



Qualification descriptor for Degree of Master of Science in Engineering, Physics and Electrical Engineering

Civilingenjörsexamen, teknisk fysik och elektroteknik

Degree regulations of 2007
Second cycle

Specialisations

Name	Start term	For admitted until
Physical Measurements and Sensor Systems (<i>Fysikaliska mätmetoder och sensorsystem</i>)	A14	
Electronic Systems and Control Engineering (<i>Elektroniksystem och reglerteknik</i>)	A14	
Computational Methods and Physics (<i>Beräkningsteknik och fysik</i>)	A14	
Sound Design within Arena Media, Music and Technology (<i>Ljuddesign inom Arena media, musik och teknik</i>)		S14
Computational Methods and Physics - For admitted until S13 (<i>Beräkningsteknik och fysik - för antagna t o m V13</i>)	A07	S13
Sensors and Signals (<i>Sensorer och signaler</i>)	A07	S13
Electronic Systems (<i>Elektroniksystem</i>)	A07	S13

Established

Qualification descriptor approved on 2011-06-20 by Ordförande TFN. Qualification descriptor updated on 2014-06-24 by Rektor.

Examination Objectives

Higher Education Act

English information is not available

Higher Education Ordinance

Annex 2

For a Master of Science in Engineering the student shall have demonstrated the knowledge and skills required to work autonomously as a graduate engineer.

Knowledge and understanding

For a Master of Science in Engineering the student shall have:

- * demonstrated knowledge of the disciplinary foundation of and best practice in his or her chosen field of technology as well as insight into current research and development work, and
- * demonstrated both broad knowledge of his or her chosen field of technology, including knowledge of mathematics and the natural sciences, as well as a considerable degree of specialised knowledge in certain areas of the field.

Competence and skills

For a Master of Science in Engineering the student shall have:

- * demonstrated the ability to identify, formulate and deal with complex issues autonomously and critically and with a holistic approach and also to participate in research and development work and so contribute to the formation of knowledge
- * demonstrated the ability to create, analyse and critically evaluate various technological solutions
- * demonstrated the ability to plan and use appropriate methods to undertake advanced tasks within

predetermined parameters

* demonstrated the ability to integrate knowledge critically and systematically as well as the ability to model, simulate, predict and evaluate sequences of events even with limited information

* demonstrated the ability to develop and design products, processes and systems while taking into account the circumstances and needs of individuals and the targets for economically, socially and ecologically sustainable development set by the community

* demonstrated the capacity for teamwork and collaboration with various constellations, and

* demonstrated the ability to present his or her conclusions and the knowledge and arguments on which they are based in speech and writing to different audiences in both national and international contexts.

Judgement and approach

For a Master of Science in Engineering the student shall have:

* demonstrated the ability to make assessments informed by relevant disciplinary, social and ethical aspects as well as awareness of ethical aspects of research and development work

* demonstrated insight into the possibilities and limitations of technology, its role in society and the responsibility of the individual for how it is used, including both social and economic aspects and also environmental and occupational health and safety considerations, and

* demonstrated the ability to identify the need for further knowledge and undertake ongoing development of his or her skills.

Detailed objectives for this degree

For a Master of Science in Engineering Physics and Electrical Engineering degree at Luleå University of Technology, the student shall be able to:

- demonstrate knowledge of physics, math, and electrical engineering applications and methods, and have the ability to model, simulate, measure and control physical phenomena.
- demonstrate ability, both in writing and orally, to present engineering problems, models and results to specialists and laymen
- demonstrate good ability to apply and combine computers, program and measurement equipment, knowledge and skills from different subject / knowledge areas in order thereby to be able to solve engineering problems.
- have a good basis for research and development work in physics, math, electronics, and mechanics.

Specialisations

Physical Measurements and Sensor Systems

Upon graduation from Physical Measurements and Sensor Systems the student shall:

- show advanced knowledge of physical measurement techniques, signal processing and statistical data analysis,
- show good ability to develop measurement methods and sensor systems.

Electronic Systems and Control Engineering

Upon graduation from Electronic Systems and Control Engineering the student shall:

- show advanced knowledge about the design of analog and digital electronics, control engineering and electronics production,
- show good ability to develop electronic systems for measurement and control purposes.

Computational Methods and Physics

Upon graduation from Computational Methods and Physics the student shall:

- show advanced knowledge of scientific computing, physical modelling and model-based analysis,
- show good ability to model, simulate and analyse physical systems.

Sound Design within Arena Media, Music and Technology

Upon graduation, the student will be able to

- demonstrate knowledge about and ability to formulate product sound design problems,
- demonstrate fundamental knowledge in design methodology applied to product sound,
- be familiar with the interaction between arts, industry and academic research,
- integrate engineering physics and electrical engineering with one or several other subjects.

Computational Methods and Physics - For admitted until S13

On completion of the education with specialization in computational methods and physics the student should have acquired considerably advanced knowledge of mathematics, physics, and scientific computing.

Sensors and Signals

On completion of the education with specialisation in sensors and signals the student should have acquired considerably advanced knowledge of signal processing, measurement techniques, and statistics.

Electronic Systems

On completion of the education with specialisation in electronic systems the student should have acquired considerably advanced knowledge of electronics design, embedded systems and control theory.

Credits

The programme requires 300 credits.

The credits stated indicate the total for all courses leading to the degree. All courses are to have been completed and passed.

Special requirements

Higher Education Ordinance and Luleå University of Technology

Independent project (degree project)

A requirement for the award of a Master of Science in Engineering is completion by the student of an independent project (degree project) for at least 30 credits. (The Higher Education Ordinance, Annex 2 Qualifications ordinance)

For the Master of Science in Engineering degree equivalent to 300 credits, it is a requirement that a minimum of 90 credits shall consist of courses at second cycle level. (Riktlinjer för Bolognaanpassning (Guidelines for Bologna adaptation), LTU Dnr 783-06)

Detailed specific requirements for this degree

In order to obtain a degree in Engineering Physics and Electrical Engineering it is required that:

- all mandatory courses are completed
- the Master's thesis work is completed
- mandatory courses within a specialization are complete, when applicable

The following specializations are offered until H08:

- Electronic systems
- Sensors and signals
- Computational methods and Physics

All course requirements for this degree are stated in the official syllabus.

Degree certificate

A degree certificate will be issued upon application to students who fulfil the requirements for a degree.

Course requirements for this degree

Syllabus - [Arena, Media, Music and Technology](#) (Utbildningsplan - Arena media, musik och teknik)

Syllabus - [Master Programme in Engineering Physics and Electrical Engineering](#) (Utbildningsplan - Civiilingenjör Teknisk fysik och elektroteknik)