Programme Syllabus:

Master's Programme in Embedded Sensor Systems, 120 credits

General data

Code	TELBA
Cycle	Second cycle
Ref no	2016/123
Credits	120
Answerable department	Electronics Design
Answerable faculty	Faculty of Science, Technology and Media
Established	2017-07-18
Date of change	2020-07-15
Version valid from	2016-07-01

Aim

The objective of this programme is to provide deep knowledge in embedded sensor systems. The programme provides knowledge, methods, and tools for modeling and design of sensors and sensor systems. A theoretical base is given that covers a wide field within electronics system, from sensor technologies to the design of embedded systems. The different areas are integrated in order to give a good understanding of the different technologies, possibilities and limitations. The student's knowledge and understanding is strengthened by independent problem solving for specific technological problems.

Programme objectives

LEARNING OBJECTIVES ACCORDING TO THE HIGHER EDUCATION ORDINANCE

Knowledge and Understanding
For a 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.

Competence and Skills
For a 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 Approach
For a 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.

LEARNING OBJECTIVES FOR MASTER'S PROGRAMME IN EMBEDDED SENSOR SYSTEMS

Upon completion of the education, the student should be able to:

Knowledge and Understanding:
- demonstrate understanding of the components, architecture and functionality of embedded sensor systems and their constraints.
- show deeper knowledge in at least one of the areas of embedded sensor systems.

Judgement and Approach:
- show ability to reflect on the influence of embedded sensor systems on social, environmental and ethical aspects.
- show ability to reflect on the technological development and its impact on embedded sensor systems and their applications.

Competence and Skills:
- demonstrate ability to design and implement an embedded sensor system based on specific application requirements.
- analyse an embedded sensor system with respect to the potentials and limitations of its technology and implementation.
- ability to adapt to technology development by incorporating new knowledge.

Content

The programme consists of 120 Credits (120 ECTS) in the following courses:

Electrical Engineering BA (BC):
Metrology, 7.5 Credits
Introduction to Embedded Sensor Systems, 6 Credits
Project in Embedded Sensor Systems, 9 Credits
Embedded System Prototyping, 6 Credits

Electronics MA:
Sensors and Instrumentation, 7.5 Credits
Embedded Computing, 9 Credits
Physical Modelling of Embedded Systems, 7.5 Credits
Sensor Networks, 7.5 Credits
Energy Management in Embedded Systems, 7.5 Credits
Signal Processing and Analysis, 7.5 Credits
Scientific Writing and Research Methods, 6 Credits
Specialization Project, 9 Credits
Master's Thesis, 30 Credits

Entry requirements

Degree of Bachelor, Degree of Bachelor of Science in Engineering (at least 180 Credits), or equivalent, in Electrical Engineering/Electronics, Computer Engineering, Physics or Mathematics, with at least 22.5 Credits (22.5 ECTS) in Mathematics/Applied Mathematics and at least 15 Credits (15 ECTS) in Electronics Engineering.

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

Description of programme

The educational programme is a full-time programme for two years, including a half year master thesis project.

Selection rules and procedures

The selection process is in accordance with the Higher Education Ordinance and the local order of admission.

Programme with restricted admissions

Prerequisites for courses are given in their respective syllabus.

Teaching and examination

The study programme is given as a full-time programme and the teaching is given as lectures, supervision/exercises, laborations, projects, and seminars. All courses are given at campus. Parts of the studies are project-oriented. The students are trained to solve problems in a systematic way of increasing level of difficulty. There are written and oral exams. The gradings are given in the syllabi. The language of instruction is English.

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 Degree of Master of Science (120 credits) with a major in Electronics or Teknologie masterexamen med huvudområdet elektronik, also translated into Degree of Master of Science (120 credits) with a major in Electronics, if the student has former studies of at least 30 credits in the subject of Mathematics.

Other information

The education is given at Mid Sweden University, Campus Sundsvall. During the time of the studies the course names, contents, credit units, and schedules may change.