

Programme Description

Master in Electric Engineering

TAMEL – Spring 25

Decision taken by	Department board
Document contact	Boel Ekergard, Head of Programme
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Programme description is a supplement to the programme syllabus which is the legally binding document.

Basic data

Department	Institutionen för Ingenjörsvetenskap
Division	Avdelningen för industriell ekonomi, elektro och maskinteknik
Name of Programme, Swedish	Magister i elektroteknik
Name of Programme, English	Master in Electrical Engineering
HE credits (number of credits)	60
Level (1st Cycle, 2nd Cycle)	2nd Cycle
Entry requirements, Swedish	Kandidatexamen med huvudområdet elektroteknik eller motsvarande, alternativt en motsvarande högskoleingenjörsexamen inom elektroteknik. I utbildningen på grundnivå skall minst 3 hp programmering samt 15 hp matematik ingå. Engelska 6 eller motsvarande.
Entry requirements, English	Degree of Bachelor of Science in Electrical Engineering or equivalent. Additionally, the Bachelor of Science degree must be comprised of a minimum of 3 HE credits in programming and 15 HE credits in mathematics. English course 6 in the Swedish upper secondary school or equivalent.
Main field of study, Swedish	Elektroteknik
Main field of study, English	Electrical Engineering
Degree, Swedish	Teknologie magisterexamen med huvudområdet elektroteknik
Degree, English	Degree of Master of Science (60 credits) with a major in Electrical Engineering
Rate of study (full-time, part-time)	Full-time
Type of instruction (on campus, distance teaching)	Campus
Language of instruction (Sw, Eng)	English

General programme information

Master in electrical engineering, 60 credits, is a campus-based education program given at University West, Trollhättan. The program has been developed together with relevant industry and through program-specific courses, students are offered in-depth knowledge in the electrical power grid and the electrical drivelines within electrical engineering. Through industry-related exercises, guest lectures, laboratories and study visits, the industry is present throughout the study period.

Programme contents, structure, and progression

Master in electrical engineering, 60 credits, is a one-year program which includes two dedicated paths:

- Electrical vehicle
- Electric Power Systems

The courses for the respective path are presented in Table 1.

Master in electrical engineering P0000350		
	Electrical vehicle	Electric power systems
Lp 1	Modeling of electrical machines, 5 hp MEM500	
	Power electronics and drivesystems, 5 hp ELD500	
	Electrical design of propulsion batteries, 2.5 hp EDF500	
	Safety when working on and in electric vehicles, 2.5 hp, SAE500	Introduction to power system simulations, 2.5 hp K0004925
Lp 2	Sustainability regarding materials and production of electric vehicles, 7.5 hp HDP600	Electric Power System, 7.5 hp K0004872
	Control systems for electrical vehicles, 5 hp, SFE600	Electricity production and energy storage, 7.5 hp K0004913
	Electrical solutions of auxiliary systems in vehicles, 2.5 hp ELS600	
Lp 3	Analysis and Design of Electromagnetic Compatibility, 2.5 hp, AEK600	Power system Automation and control, 5 hp K0004914
	Electrical vehicles, 7.5 hp, k0004535	Economy and electricity market, 5 hp K0004915
	Thesis, 5 hp K0004653	Regulations, network codes and grid requirements, 5 hp K0004916
Lp 4	Thesis K0004653 20 hp (15 hp), k0004924 15 hp	

The specific path gives you a unique in-depth knowledge, which the industry today has an urgent need for.

As a completed student from the Master in Electrical Engineering, 60 credits, you will receive the degree:

- Technology master degree in electrical engineering

The research basis for the programme

The research areas within electrical engineering at University West is:

- Electrical Drivelines
 - Battery systems
 - Power electronics
 - Control systems
 - Additional energy storage
 - Electrical motors
- Electrical Power systems
 - Flexible Loads
 - Voltage stability
 - Transient stability

The material in Master in Electrical Engineering is developed by the researchers within the area at University West. This gives the students a direct link to the research group and the industry contacts they have. Further, it also ensures that the material within each course is highly up to date and relevant to face the challenges within the area.

The labour market, collaboration, and work-integrated learning¹

Collaborative companies and actors in the industry are included in the design and execution of the program.

According to forecasts, Europe will lead the transition to an electrified vehicle fleet. In Europe there is a large automotive industry, which, like Sweden, will have a great need for new engineers with in-depth knowledge in electrical engineering. Education that matches this need will thus be sought after by students not only in Sweden but also in and outside Europe.

Following the electrification of the vehicle fleet and the industry as well as the increase of electric power production, there is a large need for engineers designing and operating the electrical grid in Sweden as well as in other countries. Today there is a lack of electrical engineers in the electric power industry, and the need for

¹ Work-integrated learning is a pedagogical practice in which students' learning takes place through the integration of theoretical and practical knowledge and experience, derived from an educational context within the framework of both higher education as a work environment and civil society.

knowledge will increase with the changes in the grid. Therefore, the knowledge in this education is very valuable for the industry.

Through company visits, labs both on campus and in companies and with lecturers from industry, work-integrated learning is woven into the education in a very natural way.

Sustainable development

The program provides the knowledge in electrical engineering that companies demand and today have an acute shortage of. Sustainable development is, in this area, very clear as electrification dramatically reduces the use of fossil fuels and the emissions they entail and resource consumption, as an electric powertrain has up to 4 times the efficiency of a powertrain based on fossil fuel. Furthermore, the program's clear and natural sustainability focus also leads to an increasing interest in technology for female students and female employees - we therefore believe that the program will lead to increased search pressure from female students and, in the next step, recruitment of female staff.

As all technical solutions must be economical, the Master in Electrical Engineering includes work related to economic sustainability.

Internationalisation

The program strives to be able to offer students a Mobility Window, where students who want to study abroad have the opportunity to do so. The studies can take place at an international university with which University West currently collaborates, or can be chosen freely according to the students' wishes.

University West also has an established collaboration with offering international summer courses at various international universities.