detectors, solid-state technology, industrial measurement technology, wireless sensor networks, or machine vision be able to choose an appropriate technology and procedure
- be able to analyze a technological problem and based on the analysis plan and document knowledge procurement and the realization of the project
- have developed the ability to understand and evaluate the possibilities and limitations of different technologies
- independently be able to plan, realize and communicate results of a work of considerable extent.

## **Content**

Optional courses BA/MA, 30 credits

Electronics MA:

Scientific Writing and Presentation Techniques, 7.5 credits

Problem formulation and Thesis Planning, 7.5 credits

Development of Theory and Experiment, 15 credits

Scientific Project I, 15 credits

Scientific Project II, 15 credits

Thesis, 30 credits

## **Entry requirements**

English course 6/English course B from Swedish Upper Secondary School (Gymnasium) or the equivalent.

Bachelor of Science, Bachelor of Science in Engineering or equivalent (at least 180 credits/180 ECTS) in Electronics Engineering/Electronics, Computer Engineering or Physics, with at least 22.5 credits (22.5 ECTS) in Mathematics and 22.5 credits (22.5 ECTS) in Electronics Engineering.

Eligibility for available research project is assessed on the basis of the applicant's bachelor's degree project/thesis, a letter of motivation, and, where appropriate, through other documented experience relevant to the subject.

## **Description of programme**

The degree programme runs full-time for two years and is carried out for the most part in the form of research work in a research group. As a student you are part of a research team at the research center STC (Sensible Things that Communicate) that develops sensor-based systems and services in electronics and computer science. You are participating with scientists in a research project and will work both independently and in collaboration with others. The programme consists of advanced courses and project work and leads to an individual dissertation last semester - a master's thesis. After the education, you will be able to understand and assess the various technologies and their possibilities and limitations. Projects can range from areas such as detectors, readout electronics, signal processing, optics, power electronics, energy harvesting from the environment etc.

## **Selection rules and procedures**

Alternative selection, see heading "Other information".

## **Programme with restricted admissions**

Special prerequisites for courses are given in the respective course specifications.

## **Teaching and examination**

Teaching is full-time in the form of research work in a research group.

The language of instruction is English.

The teaching and examination procedures are stated in the syllabus of each course.

## **Title of qualification**

Degree of Master of Arts/Science (120 credits)

Masterexamen med huvudområdet elektronik, translated into Master of Science (120 credits) with a major in Electronics.

## **Other information**

During the programme course names, contents, credit units and schedules may change.

### CRITERIA FOR ALTERNATIVE SELECTION

- The applicant's qualifications in relation to the chosen subject
- Statement of purpose
- Scientific quality of Bachelor's thesis, or other documented scientific work relevant to the planned field of research
- The applicant's analytical ability and English writing skills